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DIVISION OF BOTANY AND PLANT PATHOLOGY

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TWENTY-FOURTH ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1944

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FOREWORD

The Twenty-Fourth Annual Report of the Canadian Plant Disease Survey is very similar in scope and arrangement to previous reports, particularly to those which immediately preceded it. The nomenclature of the cereal smut fungi is in accordance with that set forth by J.A. Stevenson and A.G. Johnson (Pl. Dis. Reporter 28(20):663-670. 1944).

With the publication of this Report, the Plant Disease Survey has covered 25 successive seasons. Except for 1924, a report has been issued annually and, since 1930, they have appeared within the next twelve months. The observations for 1924 are included in the five year summary, 1920-1924, prepared by F.L. Drayton (Dom. Dept. Agr. Bull. 71 n.s. 1926).

Special reports are included in the present Report as follows: "Survey of Rust Nursery Material for Plant Diseases in 1944" by T. Johnson, "Physiologic Races of Cereal Rusts in Canada in 1944" by Margaret Newton, T. Johnson, B. Peturson and W.J. Cherewick, "Flax Diseases in Saskatchewan in 1944" by T.C. Vanterpool, "Soybean Diseases in Southwestern Ontario in 1944" by L.W. Koch and A.A. Hildebrand, "Diseases of Sugar Beets in Southwestern Ontario in 1944" by A.A. Hildebrand, and a report on tobacco diseases by L.W. Koch.

Our thanks are due to all who have contributed to the Survey. Contributors outside of the Division of Botany, who may be mentioned are: Dr. J. Emile Jacques, Prof. J.E. Howitt, Dr. J.D. MacLachlan, Mr. Edouard Lavallée, and Mr. Lucien J.S. Laporte, and all the District Potato Inspectors. Dr. R.O. Lachance has again translated "New and Noteworthy Diseases" for the benefit of our French readers. Dr. A.D. Baker, who has contributed notes on parasitic plant nematodes in several previous Reports, has brought together previous records along with his recent observations in a report which will be issued in a special supplement to the Canadian Insect Pest Review. Any readers, who may be interested in receiving a copy of this supplement should address their requests to the Division of Entomology, Dom. Dept. of Agriculture, Confederation Bldg., Ottawa, Ont.

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New or Noteworthy Diseases

Stem rust (Puccinia graminis) is no longer of economic importance on wheat in the Prairie Provinces. J.H. Craigie (Sci. Agr. 25:51-64. 1944) has estimated recently that the growing of rust resistant wheat varieties in Man. and Sask. "has increased, respectively, the average annual wheat production and farm income in the 'rust area' of Western Canada by 41,339,000 bushels and $27,242,000." Stem rust of wheat was of little importance elsewhere in Canada. Stem rust of oats, thanks to the newer rust resistant varieties, is becoming less important in Man. and elsewhere. Physiologic races which are capable of attacking these varieties were less prevalent in 1944 than in 1943. A new variety, Beaver, which combines resistance to stem rust and crown rust, has proven in experimental trials superior to the parental varieties, Vanguard and Erban, in yield and quality.

Common root rot (Helminthosporium sativum and Fusarium spp.) was destructive throughout the Prairie Provinces. It was slightly more prevalent in Alta., slightly less so in Sask. and much more severe in Man. in 1944 than in the previous year. The phase known as pre-maturity blight was unusually prevalent. Common root rot usually attacks individual plants more or less severely. In southern Sask., however, common root rot was found affecting the plants uniformly in large areas of the field. Take all was recorded for the first time in Ont., when it was found in several fields of winter wheat in the Guelph and Waterloo districts. Browning root rot (Pythium spp.) was about as prevalent as usual. The disease is usually confined to wheat, because summer-fallowed fields are rarely sown to any other cereal crops. Oats and barley are, however, equally susceptible under the same conditions, as the occurrence of a diseased field of oats on fallowed land in 1944 testifies.

False loose smut or black smut (Ustilago nigra) was found to occur quite commonly in the Prairie Provinces as the result of a survey conducted in these Provinces. U. nigra was present in 14% of the collections of loose smut in Alta., 35% in Sask., and 44% in Man. In Que., 25% of the collections were U. nigra.

A strain or species of Septoria, similar to S. nodorum but with longer spores, is reported by T. Johnson from Man., on wheat and barley. Infection was largely confined to the leaves and was followed by the development of a Leptosphaeria stage late in the season. J.E. Machacek (Phytopathology 35:51-53. 1945) has indicated that both this species and S. nodorum occur on the seed, the former more particularly in Western Canada. Grey speck (manganese deficiency) was proven to occur in Man.; previously the disease was known for certainty from only Que. and Ont. A survey of rust nursery material for plant diseases was again carried out; the results published in tabular form give valuable data on the distribution of several diseases. The results of the survey of the physiologic races of cereal rusts in Canada are included for the first time. The rarer varieties of stem rust, which occur on grasses, are recorded. It may be noted that

Bacterial wilt (Corynebacterium insidiosum) continues to spread in alfalfa in Alta.; it has now become established outside the irrigated districts, but it has not yet appeared in the important seed-producing district of Cherhill-Sangudo-Westlock. Crown rot (low temperature basidiomycete), on the other hand, was less widespread and caused less damage in Alta. than in 1943 and true winter-killing was not observed. Cercospora leaf spot (C. zebrina) was observed for the first time in Alta. Stagonospora leaf spot (S. recedens) on red clover was found in Alta. and Man.

Diseases of flax continue to be important. Rust (Melampsora Lini) was less destructive than in recent years. The gradual decline of flax rust is largely due to the displacement of the very susceptible Bison variety by the rust resistant Royal. Stem break and browning (Polyspora Lini) was prevalent early in the season in Sask. as a result of sowing infected seed. However, dry weather during mid season prevented its spread but later rains resulted in the seed becoming heavily infected. Die-back, the cause of which has not been ascertained, was found to be common in the central, west central and southern districts of Sask. It may occur in other provinces. Pasmo (Septoria linicola) was observed in Man. but not in Sask. What was believed to be the perfect stage, Sphaerella linicola, was found on fibre flax affected by pasmo from Portage la Prairie, Man. Alternaria linicola, recently described by Groves and Skolko, is at present only known from the seeds of flax.

Diseases of soy beans were of little importance in southwestern Ont. in 1944. However, bud blight (virus) and charcoal rot (Macrophomina Phaseoli) were recognized for the first time. Diseases of sugar beets were also of little importance. Black root (various fungi) resulted in the loss of some hundreds of acres; Cercospora leaf spot (C. beticola) was virtually absent. In sunflowers, a case of boron deficiency was observed in N.B.

Only a few of the more important or interesting observations on vegetables are recorded here. The black leaf spot of crucifers, which has been attributed to Alternaria circinans, is actually caused by A. oleracea Milbrath according to Groves and Skolko. On the other hand, the grey leaf spot is still ascribed to A. Brassicae (Berk.) Sacc. Besides these two fungi, a third species, Alternaria Raphani Groves and Skolko has been found on the seeds and seed pods of radish; it is probably an important pathogen. The same authors have found on carrot and parsley seed Alternaria radicina, the cause of black rot of carrots, and on carrot seed A. Dauci (Kühn) Groves & Skolko, the leaf blight fungus, long known as Macrosporium Carotae. Although A. radicina appears to produce no pronounced field symptoms, black rot is apparently controlled when treated seed is used to produce the crop and the roots are stored in a house free from infection. Yellows (Callistephus virus 1) occurred in epidemic proportions in carrots across Canada, including one severe outbreak in Ont., from which province it had not previously been recorded. Purple top (virus) was similarly much more prevalent in potatoes than in any previous year. Onion was a new host for Aster yellows; it was fairly prevalent in the Winnipeg area, Man., in 1944, and about Grand Forks, B.C., in 1943. Yellows in celery, known only from a few scattered reports from Alta., was reported this year from Alta. and Sask. Yellows was also reported on buckwheat, kok-saghyz, lettuce, parsnip, pumpkin, squash, Calendula, Callistephus, Centaurea, Clarkia, Coreopsis, Cosmos, Dahlia, Dimorphotheca, Eschscholtzia, Gaillardia, Nigella, Petunia, Phlox, Schizanthus, Tagetes and Zinnia.

Truscott (Can. J. Research 290-304. 1944) has given an account of the storage crown rot of celery, the occurrence of which in Ont. was reported last year. The correct name for the pathogen according to H.N. Hansen and C.M. Tompkins (Phytopathology 35:218-220. 1945) is Ansatospora acerina (Hartig.) n. comb. An undescribed Alternaria sp. of the Brassicae type is recorded on the leaves of celtuce in Man. and from lettuce seed in B.C. The septoria leaf spot already known on lettuce and found on celtuce in Man. is properly attributed to Septoria Lactucae Pk. There are indications that a new strain of Cladosporium fulvum, to which the tomato variety V121 is susceptible, has been encountered in Ontario.

Bacterial ring rot (Corynebacterium sepedonicum) of potato is one of the most important diseases affecting table stock in Canada. The only measure of control that can be recommended is the complete eradication of the disease as it occurs on individual farms. After the disease has become established its elimination can only be accomplished through regulations enacted and effectively enforced by each Province. Up to the present special legislation against ring rot has been passed by B.C., Alta., Man., Ont. and P.E.I. The disease has not become established in B.C., N.S. and P.E.I., although the latter province may not be entirely free from it. In all the other provinces bacterial ring rot is present in varying amounts. An annual survey for ring rot has been carried out in Alta. each year since 1939. Although the disease is still spreading, the rate of spread and the severity of the disease have declined. The exact situation in Sask. is unknown, but in the absence of an extensive survey the disease is probably more prevalent than has been reported. Bacterial ring rot is well established in Man., a light infection having been observed in about 25% of the lots examined in the field or on the market. As a result of a thorough and widespread survey there was a marked increase in the number of fields found infected in Ont. Nevertheless, the eradication campaign on farms where the disease was found in 1943 gave encouraging results. No provincial survey has been undertaken in Que. or N.B., or at least the findings of such a survey have not been disclosed. There is evidence of considerable infection in Que.; in N.B. it is believed some improvement has taken place on account of the present unusually favourable prices being paid for potatoes.

Late blight (Phytophthora infestans) was epidemic in Man. for the fourth consecutive year and a slight infection occurred about Edmonton, Alta. The disease was also prevalent through Northern Ont. Late blight was unusually severe along the lower St. Lawrence and the Gaspé Peninsula. It also caused considerable tuber rot as a result of unusually favourable conditions for infection about digging time in N.B. and P.E.I.

There was a marked drop in the amount of leaf roll and mosaic in the certified crop. This improvement may be due to the greater initial freedom of the seed from virus diseases as fields entered for certification must now be planted with foundation or foundation A seed. On the other hand, the aphid population was at a low ebb in 1943.

Fire blight (Erwinia amylovora) was of importance in few commercial apple orchards in Ont. and Que. The disease, however, was again severe in many of the restricted plantings in Alta., Sask., and Man. It also caused severe damage in several pear orchards and was recorded once on quince. Scab (Venturia inaequalis) caused little damage to the fruit in well sprayed orchards in all the leading commercial apple districts.

Vertililium wilt (V. Dahliae) was observed for the first time in the Okanagan Valley, B.C., on apricot, cherry and peach.

The occurrence of the Dutch elm disease (Ceratostomella Ulmi) in Canada was established late in 1944 when Dr. R. Pomerleau received specimens from St. Ours, near Sorel, Que. Before the close of the season 28 diseased trees were located in an area about 40 miles long near Lake St. Peter, about 50 miles below Montreal.

Needle blight (Rehmiellopsis bohemica) was found on balsam fir in Cape Breton Island, N.S.; this European disease was previously known from Me., Mass., and N.Y., but not from Canada.

New records among the diseases of ornamentals were: downy mildew (Peronospora Hesperidis) on rocket at Ottawa, Ont.; club root (Plasmodiophora Brassicae) on candy tuft in P.E.I.; crown and root rot (Sclerotium Delphinii) on larkspur and nearby pansy at Montreal, Que.; stem blight (Collectotrichum vermicularioides) on Linaria purpurea in Ont.; smut (Entyloma fuscum) on Papaver Rhoeas and P. orientale and bacterial blight (Xanthomonas papavericola) on P. Rhoeas near Ottawa; leaf spot (Ramularia Tanaceti) on tansy at Winnipeg; and leaf spot (Ramularia Veronicae) on Veronica Teucrium at Ottawa.

MALADIES NOUVELLES OU D'IMPORTANCE NOTABLE

R.O. Lachance

La rouille de la tige (Puccinia graminis) du blé n'a plus d'importance dans les provinces des Prairies. J.H. Craigie (Sci. Agr. 25: 51-64, 1944), dans un article récent, estime que la culture des variétés de blé résistantes à la rouille au Manitoba et en Saskatchewan a augmenté la production annuelle du blé de 41,339,000 boisseaux et les revenus des fermes de $27,242,000.00 dollars dans les régions de l'Ouest canadien propices à la rouille. La rouille de la tige du blé n'a que peu d'importance dans les autres parties du Canada. La rouille de la tige de l'avoine, grâce aux nouvelles variétés résistantes, devient de moins en moins importante au Manitoba et ailleurs. Les races physiologiques capables d'attaquer ces variétés résistantes étaient moins communes en 1944 qu'en 1943. Une variété nouvelle, la Beaver, qui est résistante à la fois à la rouille de la tige et à la rouille couronnée, s'est avérée supérieure à ses parents la Vanguard et l'Erban quant au rendement et à la qualité.

La pourriture commune des racines (Helminthosporium sativum et Fusarium spp.) fut destructive dans toutes les provinces des Prairies; si l'on compare les années 1943 et 1944 l'Alberta a plus souffert de cette maladie en 1944, le Manitoba encore davantage tandis qu'en Saskatchewan les dommages étaient moindres

en 1944. La phase de la maladie qui se manifeste sous forme de brûlure juste avant la maturité était répandue de façon inusitée. La pourriture commune des racines attaque généralement des plants isolés plus ou moins gravement. Dans le sud de la Saskatchewan, cependant, on a observé que cette maladie attaquait uniformément tous les plants sur des étendues considérables des champs. Le piétin fut observé pour la première fois en Ontario dans plusieurs champs de blé d'automne des districts de Guelph et de Waterloo. La pourriture pythienne des racines (Pythium spp.) fut à peu près aussi grave que d'habitude. Cette maladie est généralement restreinte au blé parce que les champs en jachère sont rarement ensemencés avec d'autres céréales. L'avoine et l'orge sont toutefois aussi susceptibles que le blé lorsqu'ils sont dans les mêmes conditions, comme en témoigne un champ d'avoine, atteint de cette maladie en 1944, dans un sol où l'on avait fait une jachère.

Le faux charbon nu ou charbon noir (Ustilago nigra) était assez généralement répandu dans les provinces des prairies, comme l'indique le résultat de l'enquête poursuivie dans ces provinces; 14% des échantillons récoltés appartenaient à l'espèce U. nigra en Alberta, 35% en Saskatchewan et 44% au Manitoba. Dans Québec, 25% des échantillons appartenaient à la même espèce.

Une lignée de Septoria nodorum ou une espèce similaire possédant des spores plus longues a été notée par T. Johnson au Manitoba sur le blé et l'orge. L'infection fut en grande partie limitée aux feuilles et le stage de Leptosphaeria se développa subséquemment, tard dans la saison. J.E. Mackacek (Phytopathology, 35: 51-53, 1945) a noté que cette espèce aussi bien que Septoria nodorum se rencontrent sur les graines et que la première est la plus commune des deux dans l'Ouest canadien. On a la preuve que la tache grise de l'avoine (carence de manganèse) se rencontre au Manitoba; auparavant cette maladie n'avait été observée avec certitude que dans les provinces de Québec et d'Ontario. Une enquête sur le matériel des stations d'observation sur les rouilles fut faite cette année encore; les résultats publiés sous forme de tableau donnent des indications précieuses sur la distribution de plusieurs maladies. Les résultats de l'enquête sur les races physiologiques des rouilles des céréales au Canada sont insérés dans ce rapport pour la première fois. Les variétés rares de rouille de la tige que l'on rencontre sur diverses graminées sont catalogués. On peut observer qu'au Manitoba Puccinia graminis var. Secalis se rencontre plus fréquemment sur l'orge qu'avant l'introduction des variétés de blé résistantes à la rouille.

La flétrissure bactérienne (Corynebacterium insidiosum) continue de se propager dans la luzerne en Alberta; elle est actuellement établie en dehors des districts irrigués, mais on ne l'a pas encore observée dans l'important district de production de semence de Cherhill-Sangudo-Westlock. D'autre part la pourriture de la couronne (Basidiomycete de basse température) fut moins répandue et a causé moins de dommages en Alberta qu'en 1943, et la gelée n'a pas été observée. La tache cercosporéenne des feuilles (Cercospora zebrina) a été observée pour la première fois en Alberta. La tache stagnosporéenne (S. recedens) du trèfle rouge fut observée en Alberta et au Manitoba.

Les maladies du lin n'ont pas cessé d'être importantes. La rouille (Melampsora Lini) fut moins destructive que durant les dernières années; cette diminution graduelle de la rouille est en grande partie le résultat de la mise au rancart de la variété Bison très susceptible à la rouille et de son remplacement par la Royale, qui est résistante. L'oxychromose polysporéenne (Polyspora Lini) fut assez répandue cette année en Saskatchewan comme conséquence de l'ensemencement de graines malades. Toutefois, la température plutôt sèche de la mi-saison a empêché sa dissémination; mais les pluies tardives ont eu pour résultat une infection grave de la graine. Le dépérissement terminal dont on n'a pu déterminer la cause certaine fut assez commun dans les régions du centre, de l'ouest central et du sud de la Saskatchewan. Il est possible qu'on le rencontre dans les autres provinces. Le pasmo (Septoria linicola) fut observé au Manitoba mais non en Saskatchewan. On a trouvé sur du lin à filasse atteint de pasmo et provenant de Portage la Prairie, Man., ce que l'on croit être le stage parfait, Sphaerella linicola. Alternaria linicola décrit récemment par Groves et Skolko n'a été observé jusqu'à date que sur les graines.

Les maladies de la fève soya n'eurent que peu d'importance dans le sud-ouest de l'Ontario en 1944. Toutefois, on a identifié pour la première fois la brûlure des bourgeons (virus) et la pourriture charbonneuse (Macrophomina Phaseoli). Les maladies de la betterave sucrière n'eurent également que peu d'importance. La racine noire (divers champignons) est responsable de la perte de quelques centaines d'acres; la tache cercosporéenne des feuilles (C. beticola) était pratiquement absente. On a observé un cas de carence de bore du tournesol au Nouveau-Brunswick.

Quelques-unes seulement des observations les plus importantes et les plus intéressantes sur les maladies des légumes sont mentionnées ici: la tache alternarienne noire généralement attribuée à Alternaria circinans est en fait causée par A. oleracea Milbrath d'après Groves et Skolko. D'autre part, on considère encore Alternaria Brassicae (Berk.) Sacc. comme la cause de la tache alternarienne grise. En plus de ces deux espèces une troisième espèce, Alternaria Raphani Groves et Skolko, a été observée sur les graines et les gousses du radis, et c'est probablement un pathogène important. Les mêmes auteurs ont trouvé sur les graines de carotte et de persil Alternaria radicina qui cause la pourriture alternarienne des carottes, et sur la graine de carotte A. Dauci (Kühn) Groves et Skolko, agent causal de la brûlure alternarienne, longtemps connu sous le nom de Macrosporium Carotae. Alternaria radicina ne cause pas de symptômes très marqués dans le champ et la pourriture alternarienne est apparemment tenue en échec lorsqu'on utilise de la graine traitée et lorsque les racines sont placées dans un endroit non contaminé. La jaunisse (Callistephus virus 1) est apparue à l'état épidémique dans les carottes à travers tout le Canada; un cas grave fut signalé à un endroit en Ontario, province dans laquelle elle n'avait pas encore été observée. La tige pourpre (virus) fut également plus répandue dans les pommes de terre que les années dernières. L'oignon fut un hôte nouveau pour le virus de la jaunisse de l'aster, on l'observa en assez grande abondance dans la région de Winnipeg en 1944 et aux alentours de Grand Forks en Columbie-Britannique en 1943. La jaunisse, qu'on ne connaissait dans le céleri que par le signalement de quelques cas isolés en Alberta, a été observée cette année en Alberta et en Saskatchewan. On a également signalé la jaunisse sur le sarrasin, le kok-saghyz, la laitue, le panais, la citrouille, le potiron, Calendula, Callistephus, Centaurea, Clarkia, Coreopsis, Cosmos, Dahlia, Dimorphotheca, Eschscholtzia, Gaillardia, Nigella, Petunia, Phlox, Schizanthus, Tagetes et Zinnia.

Truscott (Can. J. Research 290-304, 1944) a donné un aperçu de la pourriture de la couronne du céleri dont on avait signalé la présence en Ontario l'année dernière. Le nom du pathogène responsable d'après H.N. Hansen et C.M. Tompkins (Phytopathology 35: 218-220, 1945) est Ansatospora acerina (Hartig) n. comb. Une espèce non décrite d'Alternaria appartenant au type Brassicae a été observée sur les feuilles du celtuce au Manitoba et sur la graine de laitue en Colombie Britannique. La tache septorienne des feuilles déjà connue sur la laitue et observée sur le celtuce au Manitoba est à juste titre attribuée à Septoria Lactucae Pk. Il y a des indications à l'effet qu'il existe en Ontario une nouvelle lignée de Cladosporium fulvum à laquelle la variété de tomate V121 est susceptible.

La flétrissure bactérienne (Corynebacterium sepedonicum) est une des plus importantes maladies des pommes de terre de consommation au Canada. L'unique moyen de lutte recommandable est l'élimination totale de la maladie à mesure qu'elle apparaît sur les fermes. Une fois la maladie établie, son élimination ne peut s'effectuer que par l'intervention de lois promulguées et effectivement mises en application par chaque province. Jusqu'à date une loi spécifique contre la flétrissure bactérienne a été passée par les provinces de la Colombie-Britannique, de l'Alberta, du Manitoba, de l'Ontario et de l'Ile-du-Prince-Edouard. Cette maladie n'est pas encore établie en Colombie-Britannique, dans la Nouvelle-Ecosse, ni dans l'Ile-du-Prince-Edouard, bien que cette dernière province n'en soit peut-être pas entièrement exempte. Dans toutes les autres provinces, la flétrissure bactérienne existe à des degrés divers. A tous les ans depuis 1939, en Alberta, on a poursuivi une enquête systématique sur la présence de la flétrissure. Bien que la maladie continue de se répandre, la rapidité de la dissémination et la gravité de la maladie ont diminué. On ne connait pas la situation exacte en Saskatchewan, faute d'une enquête complète mais il est probable que la maladie est plus répandue qu'on ne l'indique dans les rapports. La flétrissure bactérienne est définitivement établie au Manitoba; on a trouvé une infection légère dans 25% des lots examinés soit dans les champs soit sur les marchés. Comme résultat d'une enquête sérieuse et systématique on a enrégistré en Ontario une augmentation sensible du nombre de champs infestés. Toutefois la campagne d'éradication sur les fermes qui étaient infestées en 1943 a donné des résultats encourageants. Les provinces de Québec et du Nouveau-Brunswick n'ont pas encore entrepris d'enquête à ce sujet, ou, du moins, les résultats de telles enquêtes n'ont pas encore été mis à jour. Dans le Québec, il est évident que l'infection est très répandue; au Nouveau-Brunswick il appert qu'il y a eu quelque amélioration en raison des prix exceptionnellement bons qu'on paie pour les pommes de terre.

La brûlure tardive ou mildiou (Phytophthora infestans) a pris une allure épidémique pour la quatrième année consécutive au Manitoba et une légère infection s'est produite aux alentours d'Edmonton en Alberta. Cette maladie fut également grave dans le nord de l'Ontario, mais elle le fut plus particulièrement le long du Bas-Saint-Laurent et de la péninsule de Gaspé. La pourriture des tubercules fut très générale au Nouveau-Brunswick et dans l'Ile-du-Prince-Edouard à cause des conditions très favorables à l'infection à l'époque de la récolte.

Il y eut une diminution marquée de l'enroulement des feuilles et de la mosaique dans les pommes de terre certifiées. Cette amélioration est peut-être due à l'emploi d'une semence de meilleure qualité, moins contaminée de virus, vu que les champs éligibles à la certification doivent être ensemencés avec de la semence fondation ou fondation A. D'autre part, la densité de population des pucerons était très basse en 1943.

La brûlure bactérienne des pommiers (Erwinia amylovora) eut quelque importance dans quelques vergers commerciaux de l'Ontario et du Québec. Toutefois, cette maladie fut de nouveau grave dans plusieurs petits vergers en Alberta, en Saskatchewan et au Manitoba. Elle causa également de graves dégâts dans plusieurs vergers de poiriers et on l'a observée une fois sur le cognassier. La tavelure (Venturia inaequalis) n'a causé que très peu de dommages aux fruits dans les vergers bien arrosés dans tous les principaux districts de vergers commerciaux.

La flétrissure verticillienne (V. Dahliae) fut observée pour la première fois dans la vallée d'Okanagan, C.B. sur l'abricotier, le cerisier et le pêcher.

La présence au Canada de la maladie hollandaise de l'orme (Ceratostomella Ulmi) est devenue un fait indéniable à l'automne 1944, lorsque le Dr. R. Pomerleau reçut des spécimens de Saint-Ours près de Sorel, Qué. Avant l'arrivée de l'hiver, 28 arbres malades furent localisés sur une distance d'environ 40 milles, le long du lac Saint-Pierre, à environ 50 milles de Montréal.

La brûlure des aiguilles du sapin beaumier (Rehmiellopsis bohemica) fut observée sur l'Ile-du-Cap-Breton, N.E.; cette maladie européenne était connue dans les Etats du Massachusetts et de New York, mais non au Canada.

Parmi les maladies des plantes ornementales on a observé pour la première fois les suivantes: le mildiou (Peronospora Hesperidis) sur la julienne des dames, à Ottawa, Ont.; la hernie (Plasmodiophora Brassicae) sur l'iberis, dans l'Ile-du-Prince-Edouard; la pourriture de la couronne et des racines (Sclerotium Delphinii) sur le pied d'allouette et des pensées avoisinantes à Montréal, Qué; la brûlure des tiges (Colletotrichum vermicularioides) sur Linaria purpurea, en Ont.; le charbon (Entyloma fuscum) sur Papaver Rhoeas et P. orientale, et la brûlure bactérienne (Xanthomonas papavericola) sur P. Rhoeas, près d'Ottawa; la tache des feuilles (Ramularia Tanaceti) sur la tanaisie, à Winnipeg; et la tache des feuilles (Ramularia Veronicae) sur Veronica Teucrium à Ottawa.

The Weather and Its Influence on Plant Diseases

The main features of the weather during 1944 in coastal B.C. were the absence of snow during a mild winter, a cool and relatively dry spring, a relatively dry summer, and a dry sunny fall.

Due to the rather dry cold spring, tulip fire was held in check. Probably due to the same cause late blight of potatoes appeared later than usual, and it did not become a serious factor in most localities owing to the dry summer weather. In late spring and early summer, downy mildew developed epidemically on garden beets grown for seed in a few fields in the Fraser Valley, the temperatures at the time being apparently at the optimum for conidial development. The disease was checked during the summer.

The fall weather was very satisfactory on the coast, and no adverse effects were noticed in the seed crops as a result of disease prevalence. In central B.C., however, the rains interfered with the harvesting of clover seed crops (W. Jones).

In Alta. the winter was unusually mild and there was little or no winter killing of winter wheat and legumes. Crown rot of alfalfa also caused much less damage than usual. Seeding started early under dry conditions, but precipitation was heavy throughout the summer in the central and north-central sections. Extensive flood damage occurred in the area north-west of Edmonton. The crops were generally heavy and late-maturing, and there was considerable lodging. Under these conditions, certain foliage diseases were unusually prevalent and severe. Rust infection, however, did not appear until mid-August and made little progress under the prevailing cool conditions. Stem rust was notably more common on oats than on wheat or barley. Common root rot developed extensively in cereals but did not cause severe damage in most areas. The weather was apparently too dry during late August and September for the spread of late blight of potatoes and no tuber rot was found. Bacterial wilt of alfalfa was favoured by abundant moisture for the third consecutive year and continued to spread in the area east of Edmonton and other parts of central Alta. In southern Alta. and the Peace River district drought conditions prevailed throughout the season. Crop yields were low and foliage and stem infection was relatively slight. (M.W. Cormack).

Soil conditions in Sask. at seeding time were fair, with enough moisture for germination, except in the southwestern and western districts. Germination was good except in the dry areas of the southwest. Rainfall varied from light showers to heavy rains in the latter part of May. Some flood damage occurred southwest of Regina. Growth was good during June except in the area along the Alta. boundary which remained dry all season. Temperatures were favourable with no extreme heat; this, along with generally favourable moisture conditions, provided fast growth. Fair recovery was made from browning root rot infection, which was widespread in the heavy clay areas. The moist conditions during early summer favoured development of leaf spots, particularly halo blight of oats. The spread of these and development of rust was checked by continued dry weather during July. More smut appeared than in 1943. This was a direct result of the cool moist conditions at seeding time. Showers were frequent in the north-eastern area during the summer. As a result, stem and leaf spots flourished.

Among these were speckled leaf blotch of wheat (Septoria nodorum) and black stem of alfalfa (Ascochyta imperfecta) (H.W. Mead).

April and early May were much drier than normal throughout Man. and seeding operations were completed earlier than usual. Average weekly temperatures suring April and May, except for the first week in April, which was 4° below normal, and the first week in May, which was 6° below normal, were from 4° to 9° above normal. Although rainfall was deficient during the early part of the season there was sufficient soil moisture from the previous year to carry the crop during that period and, owing to the favourable temperature conditions, crops in general were in excellent condition and about a week earlier than normal at the end of May. During the last week in May, when crops were just beginning to suffer from lack of moisture, copious rainfall occurred and from then on until harvest precipitation was well in excess of normal, particularly during the month of June when, in many localities, precipitation for that month exceeded the normal by over 100%. For the whole season of April 1 to August 31, precipitation except in one or two districts where rainfall was normal, exceeded the normal by from 10 to 65% or more. Although crops were well advanced at the beginning of June the excessive soil moisture and the slightly subnormal temperatures that prevailed during most of the remainder of the season somewhat retarded development, and cereals ripened a few days later than usual. Cereal rusts, except leaf rust of wheat and crown rust of oats in some late crops, did not develop in sufficient intensity to cause much damage although weather conditions were favourable to their development from early June onwards. The failure of these rusts to become really heavy may, no doubt, be ascribed to the abnormally late arrival of spores and to the paucity of inoculum when it did arrive. The excessive moisture favoured the development of late blight of potatoes and it caused much damage in the field during the summer and in storage bins after harvest. Tomatoes were also affected with this disease but much less than potatoes. The pathogens that responded most favourably to the excessive moisture were those that cause leaf spots on wild and cultivated shrubs and trees, on ornamental plants, and on small fruits (B. Peturson).

In the Niagara Peninsula, Ont., sustained wet weather during cherry and plum blossom resulted in serious loss from the blossom blight and stem rot phase of brown rot. Of particular importance was the period May 22-25 when repeated fogs, drizzling rains, and cloudy weather kept the trees continually wet. In those districts where the trees were still in bloom at this time losses were very heavy with as high as 90% of the fruit clusters destroyed. Some growers reported complete loss of the crop of Schmidt's Bigarreau sweet cherries. In areas where the bloom was already over losses were moderate. Losses were reduced where growers were able to meet the emergency by dusting with sulphur but little effect followed the application of sprays. Fortunately fair weather from then until cherry harvest prevented further spread and little fruit rot developed.

Blossom blight proved of minor importance to peaches, mainly because full bloom had passed before the critical weather conditions prevailed.

The weather in May favoured heavy apple scab infection. Primary ascospore discharge occurred during the rain of April 24, and major discharges during a 36 hour wet spell of May 5-6. Further infection periods occurred with the rains of May 9, 12, and 16. Primary scab lesions were found fruiting abundantly during the very wet spell May 22-25 which undoubtedly was responsible

for initiating much secondary infection discernible on May 30. Scab became very prevalent in June, but the hot, dry weather of mid-summer helped to check its development and spread.

Defoliation due to the cherry yellows virus was considerably less in 1944 than in 1943. This was attributed to the higher temperatures prevailing in May and June.

Wet weather during and following spraying operations was a factor in the development of general and quite serious spray injury, including partial defoliation of Shiro Japanese plums from Bordeaux and arsenical sprays.

Serious outbreaks of fire blight occurred on pears in those areas where the disease was prevalent in 1943. Exudate from overwintered cankers was found during the wet weather of May 22-25 when trees were largely in bloom. Infection of blossom spurs was apparent on June 12. Showery weather favoured abundant bacterial exudate, which was spattered far and wide during a heavy rain and wind storm of June 23. Ten days later the disease was widespread, involving much of the heavier wood through spur and twig infection. Wet weather of July 24-26 produced further bacterial exudate, particularly from diseased fruit, but little further infection occurred.

Leaf spot of cherries was of little importance until late in the season, when fall rain served to initiate a moderate infection especially on the susceptible sweet cherry varieties after spraying had been discontinued.

A hail storm in localized areas on September 21 caused moderate damage to fruit crops especially grapes (G.C. Chamberlain).

In the Ottawa district, Ont., the winter was fairly mild and snowfall was below average. The depth of snow was never more than about 9 in. The growing season was warm and dry. Precipitation was normal in April, temperature was somewhat low and sunshine was above average. Precipitation was seriously below the average for May to Sept. inclusive, temperature was normal in June and high in the other months, and sunshine was below average in June, normal in July and above average in May and August. Precipitation was abundant in Sept. and temperature and sunshine were normal.

There were three notable spells of dry weather. From May 15 to 30 inclusive precipitation totalled 0.03 in., and on many days the temperature reached about 80°F. June 27 to July 8 was rainless, with 4 days on which the temperature reached 90°F. or higher. From July 29 to Aug. 16 there was no measurable rain, although traces were recorded on July 30 and Aug. 16, and maxima of 90 to 100°F. were recorded on 12 days. The shower on Aug. 16 when the shade temperature was about 92°F. probably caused considerable damage; one striking case is described in the test under Vitis.

Early in the season several downy mildews appeared in some abundance, evidently as a result of copious inoculum remaining from 1943, but all of these disappeared by the end of June. Among the rusts, development of Coleosporium spp. was strikingly less than in the wet summer of 1943. Some pucciniaceous species developed abundantly, in some cases because slugs and Darluca were checked by the drought, and in some because of the sprinkling of gardens.

The common practice of sprinkling private gardens gently several times a week in hot weather, not only aggravated drought injury by checking root development, but certainly increased the damage caused by several foliage parasites, including Puccinia Malvacearum, Cercospora Carotae and C. Violae. It should also be noted, however, that C. Carotae seems to be stimulated by high temperature; in one garden under observation heavily infected plants threw out new leaves in late August and these remained almost free from attack.

Drought injury often made it difficult to assess the damage caused by diseases, but it was noted in a wide variety of plants that parasitized leaves tended to be killed before healthy ones (D.B.O. Savile).

In eastern Que. the spring was exceptionally dry, precipitation for May and June being 1.48 in. and 2.52 in. respectively. There was no rain at Ste. Anne de la Pocatière from May 18 to June 3, the usual period for primary infection by Venturia inaequalis; apple trees were in bloom by May 23, whereas the first, weak discharge of ascospores took place on June 3. Consequently control of scab was easily obtained with a regular spray schedule; even small unsprayed orchards were relatively clean.

The dry weather allowed early seeding, but also caused very irregular stands, particularly of fiber flax. Cereal rusts developed rather late and were not prevalent.

In July the precipitation was 5.53 in., but the showers were usually followed by strong drying winds and rather low temperatures, especially during the latter part of the month.

The wet, early fall brought a severe epidemic of late blight on both potatoes and tomatoes. Unsprayed fields were blighted early in Sept., and in the first 10 days of the month there was rain almost daily. Temperatures at night averaged about 50-54°F. Considerable tuber rotting occurred in the fields and even more in cellars, owing to rather high night temperatures during Sept. and early Oct.

With the exception of late blight, diseases were in general easily controlled by ordinary measures.

In western Que. early blight of potatoes was unusually prevalent and destroyed many fields before late blight developed.

Fiber flax in the Montreal district suffered from poor retting. The hot, dry weather in Aug. destroyed several acres of this crop (R.O. Lachance).

In N.B. snow coverage and rainfall were light during the winter. Only 4 in. of snow fell in Dec. and but 3 inches during Jan., the total precipitation being 1.07 and 0.57 in. respectively. The fields were bare at the end of Jan. and remained so until Feb. 9. At the end of Feb., 15 inches of snow covered the fields, the greatest depth recorded for the winter. This snow and various light falls in early March were largely removed by six rainstorms during the month. In Feb. and March the total precipitation was slightly above the 30-year average.

The scanty snow covering, and the freezing and thawing of bare or partially bare fields nearly every night during late March and throughout April, resulted in severe winter injury of many plants. At least 80% of the red clover and much alsike clover were winter killed. Grasses were not noticeably winter killed but meadows and pastures reflected the severe winter in the slow rate at which they became established. Apple orchards suffered little except for some delay in the opening of buds on the terminal twigs. The bloom was moderately light and of the shortest duration recorded. In some localities raspberry canes were killed back for some feet, but in other localities no injury was experienced. Strawberries suffered severely, some plantations being completely wiped out. The only strawberry plants available for transplanting were frost injured stocks. Many of these plants succumbed after transplanting, while the bulk of the survivors appeared weak and chlorotic after establishment. Perennials suffered severely as did foundation plantings of evergreens about residences. Cedar hedges throughout the province suffered the worst winter killing in years.

May was characterized by considerable sunshine and high winds. The frost was sufficiently out of the ground by May 5 to permit ploughing. Seeding operations began around May 19. The first ascospore discharge of the apple scab fungus occurred May 27, when the trees were in full bloom. June was wet and cool and ideal for weed growth. Aecial discharge from barberries and buckthorns was at its maximum June 22. The first twenty days of July were mostly fair and ideal for early haying. For six consecutive days, beginning July 11, maximum temperatures between 92 and 96°F. were recorded. As a result of these high temperatures, fallen apples and tomatoes scalded on the ground and bean and pea pods, still attached to the plants, scalded on sun-exposed surfaces. The first three weeks of Aug. were hot and dry, being excellent for haying and harvesting of early sown grain, but the last week was unsettled. The hot weather, however, caused the grain to ripen prematurely, resulting in light weights per measured bushel.

Almost 6 in. of rain fell in Sept. and poorly drained fields were definitely wet at the end of the month. Almost 7 in. of rain fell in Oct., leaving the fields water-soaked, and making harvesting of grain, roots and potatoes difficult.

Late blight of potatoes was first noticed July 16 in limited areas along the Bay of Fundy. Environmental conditions did not favour its

spread then or in Aug. or early Sept., during which period it was chiefly confined to the stems of affected plants. Late Sept., though wet, was too cool to favour a rapid development of blight. Potatoes harvested during the first two weeks of Sept. were comparatively free of blight infection. Weather conditions in early Oct. favoured the abundant production of blight spores on the lower leaves of potato plants, and the moist condition of the soil enhanced the survival of spores on its surface until Oct. 16 when a killing frost occurred.

Ploughing operations ceased Dec. 2 and the St. John River froze over Dec. 3 (J.L. Howatt).

Precipitation at Kentville, N.S., during March and April was 76% of the 30-year mean for those months. The rainfall during May, 1944, was the lowest on record, being 0.22 in. compared with a mean of 2.64 in. This meant that there was a pronounced soil moisture deficit during the early summer. The months of June and July had total rainfalls slightly below the mean, so that there was no build up of the early deficit. From July 31 to Aug. 17 inclusive there was no rainfall, but there was a mean temperature well above 65° for that period. On six successive days the maximum temperature was above 92° and on one occasion reached the new high of 100° for Kentville. The minimum temperature for the same six days was 56°. During the last fourteen days of August there was a total rainfall of 3.02 in. and during the balance of the season rainfall was adequate.

No severe plant disease outbreaks occurred during 1944. Apple scab was of minor importance and late blight of potatoes did not appear until late in the season. Apple russeting was severe on Cox's Orange Pippins irrespective of spray treatment. Much of this russeting must have been caused by climatic conditions. Boron deficiency symptoms on apples showed up conspicuously in susceptible orchards where no boron had been applied.

Due to the dry soil conditions in May and June, particularly in the lighter soils, there were poor stands of carrots and many fields were seeded the second time (J.F. Hockey).

In P.E.I. the heavy covering of snow gave ample winter protection to clover. In the absence of general thaws during Jan. and Feb. and of severe spring frosts this crop wintered well and developed exceptionally strong growth. Tree fruits, on the other hand, suffered pith injury to year old wood as a result of the low temperature of Feb. 9. Perennial and biennial ornamental flowers came through well, although there was some killing of hollyhocks. Considerable low temperature injury was sustained by potatoes in the late fall of 1943 and again during the cold snap in Feb., this was followed by destructive storage rots.

Small fruits wintered well, giving early promise of at least average yields, although the crop of strawberries suffered from low temperature injury to the early bloom. Excessive rainfall in June favoured the development of apple scab and brown rot in stone fruits. These diseases were checked by the

comparatively dry month of July only to develop again during Sept. Brown rot was particularly serious on plums in the Fall.

Late blight of potatoes appeared during late July but this outbreak was arrested by dry weather in early Aug., only to become serious later in that month with lower temperatures and prolonged periods of rain. The ensuing epiphytotic was general but reached its most serious proportions in western Prince Co. During the hot period of Aug. it was necessary to curtail the spraying program in order to avoid the severe spray burn which follows wet applications during unusually hot weather. Following severe injury from the Aug. 7 application the spray schedule was interrupted accordingly until Aug. 24 when rainy weather was encountered. The subsequent applications made Sept. 1 and Sept. 8 completed our spray program for the season. Little spraying was done anywhere in the province after Sept. 8 owing to rainy weather. Vine growth being still strong, top-killing was resorted to and, where it was practised, highly satisfactory blight control was noted. Open weather in late Sept. and early Oct. allowed potatoes to be left in the ground for at least ten days after the tops had been destroyed, an essential supplementary blight prevention measure (R.R. Hurst, L.C. Callbeck).

Phenological Data - 1944

by
R.C. Russell

The data in the accompanying table are from records secured by M.W. Cormack at Edmonton, R.C. Russell at Saskatoon, and B. Peturson at Winnipeg; they have now been collected regularly for eight years. The figures in the second column under each place give the number of days earlier or later than the 8-year average.

The spring and summer records were consistently earlier than average at all three places. Unfortunately, records of early-sown wheat could not be obtained at Saskatoon, so that the dates obtained for wheat were late throughout the season.

Mr. Peturson also supplied the dates when the following rusts were observed in Manitoba:

Melampsora Lini I	Winnipeg	26/5
" " II	"	2/6
Puccinia coronata Avenae I	"	10/6
Puccinia triticina II	Deloraine	20/6
" coronata Avenae II	Macdonald	4/7
Puccinia graminis Avenae II	Winnipeg	11/7
Puccinia graminis Tritici II	Ste. Agathe	11/7

For nine plants in the main list Dr. W.H. Minshall has supplied the following dates of first anthesis at Ottawa:

Populus tremuloides	26/4	Anemone canadensis	28/5
Acer Negundo	2/5	Bromus inermis	12/6
Prunus pennsylvanica	13/5	Phleum pratense	22/6
Smilacina stellata	17/5	Solidago canadensis	18/7
Viola canadensis	6/5		

Dr. Minshall has also supplied the following figures for anthesis dates of four trees at Ottawa, to allow comparison with other years:

	9-year Average	1943	1944
Acer saccharinum	16/4	23/4	17/4
Ulmus americana	29/4	7/5	30/4
Acer saccharum	9/5	19/5	6/5
Pinus sylvestris	26/5	2/6	24/5

Summary of Phenological Data Taken at Winnipeg, Saskatoon, and Edmonton, in 1944

Species	Winnipeg		Saskatoon		Edmonton	
Pulsatilla Ludoviciana	--	--	17/4	N	--	--
Populus tremuloides	21/4	5E	20/4	2E	15/4	6E
Phlox Hoodii	--	--	23/4	3E	--	--
Acer Negundo	29/4	8E	30/4	6E	22/4	8E
Betula papyrifera	--	--	7/5	1E	27/4	11E
Thermopsis rhombifolia	--	--	9/5	N	--	--
Prunus americana	10/5	2E	--	--	--	--
Amelanchier alnifolia	13/5	2E	13/5	1L	7/5	5E
Prunus pennsylvanica	--	--	14/5	4E	8/5	6E
Viola canadensis	--	--	15/5	N	12/5	5E
Hierochloë odorata	--	--	16/5	N	--	--
Smilacina stellata	23/5	1E	20/5	3E	17/5	6E
Prunus melanocarpa	--	--	24/5	1E	18/5	5E
Cragaegus sp. (Hawthorn)	20/5	3E	24/5	1E	19/5	?
Prunus virginiana	23/5	1E	--	--	--	--
Svida sp. (Dogwood)	26/5	2E	26/5	2E	22/5	7E
Elaeagnus commutata	--	--	29/5	3E	1/6	N
Lonicera glaucescens	--	--	2/6	2E	28/5	10E
Viburnum Lentago	29/5	4E	--	--	--	--
Viburnum trilobum	--	--	--	--	30/5	9E
Achillea lanulosa	--	--	--	--	18/6	6E
Viburnum pubescens	2/6	5E	--	--	--	--
Anemone canadensis	3/6	5E	30/5	9E	8/6	8E
Diholcos bisulcatus	--	--	5/6	4E	--	--
Galium boreale	--	--	6/6	5E	6/6	9E
Rosa alcea	--	--	15/6	3E	--	--
Campanula petiolata	--	--	12/6	9E	--	--
Gaillardia aristata	--	--	19/6	3E	--	--
Bromus inermis	16/6	4E	23/6	N	21/6	4E
Agrimonia striata	--	--	--	--	19/6	10E
Symphoricarpos occidentalis	19/6	7E	29/6	5E	28/6	4E
Psoralidium argophyllum	--	--	29/6	10E	--	--
Phleum pratense	--	--	--	--	2/7	3E
Chamaenerion spicatum	--	--	--	--	5/7	3E
Spiraea alba	--	--	26/6	8E	--	--
Lactuca pulchella	--	--	3/7	6E	10/7	3E
Chrysopsis hirsutissima	--	--	28/6	1E	--	--
Agastache anethiodora	--	--	--	--	4/7	7E
Solidago canadensis	--	--	--	--	12/7	4E
Grindelia sp. (Gum Weed)	--	--	18/7	4E	--	--
Oligoneuron canescens	--	--	25/7	1L	--	--
Aster laevis	--	--	28/7	1E	22/7	9E
Aster crassulus	--	--	17/7	9E	26/7	?
Thatcher Wheat: Sown	17/4	6E	※ 5/5	9L	21/4	5E
Emerged	1/5	2E	15/5	5L	2/5	5E
Headed	25/6	N	2/7	3L	27/6	3E
Harvested	1/8	1E	10/8	5L	12/8	2E

※ No earlier dates of seeding data were available.

I. DISEASES OF CEREAL CROPS

WHEAT

HEAD DISCOLORATION (Alternaria, etc.) was recorded from Man. eastward. A. tenuis was isolated from one collection at Winnipeg and Helminthosporium sativum from another (W.A.F. Hagborg). Traces were present on some rust resistant varieties at Ste. Anne de la Pocatiere, Que. (A. Payette), while discoloration was heavy on 2 varieties in the same test at Fredericton, N.B., as well as on some soft wheats (S.F. Clarkson). About 1% of the heads showed discoloration in the plots at Charlottetown, P.E.I., and it was also observed in 12 fields in Queens Co. (R.R. Hurst).

ERGOT (Claviceps purpurea) was recorded as follows: trace in one field out of 89 in Alta.; in Red Bobs in the plots at Edmonton and Lacombe (M.W.C.); in 5 fields out of 210 in Sask., a trace except one, where 15% of the heads bore ergots along one edge of the field adjoining severely infected brome grass (H.W. M.); recorded in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis) was first observed on winter wheat at the Sidney Station, B.C., on April 24 and was present on all winter varieties on May 22; mildew was not seen at the Agassiz Station on May 26 (W. Jones). A slight infection was observed in 2 fields in Alta.; it was slight to severe in the variety plots at Lacombe and slight to moderate at Edmonton (M.W.C.). Powdery mildew was severe on winter wheat about Guelph, Ont. (J.D. MacLachlan). It was severe in the rust nursery (q.v.) at Saanichton, B.C., and moderate at several points in Alta. and Ont. Of the commercial varieties in the test, Thatcher was the most susceptible, followed by Marquis and Apex; Renown and Regent were almost free from infection (T. Johnson).

HEAD BLIGHT (chiefly Fusarium spp.) infected 5% of the heads in a field of Renown near Nipawin, Sask. (H.W.M.). In fields of winter wheat affected by take all (q.v.) in the Guelph and Waterloo districts, Ont., the disease was prevalent on heads of lodged stems (J.D. MacLachlan). Traces to light infection occurred at Ste. Anne de la Pocatiere, Que., particularly in the wheat plots on sandy soil (A. Payette). Traces were present in the plots at Fredericton, N.B. (S.F. Clarkson) and in Prince and Queens Co., P.E.I. (R.R. Hurst). In the rust nurseries (q.v.), the disease was most prevalent in Que. (T. Johnson).

A number of collections of head blight of wheat and barley from the 1944 crop was cultured to determine the organisms associated with them. The collections from outside Man. were obtained from diseased heads of plants sent to the Laboratory from the rust nurseries (q.v.). On wheat: Winnipeg, Man., Fusarium culmorum, 1 collection, F. Equiseti, 1, F. Scirpi var. acuminatum, 1; St. Germain, F. Poae, 1; Agassiz, B.C., F. avenaceum, 1; Macdonald College, Que., F. avenaceum, 3, F. culmorum, 1, F. Poae, 1; Lennoxville, F. avenaceum, 5, F. culmorum, 7, Colletotrichum graminicola, 1.

Isolations were made from one collection of barley from each of the following places in Man., the most common isolate being mentioned first: Morden, Helminthosporium sativum, F. Poae, Alternaria sp.; Nesbit, A. sp., H. sativum, F. Poae; Treherne, H. sativum, A. sp.; Neepawa, F. Poae. Head blight of barley was more common this year than usual in Man. (W.L. Gordon).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Out of 89 fields examined in Alta., common root rot caused a trace of damage in 41 fields, slight in 33 and moderate in 1. The disease was found in the plots at Beaverlodge and Lacombe, and at Olds, where it was most prevalent in the manured plots. It caused more damage than usual in the Drumheller area, especially in volunteer stands in fields hailed out last year (M.W.C.).

Common root rot was present in every one of the 194 fields of wheat examined in Sask. after July 25. The mean disease rating was 8.5 and its standard deviation 3.63. The difference between the mean for 1944 and that of 9.4 for 1943 (P.D.S. 23:2) is significant at the 5% point. If the province is considered as a whole, the crops were somewhat better than in 1943, but worse than those of 1942 when the mean disease rating was very low, 6.0. Thus there is evidence of a negative correlation between yield of grain and disease rating. When the data are considered by crop districts for a single year, in crop districts 4 and 7 in the western part of the province the yields were low due to low rainfall and the disease ratings were about 11.0, while in crop districts 1 and 5, on the eastern side, the yields were relatively high and the disease ratings were 6.7 and 7.3 respectively (B.J. Sallans).

A phase of common root rot, known as pre-maturity blight, characterized by premature ripening with lodging of affected plants, caused a trace to 3% damage in 15 fields. It was severe in the durum varieties in the dry land plots and in many lines of common wheat in an irrigation plot at the University, Saskatoon. It was also severe at the Swift Current Station (H.W.M.). Isolations made from basal parts of the affected wheat plants at Saskatoon yielded mostly Helminthosporium sativum and less frequently, Fusarium culmorum. The discoloration of basal parts was usually not at all conspicuous in the affected plants with their empty heads (T.C. Vanterpool).

Many wheat fields in the Willowbunch district in southern Sask. were reported to be yielding below expectations. An examination of some fields revealed large areas usually on slopes or low spots where heads of the plants were poorly filled and the bases of the majority of such plants were attacked by common root rot. The situation in this part of the province in 1944 appears to be similar to that reported in 1942 by Sallans and Ledingham (P.D.S. 22:2). It was concluded that common root rot can be much more serious than has been generally realized. For the first time, as pointed out by Sallans and Ledingham, large areas in the fields appeared to be attacked intensively by this disease. The disease was also conspicuous at Carlyle, Lac Vert, Porcupine Plain, and Achydal, Sask. (T.C. Vanterpool).

Common root rot was much more severe in Man. in 1944 than in 1943. The disease was present in most fields of wheat and barley examined, and it was more severe in the lighter soil zones in the province. Severe pre-maturity blighting of wheat, oats, and barley occurred throughout the province. In some fields of durum wheat in northwestern Man., as many as 10% of the plants were blighted. In general, such plants produced little, if any, grain. At Winnipeg, many varieties of oats were severely affected with a form of pre-maturity blight (F.J. Greaney).

Common root rot was found in all foundation spring wheat varieties inspected in the Cereal Division plots at Ottawa, Ont. Infection was most severe in a plot of Coronation; all the plants were severely stunted resulting in a marked reduction in yield. A moderate to severe infection also occurred in Garnet, Reward, Regent, Marquis and Thatcher (R.G. Atkinson).

HEAD BLIGHT (Helminthosporium sativum). Specimens were received from Evesham, Sask.; Alternaria and Cladosporium were also present on the straw and glumes (T.C. Vanterpool).

TAKE ALL (Ophiobolus graminis) was observed in 12 out of 89 fields in Alta. About 25% of the plants were severely affected in a field of Red Bobs at Millet and a field of winter wheat was moderately damaged in the Peace River district; in the other fields the damage was severe in 1, moderate in 3, slight in 6 and a trace in 2 (M.W.C.). A trace was present on widely scattered plants in 8 out of 210 fields examined in Sask. (H.W.M.). Take all was not found in Man. in 1944 (F.J. Greaney). The disease was observed in several fields of winter wheat in the Guelph and Waterloo districts, Ont.; it affected localized areas in the field (J.D. MacLachlan). This is the first report of take all to the Survey from Ont. (I.L.C.).

BASAL GLUME ROT (Pseudomonas atrofaciens). A trace was observed in 2 fields in Alta. and a general moderate infection was reported in another at Provost following damage by hail (M.W.C.). A trace occurred in a field near Rosthern, Sask. (H.W.M.).

STRIPE RUST (Puccinia glumarum). A slight infection was recorded on Dawson's Golden Chaff at the Sidney and Agassiz Stations, B.C. (W. Jones).

STEM RUST (Puccinia graminis) was first observed at Edmonton, Alta., when a trace was recorded on Aug. 19. Its development was delayed by cool weather and infection was slight even on late maturing stands in September. Infection was a trace in 9 fields and slight in 3 out of the 89 examined (M.W.C). Stem rust was observed only in the south and southeastern parts of Sask. Infection was in general very light and developed late, but it was severe in some late maturing crops (H.W.M.).

Stem rust was of very minor importance in Man. this year. Most of the commercial acreage was sown to rust resistant varieties and only slight traces of stem rust were observed in any of these stands. Stem rust infections, however, were general on Hordeum jubatum and in stands of Marquis in the experimental plots at Winnipeg, Morden, and Brandon. The rust infection on Marquis in these plots averaged 50%. Infections ranging from 5 to 50% were present on H. jubatum in many localities in southern Man. in late August. A very light sprinkling of stem rust was general on barley. However, in only a small fraction of the fields did this infection exceed 5% (B. Peturson). It may be noted that a goodly number of the collections of stem rust on Hordeum jubatum and barley in Man. proved, upon culture, to be the Secalis variety. Before the advent of rust resistant varieties, these hosts were almost always affected by the Tritici variety (M. Newton).

Stem rust slightly infected winter wheat in the Guelph district, Ont. (J.D. MacLachlan). Stem rust was not observed on wheat in the plots at Ste. Anne de la Pocatiere, Que. (C. Perrault). It was virtually absent from the plots at Fredericton, N.B., except for a trace on Dicklow (S.F. Clarkson). Traces were observed at several points in P.E.I. in August, while infections varying from 5 to 25% were recorded in September (R.R. Hurst).

In the rust nurseries (q.v.) stem rust was heavy on susceptible varieties at Brandon and Winnipeg, Man., moderate at Morden and near Ottawa, Ont., and slight to absent elsewhere (T. Johnson).

LEAF RUST (Puccinia triticina) appeared late in the season in Alta., being first observed on Aug. 15 at Edmonton. Only a trace was recorded in 6 fields and in the plots at Lacombe and Olds; a slight infection was present at Edmonton (M.W.C.). Leaf rust was more prevalent in 1944 than in the previous year in Sask. Infection was a trace in 34 fields, slight in 20, moderate in 13 and severe in 3. In four fields in the Weyburn district, infection was moderate to severe and the grain in the heads was definitely shrivelled, apparently by the rust (H.W.M.).

Leaf rust inoculum was very scarce in the air over Man. during the early part of the growing season of 1944, and although both temperature and moisture conditions were quite favourable for the establishment and development of this rust, it was not until June 20, a full week later than normal, that scattered traces of leaf rust were found in southern Man. Owing to the scarcity of initial infections rust spread rather slowly at first. However, by mid-July a light infection of leaf rust was general on susceptible wheat varieties throughout the southern part of Man. At that time wheat generally was well past the flowering stage. From then on leaf rust developed very rapidly and in early August, shortly before harvest, infections ranging from 60 to 80% in intensity were quite general in the southeastern part of the province. Infections were much lighter in the northern agricultural areas. Although leaf rust infection was quite severe, its adverse effect on the yield of early sown wheat, as judged by the comparative yields of susceptible and moderately resistant varieties in test plots located in the more heavily leaf rusted areas, was not very great. However, in late sown field plots it caused substantial yield reductions (B. Peturson).

Leaf rust was not as severe in winter wheat in the Guelph district, Ont., as in 1943 (J.D. MacLachlan). Leaf rust was severe on Marquis, Reward, and Thatcher and moderate on Triticum turgidum var. megapolitanicum in a small plot in the Montreal Botanical Garden, Que. No signs of rust were seen on T. aegilopoides, T. compactum var. creticum, T. dicoccum, T. durum, T. durum var. africanum, T. monococcum, T. polonicum var. elongatum, T. polonicum var. martinarii, T. spelta and T. turgidum var. speciosum (J.E. Jacques). Trace to slight infection was recorded on the varieties on clay at Ste. Anne de la Pocatiere, Que. (C. Perrault). A few varieties showed slight infection in the plots at Fredericton, N.B. (S.F. Clarkson). Traces were observed at two points in N.S. (J.F. Hockey), while infection was usually about 40% at several places in P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) the highest infection was at Brandon, Man. and Lennoxville, Que., with high percentages at many other points. Of the commercial varieties in the test, Regent and Carleton were the most resistant (T. Johnson).

LEAF BLOTCH (Pyrenophora Tritici-repentis (Helminthosporium Tritici-repentis) was severe over a whole field near Rosetown, Sask., on June 20, and probably slightly arrested the growth of the seedlings. Perithecia were present on the stubble. No Pythium was present on the roots (T.C. Vanterpool).

BROWNING ROOT ROT (Pythium spp.) caused a trace of damage in 4 fields and slightly affected 2 others out of about 30 examined in east central Alta. in early July. Several hundred acres on fallow were affected near Winterburn, west of Edmonton. A field of Red Bobs at the University showed a 70% infection in June, but it recovered to yield about 60 bu. per acre (M.W.C.).

In the central and northern wheat growing areas of Sask. the browning root rot situation was normal; that is, in localities where the disease is commonly conspicuous the majority of summer-fallow wheat fields were highly to moderately infected, with an occasional one showing severe symptoms. There was also a normal or above normal infestation on the Regina plains (see report of the Dom. Lab. of Plant Pathology for this year), but on the same clay soil type in the Rosetown area, no fields showing heavier than slight infestations were recorded. So-called 'recovery' from the disease was observed in many districts owing to the moist and relatively cool conditions prevailing till well on into the summer. This actually means that the plants in diseased areas were not stunted, but the early damage caused by reduced tillering was still reflected in lower yields. An oat field following fallow at Saskatoon showed a moderate infestation with accompanying root-tip necrosis. This brings out the fact, not sufficiently recognized, that oats and barley when grown on fallowed land may be as heavily attacked as wheat under the same conditions. Many farmers who, during the drought and depression years, had reduced the applications of phosphatic fertilizer or had ceased using it entirely, are again increasing their purchases of phosphate. Obviously then, in estimating the severity of the disease in a district for any given year, a careful survey would have to be made of the number of fertilized and unfertilized fields, since adequate applications of phosphate will ordinarily eliminate the 'browning' symptoms. The Agricultural Committee of the Regina Board of Trade have improved the situation for 1945 in procuring from the Wartime Prices and Trades Board increased quotas on phosphatic fertilizers and fertilizer machinery attachments for the province (T.C. Vanterpool).

In a limited survey made June 13-17 between Saskatoon and Indian Head, particularly in the Regina area, browning root rot was found to be present in epidemic form on heavy land, south and east of Regina. On June 2, leaf symptoms were evident from the highway near Indian Head (H.W.M.).

A survey made in late June revealed little browning root rot, although many fields in the Red River Valley and the Portage Plains of Man. suffered considerably from water damage. A trace of the disease was found in a field at Forrest. There was almost no loss from the disease in Man. in 1944 (F.J. Greaney).

GLUME BLOTCH (Septoria nodorum). Infection was a trace in 8 fields, slight in 3 and moderate in 2 out of 89 examined in Alta.; a moderate infection was present on several varieties at Edmonton and a trace at Olds (M.W.C.). Diseased specimens were received Aug. 24 from Bresaylor, Sask. (T.C. Vanterpool). A slight to moderate infection was found in 12 out of 21 fields examined in P.E.I. (R.R. Hurst). Septoria nodorum was moderate in the rust nurseries (q.v.) at

Brandon, Winnipeg, Morden, Man.; Kapuskasing, Ont.; Macdonald College, Lennoxville, Ste. Anne de la Pocatiere, Que., and Fredericton, N.B., with lesser amounts at several other places (T. Johnson).

SPECKLED LEAF BLOTCH (Septoria spp.). A slight infection by S. Tritici was present on Rideau and Ridit in May at Agassiz, B.C. (W. Jones). Speckled leaf blotch was unusually prevalent and severe in central Alta. in 1944; infection was a trace in 6 fields, slight in 12, moderate in 13 and severe in 19. Infection was severe on some late-maturing varieties at Edmonton and ranged from a trace to slight in the plots at Lacombe and Olds. Both S. nodorum and S. Tritici were found in specimens examined (M.W.C.). Septoria Tritici was observed in rust nursery (q.v.) material from Edmonton and Lacombe only (T. Johnson). Leaf spots of various kinds were recorded in 33 out of 210 fields examined in Sask. In 5 in the northeastern part of the province, where the pathogen was identified as S. nodorum, the damage was moderate to severe (H.W.M.).

Light to moderate infections by certain species of Septoria occurred on cereals in Man. in 1944. Trace or light infection of Septoria nodorum was found on wheat in four localities (Winnipeg, Macdonald, McCreary, Gilbert Plains) and moderate infection in one (Melita).

A strain of Septoria of the general type of S. nodorum, but with longer spores that conform in size with Septoria Avenae, was found rather commonly throughout the province in the late summer on wheat and occasionally on barley. Infections were mostly trace or light, but in the latter part of August heavy infections were noted on wheat at Gimli and Kenville, and on both wheat and barley at Winnipeg. Infection, unlike that of S. nodorum, was largely confined to the leaves and was followed, at Winnipeg and Gimli, by abundant development of perithecia of Leptosphaeria in early September.

Septoria Passerinii was found at three points, Morden, Brandon, and Neepawa, infection varying from light to moderately heavy. Septoria Avenae was observed at Winnipeg, only trace infection being present (T. Johnson).

BUNT (Tilletia caries and T. foetida). A summary of car inspections for the first quarter of the grain year 1944-45 was prepared by W. Popp from the records of the Western Inspection Division. The results are presented in Table 1.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1 to October 31, 1944

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	61,865	214	0.34
Amber Durum	1,300	33	2.54
White Spring	14	0	0.00
Alberta Red Winter	121	1	0.82
Garnet	262	2	0.76
Mixed Wheat	35	0	0.00
All Classes	63,597	250	0.39

There appears to be a distinct increase in the amount of bunt in the 1944 crop over the previous year, if the percentage of cars graded smutty in the first quarter of the 1944-45 grain year is any indication. Although the figure is still small, it is the highest of the war years.

Bunt affected about 35% of the heads in a field at Lousana, Alta., 2% in 1 and a trace in 3 (M.W.C.). Infection was 35% in one field, 12% in 1, 1-2% in 3 and traces in 5, all located in the southwestern to western part of Sask. An examination, by the Associated Laboratory Service, of over 2,000 samples of 1943 seed to be sown on Sask. farms in 1944 revealed 79.6% of the samples free from bunt spores, while the spore load was a trace in 16.9%, slight in 2%, moderate in 1.3% and heavy in 0.2% (R.C. Russell).

LOOSE SMUT (Ustilago Tritici) affected 5-10% of the heads in a field of Red Bobs at Fort Saskatchewan, Alta.; a trace occurred in 8 other fields (M.W.C.). Infection was a trace to moderate in winter wheat about Guelph, Ont. (J.D. MacLachlan). Loose smut was observed in one field in P.E.I. (R.R. Hurst).

BLACK CHAFF (Xanthomonas translucens). A trace was found in 1 field in Alta. (W.C. Broadfoot), Black chaff was recorded in Man. as follows: X. translucens f. sp. cerealis, severe on leaves of several varieties at Morden and slight at Winnipeg; X. translucens f. sp. undulosa slight at Headingly, Ste. Rose du Lac and Winnipeg; f. sp. undetermined, slight, at Brandon (W.A.F. Hagborg).

A head blight, due to bacteria, was severe at least at Erinferry and Paddockwood, Sask., on Thatcher. The lower parts of the fields were the more seriously affected. It is thought that wet, cool conditions favoured the disease, which killed the heads. Saprophytic fungi then developed on the standing grain, resulting in large blackened areas in the fields. There are indications that in some years the new rust resistant varieties may suffer heavily from bacterial diseases in northern Sask.; cf. P.D.S. 22:7 sub Head Discoloration (T.C. Vanterpool).

OATS

ERGOT (Claviceps purpurea). A trace was found in the plots at Edmonton, Alta. (L.E. Tyner).

ANTHRACNOSE (Colletotrichum graminicola). The fungus was isolated from the roots of a slightly affected sample sent from Beaverlodge, Alta. (G.B. Sanford). Anthracnose caused severe damage in an area 25 yards square in the corner of a field at Zelma, Sask. Affected plants were definitely shorter than the normal and had a bleached appearance; no grain was present in the panicles and the basal parts were markedly darkened by the fungus. The disease has not been observed by me on oats since 1928 (T.C. Vanterpool). The pathogen was found on the mesocotyl of 2 samples of oats examined during the root rot survey (H.W.M.)

POWDERY MILDEW (Erysiphe graminis) moderately affected the leaves of Hermit, a winter oat, at the Sidney Station, B.C., on May 4. It was also recorded at the Agassiz Farm and at the University, Vancouver (W. Jones). It was moderate in the rust nursery at Saanichton (T. Johnson).

COMMON ROOT ROT (Fusarium spp.). Damage was a trace in 4 fields and slight in 3 out of 40 examined in Alta. (M.W.C.). Infection was slight in 3 fields and moderate in 31 out of 41 fields examined in Sask. (B.J. Sallans). Pre-maturity blight was fairly common and this year was often associated with severe blast (H.W.M.).

HEAD BLIGHT (Fusarium spp.). A trace was observed in one field near Montague, P.E.I. (R.R. Hurst).

LEAF BLOTCH (Helminthosporium Avenae). Infection was a trace in 8 fields, slight in 16 and moderate in 1 out of 40 examined in Alta. Infection ranged from slight to moderate on the varieties at Edmonton and a trace to slight at Lethbridge (M.W.C.). The disease was common on the lower leaves of oats in early July in the O.A.C. plots and in the fields in the Guelph and Waterloo districts, Ont. (J.D. MacLachlan). Traces were recorded in plots on clay soil at Ste. Anne de la Pocatiere, Que. (A. Payette). Leaf blotch varied from a trace to 40% averaging about 10% in the plots at Fredericton, N.B. (S.F. Clarkson). Infection was slight at South River, Mabou, Waterville and South Alton and moderate at Somerset out of 11 fields examined in N.S. (J.F. Hockey). Traces were observed in late sowings in P.E.I. (R.R. Hurst).

HETEROSPORIUM LEAF SPOT (H. ?maculatum Klotzsch) was slight to moderate on 2806-123 in the Cereal Division plots, Ottawa, Ont., on July 10. Spots were nearly white with a narrow orange-yellow margin, irregularly oval to rectangular, 4-37 x1.5-6 mm. Spores finely echinulate, olive brown, mostly 2-celled, 9.3-16.3 x 4.6-6.5 microns; a few, 4-celled, 17-24.8 x 6.2 microns; conidiophores 55.8-96.1 x 3.1-4.6 microns (R.G. Atkinson).

HALO BLIGHT (Pseudomonas coronafaciens). Infection was a trace in 2 fields and slight in 3 in Alta.; infection was a trace to severe on the varieties at Lacombe (M.W.C.). Halo blight was fairly common in the earlier cool part of the summer in Sask., but it did not spread later when the weather was hot and dry; it was observed in 7 out of 41 fields examined (H.W.M.). In the University plots located at Star City, the reactions of the varieties were recorded giving 0 = susceptible, and 10 = fully resistant. By this scale, Gopher = 9, Vanguard = 9, Valor = 6, and a numbered line = 3. Most of the common varieties showed some resistance (J.B. Harrington). Halo blight infection was slight at Binscarth and Winnipeg, Man., and moderate at Woodside. The organism was isolated from each collection by W.A.F. Hagborg and found to be pathogenic in every case (W.L.G.). A heavy infection was observed in one field in Queens Co., P.E.I. on July 17 (R.R. Hurst).

CROWN RUST (Puccinia coronata) caused some damage in eastern and southeastern Sask.; a trace was present in a plot at Saskatoon (H.W.M.). Heavy infections of crown rust developed on oats throughout the whole of the southern half of the agricultural area of Man. and light infections of this rust were general in the northern areas. In the heavily rusted areas the intensity of infection in many fields ranged up to 80% (B. Peturson). In contrast to 1943, resistant varieties were not materially affected about Guelph, Ont. On susceptible varieties, infection was moderate to severe particularly on late sowings (J.D. MacLachlan). Crown rust slightly affected Cartier, Tartarian and A. brevis, while infection was moderate on Vanguard and

severe on hull-less at the Botanical Garden, Montreal, Que. (J.E. Jacques). Crown rust was absent in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette), and at Fredericton, N.B. (S.F. Clarkson). Traces of crown rust were found in 3 out of 10 fields examined at widely separated points in N.S.; one field at St. Croix was about 200 yards from a buckthorn hedge (J.F. Hockey). The intensity of infection ranged from traces to 40% in fields examined in September in all 3 counties of P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) infection was severe in Man. and moderate at Geulph, Ont., and Fredericton, N.B. Of the commercial varieties in the test, Erban was the least susceptible (T. Johnson).

STEM RUST (Puccinia graminis) was general on volunteer plants in one field near Victoria, B.C. (W. Jones). Infection was a trace in 12 fields and slight in 9 out of 40 examined in Alta. It was first observed at Edmonton on Aug. 24. Telia were present in the unusually severe local infections in the plots in September (M.W.C.). Stem rust was very light in Sask.; infection was a trace in 4 fields, slight in 1 and moderate in 1 out of 41 examined (H.W.M.).

Stem rust infections began to appear on wild oats (Avena fatua), and on susceptible oat varieties, in southern Man., during the 2nd week in July. Scattered trace infections also appeared in many stands of the new rust resistant oat varieties. The infections on wild oats and on susceptible varieties increased considerably and by mid-August ranged from 40 to 80%. The infections on resistant varieties, however, increased very slowly and in most fields ranged from scattered chance pustules to very light infections averaging less than 1% at time of harvest. Greenhouse investigations showed that the infections on the rust resistant varieties were caused by physiologic races 8, 10, and 11 of Puccinia graminis Avenae all of which are capable of infecting these varieties. These three races were, however, less prevalent than last year and comprised only a small percentage of the rust collected on susceptible hosts. As stated a year ago, no prediction can be made at this time regarding the prevalence of these races in the future, but it is encouraging to note that apparently a slight decrease in their prevalence occurred this year (B. Peturson).

Stem rust developed but little on resistant varieties, in contrast to 1943, about Guelph, Ont., while it was moderate to severe in susceptible varieties (J.D. MacLachlan). A new variety, named Beaver, a cross between Vanguard and Erban, has been licensed and is being distributed to members of the Canadian Seed Growers' Association for propogation. "In tests conducted to date it appears to mark an improvement over both parents both in yield and quality quite apart from its ability to resist both rusts." (L.H. Newman). A slight infection was observed on Erban and Avena strigosa at the Botanical Garden, Montreal, Que. (J.E. Jacques). Stem rust was not observed in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). Infection was zero or a trace in variety plots at Fredericton, N.B. However, in a separate trial, 10 varieties of oats, 5 of wheat and 2 of rye were sown in a plot adjacent to the alternate hosts, Berberis vulgaris and Rhamnus catharica on June 6. The seed was kindly supplied from Winnipeg and Ottawa. Aecia were mature on the barberry on June 22, and on the buckthorn on June 23. A moderate to severe infection developed on the oat varieties as shown below:

Variety	Crown Rust	Stem Rust
Ajax	55%	0
Roxton	trace	trace
Bond	15	65
Erban	70	55
Vanguard 7	60	trace
Victory	75	15
Mabel	15	3
2806-123	65	25
2797-69	2	3
R.L. 1272	0	0

Stem rust was not observed on the wheats, although Garnet and Marquis were two of the varieties. The rye varieties, Prolific and Ottawa Selection, showed 65 and 70% infection respectively. Some of the susceptible oats varieties were sown on May 16 about 400 yards from the alternate hosts. Little, if any rust developed on this sowing, whereas these same varieties sown adjacent to the alternate hosts were severely infected. It would appear that the early sown varieties escaped infection because of their more advanced stage of growth before the rust reached them. The same experiment was conducted in 1943, except the sowing was limited to a few oat varieties. The results in 1944 agree closely with those obtained in 1943 (P.D.S. 23:9 and 10). Mature aecia of P. graminis were also observed in Victoria Co. on June 29, in Westmorland Co. on July 3 and in Charlotte Co. on July 7 (S.F. Clarkson). A slight infection was observed in 3 fields and a trace in one examined on Aug. 18 in N.S. Old aecia were observed on barberry in Guysboro Co., on Aug. 1 (J.F. Hockey). Stem rust infections varying from 10 to 65% were observed in all three counties in P.E.I. in September (R.R. Hurst). In the rust nurseries (q.v.) stem rust was severe in Man.; Guelph, eastern Ont.; and Fredericton, N.B. In a nursery near Ottawa, Vanguard was moderately affected (T. Johnson).

BROWNING ROOT ROT (Pythium spp.) was found on oats on summer fallow at Nampa and Winterburn, Alta. (A.W. Henry). The disease was observed on Exeter on a summer fallow plot at Saskatoon, Sask.; root-tip necrosis, which is ordinarily less noticeable in oats than in wheat, was conspicuous. See also p. 5 of this MS. (T.C. Vanterpool).

SPECKLED LEAF BLOTCH (Septoria Avenae) was slight on Exeter at the Agassiz Farm, B.C. (W. Jones). The disease was observed in 3 fields - trace, slight, and moderate in Alta. (M.W.C.). A heavy infection was observed on the lower leaves of 2806-123 at Ottawa, Ont. (R.G. Atkinson). Infection was moderate in the oat plots on clay with lesser amounts in the plots on sandy soil at Ste. Anne de la Pocatiere, Que. (A. Payette). Infection ranged from trace to 25% and averaged nearly 7.5%, at the Station, Fredericton, N.B., being slightly less prevalent than leaf blotch (S.F. Clarkson).

SMUTS (Loose Smut, Ustilago Avenae and Covered Smut, U. Kolleri). Smut infection was a trace in 2 fields, and 2%, 4% and 12% in 1 field each in Alta. (M.W.C.). A trace of loose smut was recorded in 5 fields in Sask. Covered smut infection, on the other hand, was a trace in 11 fields, 1-4% in 8, 5-10% in 4 and 15-30% in 3 out of 41 examined. Associated Laboratory Service

found 27.5% of the samples of 1943 crop clean, with infection a trace in 51.9%, slight in 10.7%, moderate in 7.1% and heavy in 2.8% (H.W.M.); In field tests, naturally inoculated seed showed a moderate amount of smut, with a uniform increase in the number of smut heads with each increase in the spore load. The two sowings, May 4 and May 22, gave about the same amounts of smut (R.C. Russell). Smut was present in 15 out of the 17 fields examined in Man., the average infection being 3.7% and heaviest infection 18% (W.L. Gordon). Loose smut was less severe about Guelph, Ont. than in 1943 (J.D. MacLachlan). In 11 fields examined in N.S., infection mostly due to U. Avenae averaged 3%, the highest being 19% (J.F. Hockey). Heavy infections of loose smut were noted in 10 fields, and traces to 10% in 25 others in P.E.I. (R.R. Hurst).

BLAST (non-parasitic) was recorded as follows: slight in Victory, Eagle, and Alaska in the University plots, Vancouver, B.C. (W. Jones); trace in 10 fields, 5% in 12, 10% in 10 and 15-20% in 8 out of 40 examined in Alta., with 10% in most varieties at Edmonton (M.W.C.); moderate amounts in 23 out of 41 fields examined in Sask. (H.W.M.); trace in a field at Kelwood, Man. (W.A.F. Hagborg); 20-30% in most varieties at Ste. Anne de la Pocatiere, Que. (A. Payette); generally trace to slight, up to 12% in the plots at Fredericton, N.B. (S.F. Clarkson); about 10% of blast in all 8 varieties in the plots at River Denys, Inverness Co., N.S. (J.F. Hockey); a slight amount in all fields examined in P.E.I. (R.R. Hurst).

MAGNESIUM DEFICIENCY was observed in 10 fields in Kings and Queens Co., P.E.I.; the lack of magnesium was confirmed by tissue tests (R.R. Hurst).

GREY SPECK (manganese deficiency). A disease of oats, thought to be grey speck, was observed for several years in experimental plots at Winnipeg, Man. At times it was common enough to render examinations for halo blight difficult as the lesions in advanced stages were not always easy to distinguish from the advanced lesions of halo blight. It was severe in 1933, 1939 and 1941. At Winnipeg the disease occurred in patches and was much more severe on some varieties and strains than on others. What appeared to be the same disease in a more severe form was noted at Gilbert Plains, in July, 1942.

In the fall of 1943, a quantity of soil was taken from a patch in an oat experiment where severe symptoms of this disease were noted. A pot experiment with oats was conducted in which careful precautions were taken against contamination with manganese from extraneous sources. In this soil, grey speck developed abundantly, but it was absent where manganese sulphate was applied either dry to the soil or as a solution sprayed only once on the seedlings.

In 1944 experiments conducted at Gilbert Plains, on the field suspected of manganese deficiency, gave a good response to manganese sulphate, both in control of grey speck and in improved yield. That the response was not due to sulphate application was evident from a pot experiment conducted with soil from the field at Gilbert Plains. In this experiment a series of pots with manganese sulphate or manganese chloride gave control of grey speck, while a similar series of pots with equivalent amounts of sodium sulphate, sodium chloride or with nothing added failed to control grey speck (W.A.F. Hagborg).

PURPLE DISCOLORATION (?phosphate deficiency). Specimens were received from Indian Head, Sask., where the trouble was conspicuous in the field (T.C. Vanterpool).

FUNGICIDE INJURY. Seed oats treated with an overdose of Ceresan were slightly to moderately injured on a farm in P.E.I. (R. R. Hurst).

BARLEY

ERGOT (Claviceps purpurea). A half to 1% of the heads were affected in 3 fields out of 70 examined in Alta.; plants along the edge of some fields at Edmonton were severely affected (M.W.C.). A trace were present in scattered fields in Sask. (H.W.M.) Ergot was observed occasionally at Guelph, Ont. (J.D. MacLachlan). A trace of ergot was present at Pictou and Nappan, N.S. (J.F. Hockey). A trace was recorded in one field of Charlottetown 80 in P.E.I. (R. R. Hurst).

POWDERY MILDEW (Erysiphe graminis). Infection was general but slight in the plots at the Sidney Station, B.C., on May 4; the disease was general on the varieties at the Agassiz Farm on May 26, being severe on fall sown Plush, moderate on Peatland and slight on Olympia and Trebi (W. Jones). Infection was severe on Rex in the University plots, Winnipeg, Man. (W.L.G.). Powdery mildew was severe, especially on early sown varieties at Guelph, Ont.; it is considered the most important disease of barley in this district (J.D. MacLachlan). Trebi and O.A.C. 21, both six-rowed varieties, were heavily infected and many leaves were killed, while the two-rowed barleys, Hannchen and Duckbill, were only slightly affected although they were all growing together in the same plot at the Botanical Gardon, Montreal, Que. (J.E. Jacques). Traces were recorded on Charlottetown 80 in 3 fields in Queens Co., P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) powdery mildew was severe at Saanichton and Agassiz, B.C., and moderate at Kemptville, Ont. (T. Johnson).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). A trace was recorded in 2 fields and slight damage in 9 out of 70 examined in Alta. (M.W.C.). Infection was slight in 1 field and moderate in 32 in the fields examined in Sask. (B.J. Sallans).

NET BLOTCH (Helminthosporium teres). Infection was a trace in 4 fields, slight in 10, and moderate in 1 (H.W.M.). The disease was general and particularly severe in the northern part of Man. (W.L.G.). Infection ranged from a trace to moderate in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). Infection varied from a trace to 45% and averaged over 12% in the plots at Fredericton, N.B. (S.F. Clarkson). A slight infection was recorded at Pictou, N.S. (J.F. Hockey).

SPOT BLOTCH (Helminthosporium sativum). Infection was a trace in 8 fields and slight in 10 out of 70 examined in Alta.; a slight infection was present on most varieties at Edmonton, Olds, and Lethbridge (M.W.C.). The disease was present on the lower leaves in field plots at O.A.C., Guelph, Ont., in early July (J.D. MacLachlan).

LEAF RUST (Puccinia anomala) was severe on fall sown Trebi and Peatland and moderate on Plush and Olympia at Agassiz, B.C. (W. Jones). Slight traces of leaf rust of barley occurred on barley varieties at Morden, Man. Elsewhere in the province this rust was not observed (B. Peturson). Leaf rust was moderate at Guelph, Ont. (J.D. MacLachlan). A trace was recorded in a field of Charlottetown 80 in Prince Co., P.E.I. (R.R. Hurst).

STEM RUST (Puccinia graminis). A trace was recorded in 2 fields and a slight infection in one in Alta.; at Edmonton stem rust was first observed on barley on Aug. 15 and a slight general infection was present by Sept. 1 (M.W.C.). Stem rust was a trace in 2 fields, slight in 2, moderate in 1 and severe in 1, all located in the southeastern part of Sask. A trace was also noted at Saskatoon (H.W.M.). For Man., see under wheat.

Stem rust infection was moderate at Guelph, Ont. (J.D. MacLachlan). Stem rust was not observed in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). A trace was present on a few varieties at Fredericton, N.B. (S. F. Clarkson) and on a few plants in a single row in the smut control plots at Kentville, N.S. (J.F. Hockey). In the rust nurseries (q.v.) stem rust was severe at Winnipeg and moderate at Morden, Man., and at Guelph and Ottawa, Ont. (T. Johnson).

BROWNING ROOT ROT (Pythium spp.). A light infection was found on 80% of the plants in one field at Indian Head, Sask. (H.W.M.).

SCALD (Rhynchosporium Secalis) was severe on Trebi x Sol 14 and slight to moderate on the other varieties on May 4 at Sidney, B.C.; a trace was also present on fall sown Trebi and Plush at Agassiz on May 26 (W. Jones). Scald infection was a trace in 7 fields, slight in 13, moderate in 7 and severe in 3 out of 70 examined in Alta.; the disease was severe on most varieties at Beaverlodge and Olds and moderate to severe at Lacombe and Edmonton (M.W.C.).

SPECKLED LEAF BLOTCH (Septoria Passerinii). Infection was a trace in 7 fields, slight in 4 and moderate in 8 in Alta.; it ranged from moderate to severe in the plots at Edmonton and from slight to severe at Lacombe (M.W.C.). In the rust nurseries (q.v.) the disease was moderate at Melfort, Sask., and Brandon, Man.; slight at Edmonton, Alta. and Morden, Man. (see also under wheat) and a trace at Kapuskasing, Ont. (T. Johnson).

COVERED SMUT (Ustilago Hordei). Infection was a trace in 3 fields, slight in 4 and moderate in 2 in Alta. (M.W.C.). Covered smut was more prevalent than in 1943, being recorded in 10 fields out of 30 examined in Sask.; infection was a trace to 4% in 8, 5-10% in 2 (H.W.M.). Infection from naturally inoculated seed was comparatively light in field plot tests, but it increased in intensity with each increase in the spore load. More smut developed in the May 4 sowing than that of May 25, which is the reverse of last year (R.C. Russell).

LOOSE SMUTS (True Loose Smut, Ustilago nuda and False Loose Smut, U. nigra). In a survey conducted by the Line Elevators Farm Service in co-operation with the Dominion Laboratory of Plant Pathology, Winnipeg, Man., it will be seen from Table 2 that

Table 2. Distribution of the loose smuts of barley by provinces.

Smut	Man.	Sask.	Alta.	Total
U. nuda	82	202	129	413
U. nigra	65	98	21	184
Total	147	300	150	597

"U. nigra is relatively much more important in Man. than it is in Alta., while Sask. occupies an intermediate position". U. nigra was present in 44% of the collections in Man., 35% in Sask., and 14% in Alta. It was also shown that both species occur in a wide range of barley varieties. Although U. nigra was found to occur in barley grown from treated seed, "its incidence, relative to U. nuda is much higher in the crop grown from untreated seed". This relation probably accounts for the lower incidence of U. nigra, to U. nuda, in Alta. in contrast to their occurrence in Man. for over 85% of the samples were treated in Alta. against 50% in Man.

Loose smut was present in 33 out of the 70 fields visited in Alta.; infection was trace in 18 fields, slight in 5, 5-10% in 8 and 20-25% in 2. A collection of smut was made from each field; when the spores were germinated, 32 collections proved to be U. nuda and one U. nigra (W.C. Broadfoot). A slight infection was found in Newall at Edmonton, Lacombe and Olds (M.W.C.). Loose smut was observed in 12 fields out of 30 examined (H.W.M.). A sample of Plush of the 1943 crop from Wauchope, Sask., produced a crop in the greenhouse with 2.3% of the heads affected by false loose smut (R.C. Russell). In all 56 samples of loose smut were collected in Que. in 1944 and the spores were germinated using the technique of last year; 75% proved to be U. nuda and 25% U. nigra, a drop of nearly a third over 1943 (R.O. Lachance). A trace of loose smut was recorded in one field in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas translucens). About 25% of the plants were affected in a field near Lacombe, Alta. (A.W. Henry). A slight infection was observed on leaves and heads of barley at Swift Current, Sask. (B.J. Sallans).

RYE

ERGOT (Claviceps purpurea) was recorded as follows: A rather heavy infection observed in an orchard in the Okanagan Valley, B.C. (H.R. McLarty); a trace to slight infection found in 2 fields in Alta. and in the plots at Olds (M.W.C.); present in most rye crops in Sask., but the infection generally light to moderate (H.W.M.).

POWDERY MILDEW (Erysiphe graminis). Infection was general but light on Prolific and Storm at Point Grey, B.C., on July 20 (W. Jones). Powdery mildew was severe on Prolific in the Botanical Garden, Montreal, Que., on Aug. 3 (J.E. Jacques).

ROOT ROT (Helminthosporium sativum). A slight infection was found at Airdrie, Alta., in one of the two fields examined (M.W.C.).

LEAF RUST (Puccinia secalina) was general, but damage slight on Prolific at Point Grey, B.C. (W. Jones). A trace to slight infection was seen in 2 fields in Alta. (M.W.C.). Infection was moderate in 2 out of 5 fields examined in Sask. (H.W.M.). A slight infection was present on Rosen winter rye at the Botanical Garden, Montreal, Que. (J.E. Jacques).

SPECKLED LEAF BLOTCH (Septoria Secalis) slightly infected rye in one field in Alta. (M.W.C.).

SURVEY OF RUST NURSERY MATERIAL FOR PLANT DISEASES IN 1944

T. Johnson

In Table 3 are given the results of examinations of material from the 26 uniform rust nurseries across Canada. The examinations were carried out at the Winnipeg Laboratory.

Twelve varieties of wheat, eight of oats and three of barley were grown in the nurseries. The varieties were as follows: Wheat - Apex, R.L. 228 (Marquis x Kanred), McMurchy, Regent, Carleton, Little Club, Marquis, Renown, Spelmar, Thatcher, Vernal, and Norka; oats - Bond, Erban, Trispernia, Ajax, Vanguard, White Russian, S-811, and R.L. 1228 (Victoria x 524); barley - Goldfoil, Heil's Hanna, and Plush. Varieties now or formerly of commercial importance are underlined.

As pointed out last year (P.D.S. 23:16), it is probable that few diseases have an opportunity of reaching their maximum in these nurseries. Readings for each disease were made on all varieties and separate tables were prepared for the intensity of infection of the rusts and powdery mildew and for the physiologic races of the rusts isolated. These detailed tables, however, are omitted and only Table 3, in which the severity of each disease on the more susceptible varieties for each Station is shown, has been included here.

PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1944

Margaret Newton, T. Johnson, B. Peturson and W.J. Cherewick

In 1944, surveys were made of the distribution, in Canada, of physiologic races of the following cereal rusts: Puccinia graminis var. Tritici, P. graminis var. Avenae, P. triticina, P. coronata var. Avenae and P. anomala.

Cultures were also established in spring and early summer from aecia occurring naturally on barberry and buckthorn in certain areas in Eastern Canada. The object of these studies was to determine which varieties of stem rust most commonly infected the barberry and which physiologic races of the crown rust of oats were present in the aecial material.

Table 3 - Pathogenic fungi found present on wheat, oats, and barley grown at 26 localities in Canada in 1944

Locality	Wheat							Oats			Barley			
	P. graminis Tritici	P. triticina	S. nodorum	S. Tritici	Fusarium spp. (Scab)	E. graminis	Melanism (on Apex, Renown, etc.) *	P. graminis Avenae	P. coronata Avenae	E. graminis	P. graminis	P. anomala	E. graminis	S. Passerinii
Saanichton, B.C.	0	1	0	0	0	4	0	1	0	3	0	0	4	0
Smithers, B.C.	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Agassiz, B.C.	0	4	0	0	2	0	2	3	0	0	0	0	4	0
Creston, B.C.	1	4	0	0	0	1	0	0	0	0	1	1	0	0
Beaverlodge, Alta.	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Edmonton, Alta.	0	1	2	2	0	3	0	1	0	0	0	0	0	2
Lacombe, Alta.	0	1	1	2	0	1	1	1	0	0	0	0	1	0
Lethbridge, Alta.	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Scott, Sask.	1	1	0	0	0	0	0	1	0	0	1	0	0	0
Melfort, Sask.	1	2	2	0	0	0	0	1	0	0	0	0	0	3
Indian Head, Sask.	1	2	1	0	0	0	1	1	0	0	1	0	0	0
Brandon, Man.	4	4	3	0	0	0	2	4	4	0	2	0	0	3
Winnipeg, Man.	4	4	3	0	0	0	2	4	4	0	4	1	0	0
Morden, Man.	3	4	3	0	0	0	1	4	4	0	3	1	0	2
Kapuskasing, Ont.	2	4	3	0	0	0	1	2	1	0	1	0	0	1
St. Catharines, Ont.	1	4	1	0	0	0	2	0	1	0	1	1	0	-
Guelph, Ont.	2	4	2	0	1	1	1	4	3	0	3	1	1	-
Kemptville, Ont.	1	4	2	0	0	1	1	4	2	0	2	0	3	0
Blair's, Manotick, Ont.	3	3	2	0	0	3	1	4	2	0	3	0	1	-
Ottawa, Ont.	2	3	2	0	0	3	1	4	2	0	3	1	1	-
Macdonald College, Que.	1	4	3	0	3	1	2	1	1	0	1	0	2	0
Lennoxville, Que.	1	4	3	0	2	1	2	1	1	0	1	0	0	-
Ste. Anne de la Pocatiere, Que.	2	4	3	0	0	0	1	1	1	0	1	0	0	0
Fredericton, N.B.	1	4	3	0	0	0	3	4	3	0	1	0	0	0
Kentville, N.S.	2	1	2	0	0	0	1	0	0	0	0	0	0	0
Charlottetown, P.E.I.	1	1	1	0	0	0	1	1	0	0	0	0	0	0

* Melanism of heads and internodes - confined to derivatives of Hope and H 44 and probably induced by more than one agency.

Explanatory note:

0 = none; 1 = trace; 2 = light; 3 = moderate; 4 = severe; - = plants not examined for presence of organism.

Distribution of Physiologic Races of the Cereal Rusts

Attacks of the cereal rusts were, generally, not severe except in Man., where weather conditions in June, July, and August favoured their development. Heavy attacks of stem rust of wheat and oats and crown rust of oats occurred in middle and late summer on susceptible varieties in Man. and at certain points in eastern Ont. Leaf rust infection was heavy in wheat in late summer in Man. and was also moderate or heavy in some parts of Ont. and Que., and at certain points in southern B.C. Leaf rust of barley was found only in trace quantities in a few places in Eastern Canada and B.C.

The survey of physiological races of stem rust of wheat showed that race 56 predominated in all parts of the country; it represented 62% of the isolates. Races 17 and 29, which have been common since 1940 and which, for practical purposes, may be regarded as the same race, accounted for only about 11% of the isolates in 1944 as against 24% in 1943, 19% in 1942 and 42% in 1941. Other races collected were, in order of prevalence, races 19, 38, 125, 39 and 9. A total of 127 collections of this rust were studied.

In leaf rust of wheat, a study was made of 170 isolations from 93 collections. In most cases two single-pustule isolates were made from each collection. The three rather similar races 2, 15, and 34, comprising nearly 30% of the isolates, predominated as they have done for some years past. Race 76, which has been common in previous years, particularly in Eastern Canada, was present in only 1.8% of the isolates. Race 128, which has not been found in Canada previously but which bears some resemblance to race 29, was common in Man. and Sask. Other races isolated were, in order of prevalence, races 3, 9, 29, 31, 5, 1, 126, 58, 28, 52, 101, 11, 53, and 65. Apart from the scarcity of race 76 and the relative abundance of race 128, there was little change from previous years in the distribution of leaf rust races in Canada.

In oat stem rust, races 2 and 5 predominated as they have done since surveys were first undertaken. Races 8, 10 and 11, which were rather common in 1943, were decidedly less prevalent in 1944. Owing to the fact that many of the collections of these 3 races came from oat varieties resistant to almost all other races found in 1944, they were not as prevalent as the figures indicate. In Man., for instance, races 8, 10, and 11 make up 17, or 28.8% of the 59 isolated from Man. When,however, only those isolates are considered that came from oat varieties equally susceptible to all races, it is found that these races account for only 11.6% of the isolates for Man. In 1943, a similar calculation indicated that about 18% of the rust in that province was made up of the 3 races. In all 157 collections of oat stem rust were studied.

In a study of 126 collections of crown rust, it was found that races 2 and 3 comprised by far the largest proportion of the rust collected in the East. Both these races increased in prevalence in Western Canada, with race 3 showing much the greater increase. These two races have been on the increase for the past three years and comprised about one half of the collections made in this area in 1944. Races 1 and 4, which formerly were the commonest in the West, have decreased very greatly in prevalence. Race 6, which has been on the increase in both Eastern and Western Canada during the past few years, decreased slightly in prevalence, but is still quite common in both areas.

Three physiologic races of barley leaf rust were isolated from 5 cultures of the rust. Two races were similar to two previously identified by A.M. Brown. The third race, collected at Agassiz, B.C. differed from any race previously collected in Canada.

Infection Studies with Aecia on Berberis and Rhamnus

In the spring of 1944, arrangements were made with several individuals to collect aecia on Berberis vulgaris and other species and on Rhamnus cathartica and to forward the collections by air mail to the Laboratory at Winnipeg. The writers are indebted to these persons for their collaboration.

On arrival at Winnipeg, the aecia were placed in moist Petri dishes to induce spore discharge and the aeciospores so produced were used for the inoculations. Spores from aecia on barberry were used to inoculate seedlings of wheat, oats, rye, Agrostis alba, and Poa pratensis. Spores from aecia on buckthorn were used for the inoculation of oat seedlings. The aecia were collected between May 31 and July 19. The distribution of viable collections by provinces was as follows: aecia on barberry - Man. 2, Ont. 10, Que. 10, N.B. 12, N.S. 1, total 35; aecia on buckthorn - Ont. 1, Que. 4, N.B. 5, total 10.

The following varieties of Puccinia graminis were isolated from aecia on barberry: Secalis only from 21 collections; Poae only from 1; Secalis and Agrostidis from 6; Secalis and Avenae from 3; Agrostidis and Tritici, Agrostidis and Poae, Secalis, Avenae and Agrostidis, and Secalis, Avenae and Tritici, from 1 each. In most instances the first mentioned variety predominated in the collection. Similarly the following races were isolated from aecia on buckthorn: race 3 from 8 collections; race 2, and races 3 and 24 from one each.

The work with the aecia on barberry leads to the conclusion that grasses play a predominant part in spreading rust to barberry. In most localities in the East, P. graminis Secalis was the predominant rust in the aecia. Most of the infection came from telia on Agropyron repens. The second most common variety of stem rust was P. graminis Agrostidis spread to barberry presumably by telia on Agrostis alba and probably other Agrostis spp. that may be common in the East. P. graminis Avenae, which occurred in five different collections of aecia, was probably spread to barberry by cultivated oats, although orchard grass (Dactylis glomerata) could also be responsible. P. graminis Poae is probably not very common as it occurred in only two collections. P. graminis Tritici appeared in only two collections, one from Dorchester, N.B. and the other from Glenholme, N.S. As only a single uredinium appeared in the latter collection, this may have arisen through a contamination from wheat stem rust present in the greenhouse.1/

With regard to buckthorn, the races of crown rust appearing from the aecial collections are the same ones common in field collections made on oats. Race 3, which predominated, is also as far as our knowledge goes, the one most common in the field. Similarly, the races of oat stem rust from barberry also the ones common in the field with exception of the single culture of race 10 occurring in the collection from Glenholme, N.S.

1/ Lest any reader should conclude that the barberry is of little importance in the epidemiology of stem rust of cereals because the authors have concluded "that grasses play a predominant part in spreading rust to barberry", his attention is directed to the discussion by the two senior authors in their paper entitled "Physiologic specialization of oat stem rust in Canada" in Can. Jour. Research 22, C:201-216. 1944. There can be no doubt that the barberry is important in local expidemics of stem rust in Eastern Canada. Even if all the initial inoculum is not aeciosporic, especially in the northern and western sections of Eastern Canada, local epidemics are of prime importance wherever the barberry occurs in close proximity to fields of susceptible varieties. The authors also point out that "the barberry may play a role in the origination or spread of physiologic races capable of attacking .....varieties now regarded as resistant." They have produced new races by hybridizing, or selfing, existing races and presented evidence that the number of races isolated tends to be greater in barberry areas than in non-barberry. As all local outbreaks almost certainly begin by the introduction of the rust from wind-borne urediniosporic inoculum, a new virulent race has but to reach a variety now regarded as resistant and produce enough inoculum to infect any barberries in the vicinity for the establishment of a local centre for the new race. It would be distinctly worthwhile to observe how localized the infection on the grasses may be, particularly on Agrostis tenuis, which is an abundant species in the Maritimes. (I.L. Conners).

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta) was most prevalent shortly before the second cutting in Alta. The estimated infection in 55 fields examined was a trace in 8 fields, slight in 27, moderate in 17 and severe in 1. Infection was slight to moderate in the plots at Edmonton, Lacombe and Olds, while it was severe on Orestand at Lethbridge and slight to moderate on the other varieties (M.W. Cormack). The disease was very common, causing some damage, in the Whitefox alfalfa-growing area in Sask. (H.W.M.). A severe infection was reported in a field at Melita, Man., where the previous season's crop had been left in the field. It was moderate to heavy at Macdonald. A slight infection also occurred on Ladak and variegated alfalfa (Medicago media) in the plots at Morden, Man. (W.L. Gordon).

BACTERIAL WILT (Corynebacterium insidiosum). The estimated damage caused by bacterial wilt in alfalfa fields in Alta. in 1944 is given in the table below:

District	Fields Examined	Percentage of Fields Damaged				
		Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Brooks-Lethbridge (irrigated)	103	18	27	14	2	61
Clover Bar-Bremner	106	14	6	4	0	24
Lacombe-Wetaskiwin	57	0	7	0	0	7
Cherhill-Sangudo-Westlock	60	0	0	0	0	0
All Alberta	326					29

Bacterial wilt was found in all the 63 stands, three years old or older, examined in the irrigated districts, and the early stages of infection were detected in severeal of the 40 younger stands inspected. In recent years there has been a notable increase in the proportion of these younger stands, especially in the Brooks district, where the disease has been most severe. It has developed rapidly in the Clover Bar-Bremner district, east of Edmonton, where it was found in nearly one-quarter of the 106 fields examined in an area covering about one township. The early stages of the disease were also found for the first time in 4 widely separated fields in the Lacombe and Wetaskiwin districts. No trace of it has yet been found in the alfalfa seed-producing areas near Cherhill, Sangudo, and Westlock (M.W. Cormack).

ROOT ROT (Fusarium avenaceum, etc.). Slight to moderate damage was found in 2 fields at Brooks and in 1 at Bremner, Alta. F. avenaceum was isolated from the diseased roots (M.W.C.).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti). A slight infection was present in the plots at Edmonton, Alta. (M.W. Cormack).

DOWNY MILDEW (Peronospora aestivalis). Infection was slight in one field at Duffield, Alta., and slight to moderate on young plants in the plots at Edmonton (M.W. Cormack).

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii). Infection was severe in one plot and slight in a second, but the disease was not observed in any others of the Division of Forage Plants, C.E.F., Ottawa, Ont. (D.B.O. Savile).

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was general and caused slight damage in the coastal areas of B.C. (W. Jones). This leaf spot was present through the Okanagan district, especially on plants near irrigation flumes (G.E. Woolliams). The estimated infection in 55 fields examined prior to cutting in Alta. was: trace in 2 fields, slight in 31, moderate in 18, and severe in 1. Infection varied from slight to moderate in the plots at Lacombe, Lethbridge, and Olds, and from moderate to severe at Edmonton, where there was considerable damage from defoliation (M.W. Cormack). Common leaf spot caused moderate damage from defoliation in the alfalfa growing area in northeastern Sask. and in the University plots, Saskatoon (H.W.M.). Infection was moderate to severe at Macdonald, Morden, and Winnipeg, Man., on alfalfa and at Morden on variegated alfalfa (M. media) (W.L. Gordon). Common leaf spot was not as prevalent at Guelph as in 1943 (J.D. MacLachlan). Defoliation was severe due to leaf spot in a field harvested late in Bellechasse Co., Que. (R.O. Lachance). A scattered light infection was recorded in Queens and Kings Co., P.E.I. (R.R. Hurst).

ROOT ROT (Rhizoctonia Solani). The organism was isolated from diseased roots obtained from a slightly damaged stand at Rainier, Alta. (M.W. Cormack). Crown rot was reported to have caused extensive damage at Brandon, Man.; Rhizoctonia Solani was isolated (W.J. Cherewick).

ROOT ROT (Sclerotinia sativa) caused slight damage in a field at Wetaskiwin, Alta. (M.W. Cormack).

CROWN ROT (low-temperature basidiomycete). Damage was much less prevalent and severe in Alta. than in 1943. Crown rot was found in 73 out of 223 stands of alfalfa examined in the central and north-central sections. The damage was estimated as a trace in 20 fields, slight in 48, and moderate in 5. Many of the other fields had been damaged in 1943 or previous years, but no further killing of plants was noted in 1944. Slight crown rot damage was found in 9 of the 103 fields examined in southern Alta. True winter killing was not observed in 1944 (M.W. Cormack).

MOSAIC (virus). A few affected plants were seen in a plot at the Sidney Station, B.C. (W. Jones).

MOSAIC (Medicago virus 2). Seven plants showing mosaic due to this virus were found on Aug. 17 in a field of Grimm at the Fredericton Station, N.B. The virus was readily transmitted by sap inoculation to Medicago sativa, Trifolium pratense, Datura Stramonium, Nicotiana glutinosa, N. Tabacum, and Cucumis sativus. An attempt to transmit it to Lycopersicum esculentum was not successful (D.J. MacLeod).

WITCHES' BROOM (virus). A low percentage of plants was found in fields of Grimm in the Armstrong district, B.C. (G.E. Woolliams). Witches' broom caused about 5% damage in a field near Cherhill, Alta. Occasional plants were severely affected in a field at Bremner, and in an old plot at Lacombe. The plots that have been under observation for several years at Edmonton were so severely thinned out that they were plowed up in 1944 (M.W. Cormack).

YELLOWS (boron deficiency). Evidence of boron deficiency was observed in several fields in the Grand Forks district, B.C. (G.E. Woolliams). Plants suffering from what appeared to be boron deficiency were brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

COMMON CLOVER

LEAF SPOT (Cercospora zebrina) was found for the first time in Alta., where it was observed in 13 fields of alsike clover in the Drayton Valley; the estimated infection was a trace in 4 fields, slight in 8 and moderate in one (M.W. Cormack). A moderate infection was observed on some plants of alsike at Norgate, Man. (W.L. Gordon).

SOOTY BLOTCH (Cymadothea Trifolii). A slight infection occurred in the plots of alsike at Edmonton, Alta. (M.W. Cormack). A trace infection was general on alsike at Norgate, Man. (W.L. Gordon).

POWDERY MILDEW (Erysiphe Polygoni) was present on red clover in several parts of the Okanagan Valley, B.C., but nowhere was it severe (G.E. Woolliams). Infection was slight in 6 fields of red clover and moderate in 3 out of 19 examined in Alta.; a slight to moderate infection occurred in the plots at Edmonton, Alta. A slight infection was found for the first time on alsike in the same plots (M.W.C.). Infection was general and severe on red clover at Minnitonas, Man., slight to moderate at Winnipeg and slight at Clearwater Bay, Ont. (W.L. Gordon). Powdery mildew was less prevalent at Guelph, Ont., than in 1943 (J.D. MacLachlan). Powdery mildew was severe, very few plants appearing free from infection, at the Botanical Garden, Montreal, Que. (J.E. Jacques). Traces of powdery mildew were noted on wild red clover in Prince Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Gloeosporium spadiceum). Infection was slight in 5 fields of red clover in Alta. and moderate in one, the latter in the Drayton Valley district (M.W. Cormack).

ANTHRACNOSE (Kabatiella caulivora) caused slight damage in 4 fields of red clover and moderate damage in 1 in Alta. Siberian Red was severely damaged at Lacombe, particularly in the 5-acre increase plot, where 25-50% of the plants were ruined. Damage varied from slight to severe on the other varieties at Lacombe. Infection was moderate to severe in one plot of Siberian Red at Olds, but other plots of the same variety were only slightly infected (M.W. Cormack).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti). A slight infection was found in 7 fields of alsike clover at Drayton Valley and Sangudo. The pathogen was isolated and is apparently identical with isolates from sweet clover (M.W. Cormack).

BACTERIAL LEAF SPOT (Pseudomonas syringae). Two or three affected plants were noted in block 1A, Division of Forage Plants, C.E.F., Ottawa, Ont. (R.G. Atkinson). This is the first report of the disease on red clover to the Survey (I.L.C.)

LEAF SPOT (Pseudopeziza Trifolii). Only a trace was found on the stipules of an alsike clover plant at Norgate, Man. Ascospores were 7.5-10.5 x 2.5-3 microns. This is the first record on alsike in Man. (W.L. Gordon).

LEAF SPOT (Stagonospora recedens). A slight infection was found in 2 fields of red clover at Drayton Valley, Alta. Isolations yielded a fungus, which appears to be distinct from S. Meliloti obtained from sweet clover and alsike clover (M.W. Cormack). Some leaves of red clover were infected at Morden, Man. Spots mostly circular, up to about 6 mm., zonate except when confluent; spores 10-12.5 x 3 microns, slightly smaller but similar to those of Ascochyta imperfecta on alfalfa (W.L. Gordon). The pathogen is tentatively determined as S. recedens (I.L. Conners).

RUST (Uromyces fallens). Infection was severe on leaves and petioles of red clover at Winnipeg, Man.; trace on Manhardi at Morden, general and moderate at Clearwater Bay, Ont. (W.L. Gordon). A trace was observed on wild red clover in Kings Co., P.E.I. (R.R. Hurst).

MOSAIC (Trifolium virus 1). Three affected plants of Ottawa Double-Cut red clover were found at the Fredericton Station, N.B. The virus was transmitted by sap inoculation to Trifolium pratense, Pisum sativum and Vicia Faba. Attempts to transmit it by sap inoculation to Phaseolus vulgaris, Lycopersicum esculentum, Medicago sativa, and Nicotiana Tabacum failed (D.J. MacLeod).

Mosaic affected Ladino white clover in patches in field plots at Agassiz, B.C. (W. Jones).

SWEET CLOVER

STEM CANKER (Ascochyta caulicola). A slight infection was found in one field at Edmonton, Alta. (M.W. Cormack).

BLACK STEM (Ascochyta lethalis). Infection was slight in 2 fields and moderate in one out of 12 examined in Alta. (M.W.C.).

ROOT ROT. Fusarium avenaceum was isolated from diseased roots obtained from a slightly injured stand at Markerville, Alta. The same pathogen and Cylindrocarpon Ehrenbergi caused slight to moderate damage in the plots at Edmonton (M.W. Cormack).

LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). Infection was a trace in 4 fields, and slight in 3 in Alta. and in the plots at Edmonton (M.W.C.). A moderate infection was general in the University plots, Winnipeg, Man. (W.L. Gordon).

ROOT ROT (Phytophthora Cactorum). About 5% damage was found in one field and a trace in another in southern Alta. Occasional plants were also dying in all roadside stands examined (M.W. Cormack).

CROWN ROT (Rhizoctonia Solani). Extensive damage was reported from Brandon, Man.; R. Solani was isolated (W.J. Cherewick).

ROOT ROT (Sclerotinia sativa). Moderate to severe damage occurred in the plots at Edmonton, Alta. (M.W. Cormack).

BROOMCORN MILLET

SMUT (Sphacelotheca destruens) was heavy on a sample of 1943 seed from Ritchie, Sask.; when this seed was sown in the greenhouse, half the plants were affected (P.M. Simmonds).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was fairly general on varieties of Fagopyron tataricum in York, Sunbury, Carleton, Victoria and Westmorland Co., N.B.; an occasional plant of Silver Hull (F. esculentum) was affected at the Station, Fredericton, N.B. (D.J. MacLeod).

CORN

EAR ROTS (Diplodia Zeae, Fusarium moniliforme, Gibberella Saubinetti, Nigrospora sphaerica) were all at a low ebb on Nov. 7, 1944, in Essex and Kent Counties, Ont. Diplodia, however, could be found in every field of hybrid and open-pollinated corn, although damage was usually slight. Ears infected by F. moniliforme could also be found in every field. Gibberella was present only in some fields, and then only at low infection rates. Nigrospora likewise occurred only in certain fields, although infection from this pathogen may have increased before harvest (L.W. Koch).

RUST (Puccinia Sorghi). A trace to slight infection was observed on some leaves at Morden, Man. (W.L. Gordon). Traces of rust were recorded in Queens Co., P.E.I. (R.R. Hurst).

SMUT (Ustilago Maydis). A moderate infection was general at Morden, Man. (W.L. Gordon). The disease was prevalent throughout the Guelph district, Ont. (J.D. MacLachlan). An affected specimen was received from Chicoutimi, Que. (L.T. Richardson). Traces of smut were found in Queens Co., P.E.I. (R.R. Hurst).

FLAX

Professor T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask., has again prepared an excellent summary of his observations, entitled "Flax Diseases in Saskatchewan in 1944."

The fluctuating weather conditions which prevailed in many parts of Saskatchewan this season appear to have affected the growth of flax adversely. They appeared to have favoured more particularly the development of late root rot and the condition on flax described here as die back.

SEEDLING BLIGHT (Rhizoctonia Solani). Some seedling blight was found in flax fields examined early in the season, but heavy rains in June, especially on the heavier soils, buried the tiny dead seedlings under wash soil. Very little of the disease was found after the rains, so that it was not possible to estimate how much effect this disease had on reducing flax stands. R. Solani was again the predominant cause of the trouble where this was found.

RUST (Melampsora Lini). In the over-all picture rust caused less damage than usual. Infection was generally slight on the Royal variety, low spots of the field or where the growth was heavy showing moderate amounts. The situation was similar in the Redwing variety. Early infections, even in the cotyledonary stage, were conspicuous in many districts. This serious situation could be lessened by more thorough removal of bits of rust-infested straw during seed-cleaning, by the earlier ploughing under of flax stubble and volunteer flax plants, and by growing all flax on land not in flax the previous year. Rust was unusually light on the native wild flax (Linum Lewisii). In 1942 when rust infestation was heavy on cultivated flax, it was also common on wild flax.

STEM CANKER (Melampsora Lini and Fusarium spp.). As was to be expected, with the almost complete elimination of the rust-susceptible variety Bison, stem canker was not as prevalent in commercial flax fields in 1944 as during the previous two years. Among the susceptible varieties in the University experimental plots, however, infection was high and the brown discoloration extended far beyond the black telia.

WILT (Fusarium oxysporum f. Lini) was recorded in three farm fields at Young, Alford, Elrose respectively, where the wilt-susceptible variety Crown was grown but not over 15% of the plants were affected.

STEM BREAK and BROWNING (Polyspora Lini). The June survey revealed an unusually large number of flax fields showing severe cotyledonary lesioning. Isolations from representative samples gave mainly Polyspora Lini. Severe stem break and browning were expected to develop in these fields. A pre-harvest survey at the end of August showed that little or no stem break had developed in areas where the weather during July and August was dry and hot, such as at Rosetown and points west, but with increasing rainfall north, east and southeast of this area, stem break and browning were correspondingly more severe. The stem break phase was particularly heavy in fields at Juniata, Guernsey, Hanley, Birsay, Tuxford and Archydal, with the browning lesions only moderate in size and numbers at this stage. These observations bring out very clearly the close relationship between moisture conditions and the development of the disease in Sask. One of the most severely attacked fields was sown on flax stubble; another rated as severe was a fallowed field adjoining a flax stubble field which was not ploughed up until the new flax crop was well established. In this latter field, a careful examination showed that the disease was most severe on the side nearest to the stubble field and gradually decreased toward the more distant side. Late August and September rains in some districts favoured the spread of the browning phase

and doubtless increased the amount of seed-borne infection. That spore production was abundant at this time is indicated by the heavy spore load (centrifuge test) of P. Lini on some 1944 seed samples examined. This, however, gives no indication of the percentage of internally seed-borne infection, which may even be entirely absent or present as a trace. This disease continues to be of much concern as it is generally distributed throughout the province and is not entirely eliminated by seed treatment. More attention should be given to every factor relating to its control by all growers, but most particularly by growers of certified seed.

PASMO (Septoria linicola). No authentic reports of the presence of this disease in Sask. have been received. Unconfirmed reports in September received indirectly from elevator agents, credited the disease to be present in the extreme south of the province. An attempt was made to obtain specimens, but without success.

LATE ROOT ROT (Rhizoctonia, Fusarium spp., etc.). Damage characterized by premature ripening of the plant with slight stunting and shrivelling of the seed was conspicuous in many districts this year, especially in some parts of the south (Willowbunch), where it was present in definite areas. Late root rot is usually distinct from die back (see below), though root rot in some cases may possibly be a contributing factor in die back. Owing to the late appearance of both these troubles, the loss in affected areas would be slight, but the reduction in yield between healthy and diseased plants may be as high as 40%.

DIE BACK (cause unknown). About the first week in August several varieties and selections in the plots at Saskatoon developed striking die back symptoms. The upper third of the plants including the bolls turned brown, while the lower two-thirds remained relatively green for some considerable time afterwards. The roots more often appeared normal, with some evidence of cortical lesioning. Similarly, the seeds of affected plants were usually normal, but in some cases shrivelling was evident. In field surveys after this date, die back as described above was found to be common throughout the central, west central and south (especially at Saskatoon, Tessier and Keeler) on individual plants or on small clumps scattered generally through fields. The trouble has not been seen or reported from the moister northeastern areas of Saskatchewan. Isolations from affected stem parts yielded Alternaria species only. This die back is definitely not caused by Botrytis cinerea, which is reported as the cause of a die back of flax in Ireland and California. In the south, around Willowbunch, die back and root rot seemed to merge into one another. There, in several fields both symptom types were present in sharply delimited areas of irregular shape amongst green healthy areas. From the roots of affected plants the fungi usually associated with late root rot were isolated. The soil reaction in diseased areas was pH 8+, and in normal areas around pH 7. My hypothesis at present is that the trouble is due primarily to adverse soil and irregular or changeable weather conditions, associated in some instances with slight root rot caused by cortical invading fungi.

STEM DISCOLORATION. A condition which has not attracted attention before was frequently encountered just before harvest in the University plots and in commercial fields especially in the Tessier area. Brown to dark brown

areas 3/4 to 1½ inches long completely encircled the stems, usually in the upper two-thirds. Alternaria was obtained from a moderate percentage of affected stems on plating out. This condition might bear some relation to the die back described above.

FUNGUS LESIONING FOLLOWING HAIL INJURY. On August 22 a flax field at Willowbunch showed fungus lesioning ¼ to 1 inch above and below bruises from hail stones which fell on August 1, Phoma, Alternaria and Cladosporium were isolated. It is not possible to say to what extent one or more of these organisms increased the initial hail damage, but the appearance of the lesions suggested that damage other than what would result from drying out alone had ensued.

IRREGULAR STANDS. Many instances were encountered of irregular emergence of flax last spring, particularly in the heavy soils of the Rosetown area, which was not attributable to differences in seed viability, seed-coat cracking or seed-borne organisms. From results on one farm with seed from the same source sown in the same field on different dates, it appears that flax is very susceptible to the time of rainfall following sowing. Whether the rain fell immediately after sowing or one, two or three days later, appears to influence emergence considerably. More information on this point, especially from other districts, is desirable.

Other Observations

Attention is drawn to Alternaria linicola Groves & Skolko isolated from seeds of flax (Can. Jour. Research 22 C:223, 1944). The authors state that the fungus has been isolated from seeds originating in Que., Ont., Man., Sask., and Alta., i.e. from all the provinces where the production of seed and fibre flax is of commercial importance. This disease has not yet been recognized in the field, but the authors predict that, under suitable conditions, A. linicola is likely to be found causing considerable damage probably as a leaf blight or in pre-emergence mortality. The large size of the conidia, and their resemblance to A. Brassicae should make it relatively easy to distinguish A. linicola on field material from the ubiquitous A. tenuis. Although the authors point out that it is difficult to distinguish cultures of A. linicola from non-sporulating strains of A. tenuis, they have been able to obtain conidia on agar using the mutilation technique of Rands (I.L.C.).

ANTHRACNOSE (Colletotrichum Lini) infection varied from a trace to slight in stands from Ceresan-treated seed of Cirrus and Gossamer in Kamouraska, L'Islet and Temiscouata Counties, Que., while it was moderate to severe where the seed was untreated. The disease was reported from Chateauguay Co., and its presence was confirmed by a seed examination (R.O. Lachance, A. Payette).

DODDER (Cuscuta Gronovii). A plot of flax contained many infected plants at Gilbert Plains, Man.; Chenopodium sp. in the same plot was also attacked (W.E. Sackston).

STEM CANKER (Fusarium sp.). A moderate infection was seen at Portage la Prairie, Man. (J.E. Machacek).

WILT (Fusarium oxysporum f. Lini). In experiments on seed disinfection at Ste. Anne de la Pocatiere, some plots of Gossamer on clay soil were severely infected by wilt. Neither Ceresan, Arasan, nor Spergon had any effect on its development (A. Payette). Traces were also present in nearly every plot in the variety test at the Station (R.O. Lachance).

RUST (Melampsora Lini). A slight infection was seen in Lirral Dominion at Ladner, B.C. (W. Jones). Rust was observed in 7 fields out of 11 examined in Alta.; infection was a trace in 2, slight in 2 and moderate in 3. Infection was a trace to slight in the plots at Beaverlodge and Edmonton; it was slight on Bison and Redwing at Lacombe, but rust was not seen on L33-14 selection (M.W.C.). Rust was fairly common in Sask.; a few fields of Bison were severely infected, while Royal was moderately rusted in some areas. At Saskatoon on July 17, infection was moderate on Bison, slight on Biwing and Kota, while no rust was seen on Arrow and Dakota (H.W.M.).

In 1944, aecial infections of flax rust were observed on volunteer flax seedlings at Winnipeg, Man., on May 26, and by June 6, the red stage was beginning to appear. The seedlings on which these infections occurred were growing among some flax stubble and uncut flax plants from the previous year. All the susceptible volunteer plants became very heavily infected as did susceptible varieties sown adjacent to this old flax field. Susceptible flax varieties sown at a distance of 100 yards from this field also became heavily infected, but infection at this distance from last year's flax field occurred a full week later than in the plots growing adjacent to it. Generally throughout Manitoba flax rust in farmers' fields was less prevalent than it had been for several years past. Only traces of rust were found in Royal which constituted the majority of the flax fields examined. Even in Bison and Redwing the percentage infection did not much exceed 5%. The decrease in prevalence of flax rust was, no doubt, due to a decrease in rust inoculum present in Man. owing to the displacement last year by Royal (a resistant variety) of Bison (a very susceptible variety), which for some years past comprised a large percentage of the flax acreage (B. Peturson).

Rust was reported for the second year by a provincial weed inspector from Soulanges Co., Que. (cf. P.D.S. 23:24) (R.O. Lachance).

STEM BREAK and BROWNING (Polyspora Lini). A 5-20% infection was seen in 2 fields in Sask. Leaf and stem lesions were common in some varieties in the University plots, Saskatoon (H.W.M.).

SEEDLING BLIGHT (Rhizoctonia Solani). A moderate to severe infection occurred in a seed bed in the Laboratory greenhouse at Ste. Anne de la Pocatiere, Que., where sound seed of Cirrus disinfected with Arasan had been sown. There was some typical damping off when the plants were 3 to 4 in. high, but most plants succumbed when about 10 in. high; pinkish lesions were present on the hypocotyl (A. Payette).

PASMO (Sphaerella linicola (Septoria linicola) caused moderate damage to Royal in the plots at Agassiz, B.C. (M.F. Clarke). The pathogen was detected on specimens of seed and fibre flax received earlier from Mr. Clarke and the organism was isolated by W.E. Sackston. Pasmo infection was moderate to severe in 7 fields, trace to slight in 5 out of 14 fields examined in Man. (W.L. Gordon).

Fibre flax stems received from E.M. Mackay of the Fibre Flax Pilot Mill at Portage la Prairie, Man., on Dec. 7, 1944, bore what appeared to be pycnidia of Septoria linicola on pasmo-diseased areas. Mounts showed, in one case, perithecia containing asci, mostly with immature spores; ascospores 8, biseriate in a straight to tortuous ascus, 2-celled, slightly curved, hyaline, tapering at each end, and some, apparently mature, were 16-19 x 3 microns. No paraphyses were seen (W.E. Sackston, W.L. Gordon).

CHLOROSIS (excess lime) was observed at Brandon, Man.; plants were chlorotic and stunted in large patches (J.E. Machacek).

DIE-BACK (cause unknown) caused severe damage in patches in fields at Provost, Alta., and in the plots at Lacombe (G.B. Sanford). Die-back affected 10-25% of the plants in fields at Weyburn and Major, Sask. The upper part of the plant had a scorched brown appearance and the bolls were usually empty. The injury has been attributed to drought with hot winds, but it may also be due to the fact that the flax was grown on soils showing eroded or "burn-out" spots found in soils of the Echo association (Univ. of Sask. Soil Survey Rept. 12:60. 1944) (H.W.M.). About 75% of the plants of Cirrus were affected by a die-back in a field in Kamouraska Co., Que. The lower part of the plant usually remained green, but sometimes the entire plant was involved. No organism was isolated although numerous attempts were made. The soil was dry, sandy, and poorly prepared; weeds were numerous (R.O. Lachance).

SPERGON INJURY. Spergon applied at the rate of 5 oz. per bu. caused a malformation of the leaves, which usually became united into a tube in a planting in Kamouraska Co., Que.; about 90% of the seedlings were affected, but they soon recovered (R.O. Lachance).

KOK-SAGHYZ

YELLOWS (Callistephus virus 1). Four plants were found affected in the plots at the Fredericton Station, N.B. (D.J. MacLeod).

MILKWEED

LEAF SPOT (Cercospora clavata). The leaves of some cultivated plants of Asclepias syriaca were moderately affected in a large plot at Morden, Man. A trace of Colletotrichum fusarioides (Ell. & Kell.) O'Gara and Coniothyrium sp. (spores 5-8.7 x 2.5-3.5 microns) was found intermixed with the Cercospora. C. clavata was severe on many leaves of a clump of A. syriaca grown as an ornamental at Morden, Man. In this collection the spores were unusually long, being 67.5-127.5 x 4-6 microns (W.L. Gordon).

ARGENTINE RAPE

WHITE RUST (Cystopus candidus). A slight infection was general in a field of Argentine rape (Brassica Napus) at Sanford, Man.; a moderate infection occurred on some leaves (W.L. Gordon).

SAFFLOWER

RUST (Puccinia Carthami). Infection was moderate to severe in one plot at Lethbridge, Alta. (W.C. Broadfoot). Rust was heavy on a small plot at the Field Husbandry Farm, University of Sask., Saskatoon. This plot was a 1/4 mi. from the plots where the disease occurred in 1942 and 1943 (H.W.M.).

SORGHUM

BACTERIAL LEAF SPOT (Pseudomonas syringae). A light general infection was observed on Kafir corn in the Botanical Garden, Montreal, Que.; it did not seem to cause appreciable damage (J.E. Jacques).

SOYBEAN

The account below on "Soybean Diseases in Southwestern Ontario in 1944" was prepared by Drs. L.W. Koch and A.A. Hildebrand, Harrow, Ont.

The disease situation in soybeans in southwestern Ont. this year differed from that of the past several years. Not only were losses due to disease reduced to a minimum, but also, while only traces of several of the more commonly occurring diseases could be found, certain new and potentially dangerous ones were encountered for the first time.

POD and STEM BLIGHT (Diaporthe Phaseolorum var. Sojae), first noted July 18, continued to be found throughout the growing season in nearly every commercial planting visited. Except in one field on Pelee Island, where soybeans had been grown for ten years in succession, the disease did not appreciably reduce yield. However, since the disease is seed borne, the occurrence of even a few affected plants in virtually all stands means that there is a general and a potentially important carry over of inoculum from this season to the next. Given next year a season favourable for the development of the disease, it could become epiphytotic.

BUD BLIGHT (virus). In the course of a routine inspection of laboratory experimental plots on July 7, attention was attracted to a number of plants that exhibited a symptom picture not previously encountered. The youngest tip leaves of these particular plants were cupped and showed a brownish discoloration at the apex, along the edge or from the tip toward the centre of the leaflets. In transmitted light the veins of the young leaves showed a marked clearing and there was a suggestion of inter-veinal rugosity. In attempts to unfold the leaflets the tissues were found to be "hard" and brittle.

The second youngest trifoliate leaf showed yellowish-brown to brownish discoloured areas between the veins as well as a distinctly rugose condition. The appearance of these leaves suggested infection by a virus of the mosaic type. Unlike mosaic, however, the mottled appearance of the leaves of the plants in question was due to contrasts among yellows, browns and greens rather than between varying intensities of greens as in the early stages of mosaic. The third youngest trifoliate leaflets were normal in size and colour except for a slight rugosity or blistering of the interveinal tissues.

All down the stem the buds gave the suggestion of flaccidity and showed browned and withered tips. Like the youngest leaves they were extremely brittle and broke off with the slightest handling. When the stalks were cut open, the pith at each of the distal nodes showed a distinctly brown, water-soaked condition. (In later stages, all the nodes of a plant were found to show the internal, brownish discoloration). Internally and externally the roots appeared perfectly healthy. When the growing point of the main stalk was affected as described above, growth was arrested and the plants became conspicuous because of their stunted condition. Sometimes only a single branch of a plant showed typical symptoms and stunting.

The above symptoms together with others observed later in the season, including a characteristic blotching of the pods, coincided so closely with those described for Bud Blight, that there is no doubt as to the identity of the disease.

Samson who observed this disease on vegetable soybeans in Indiana in 1941, found that it was caused by the tobacco ring spot virus or a virus that has somewhat similar properties, (U.S. Pl. Dis.Reporter 26 (17):382. 1942). In 1942, Johnson observed the disease on field soybeans in Ohio and confirmed the identification of the causal virus, (U.S. Pl. Dis. Reporter 27 (2):86-87. 1943). The latter investigator referred to the disease as Soybean Streak. In addition to Indiana and Ohio the disease has now been reported from seven more states. According to Koehler (Soybean Digest 4 (8):6-7. 1944), "In the Northern Mississippi valley 'Bud Blight' appears to rival in importance the bacterial blights of which there are several".

Bud blight was found in nearly every field inspected in Essex and Kent Counties, the number of affected plants ranging from a trace in many cases to a maximum of about 2% in others. If, like mosaic, this disease should prove to be seed borne, then already an appreciable amount of inoculum is present in the seed for next year's planting.

PHYLLOSTICTA LEAF SPOT (P. sojaecola). On June 17, Phyllosticta leaf spot was noted on the lower leaves of plants in a number of commercial plantings. In a few weeks the disease entirely disappeared and caused relatively little damage this year as compared with last.

BACTERIAL BLIGHT (Pseudomonas glycinea). During the early part of the current season infection by bacterial blight was general and threatened to be serious. However, with the onset of dry weather, the disease for the most part disappeared. During an inspection of the 5,000-6,000 acres of soybeans on Pelee Island on September 8, it was noted that there was heavy and almost general infection by bacterial blight. Infection seemed to be recent and while possibly contributing to slightly earlier defoliation had come too late to be a limiting factor in production.

FROG-EYE (Cercospora sojina). Towards the latter part of the season, as was the case last year, the reddish-brown to blackish-brown, more or less elongated lesions, characteristic of the frog-eye disease, were observed on the stems of plants in the laboratory experimental plots and in commercial plantings of the district. Observational evidence to date suggests that C. sojina is a weak parasite capable of attacking stems of plants only after they have reached a relatively late stage of maturity.

BROWN SPOT (Septoria Glycines). Early in September specimens of diseased soybean leaves that had been sent to Ottawa by J.K. Knights, Supervisor, District Experimental Substation, Fort William, Ont., were relayed to Harrow for diagnosis. The symptoms so closely resembled those described by Wolf and Lehman for brown spot (J. Agr. Research 33 (4):365-374. 1926) that the disease was tentatively diagnosed as such. Isolations from brown spots on the leaves yielded pure cultures of a Septoria sp. apparently identical with that reported last year (P.D.S. 23:31-32) as having been isolated from lesions on stems of plants at Harrow and identified as S. Glycines Hemmi. Thus, it has been established that brown spot occurs not only on stems of plants in Ontario, but also on leaves, and in widely different climatic zones within the province.

CHARCOAL ROT (Macrophomina Phaseoli (Maubl.) Ashby). On August 21, while inspecting a stand of soybeans being grown for registered seed, attention was attracted to a plant that was wilted and dying. Closer examination of the diseased plant revealed the presence of a lesion on the stem at about the ground level. Beneath the epidermis in the dried-out cortical tissues of the diseased area was noted a thick "peppering" of minute, black, shiny, sclerotia-like bodies. On the basis of these symptoms the disease was diagnosed as charcoal rot. Single sclerotia transferred to artificial media readily yielded pure cultures of M. Phaseoli (= Sclerotium bataticola). In greenhouse infection experiments, the disease was reproduced on soybeans in typical form. This fungus has been reported only once before to the Survey (P.D.S. 13:29), when it was found on sweet pepper in the Niagara Peninsula by J.K. Richardson.

ASCOCHYTA and ALTERNARIA sp. As in past seasons, Ascochyta and Alternaria were found fruiting on lesions on leaves in a manner which suggested that they might possess primary parasitic capability.

FUSARIUM BLIGHT (Fusarium oxysporum f. tracheiphilum). Last year Fusarium blight was the most destructive disease encountered. This year, the disease was virtually non-existent, only a few affected plants being noted throughout the whole season.

MOSAIC (virus) also was almost absent. Only in the variety Manchu were a few infected plants noted.

DOWNY MILDEW (Peronospora manshurica). Even on the variety A. K. Harrow, which is very susceptible to attack by downy mildew, not a single infected plant was noted this year.

RED SPIDER. In the course of an inspection on Aug. 21, it was observed that portions of fields and in some cases whole fields, particularly of the variety Manchu, showed a grayish-green rather than the normal green colour. Closer examination revealed that plants in the "off-colour" areas were heavily infested by red spider. The infestation lasted for some weeks and over a considerable portion of the soybean-growing area in Essex Co.

Other Observations

WILT (Fusarium sp.). A few scattered plants of Pagoda were affected at the Agassiz Farm, B.C. (W. Jones).

DOWNY MILDEW (Peronospora manshurica) was general on the foliage of Pagoda at Agassiz, B.C. (W. Jones).

BACTERIAL BLIGHT (Pseudomonas glycinea) was reported as follows: slight general infection on 2 garden rows of Black Eye at Agassiz, B.C. (W. Jones); slight to moderate damage in the plots at Lethbridge, Alta. (M.W.C.); infection a trace at Winnipeg, moderate in East Kildonan and Morden, and severe at Brandon (W.L.G.); severe infection in 1941-4, 1941-5, causing some defoliation at Nappan, N.S. (J.F. Hockey).

MANGEL

CROWN GALL (Agrobacterium tumefaciens) affected 2 roots of Frontenac in Queens Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola) was moderate about Guelph, Ont. being not as severe as in 1943 (J.D. MacLachlan). Infection was a trace to heavy in a field of Frontenac in Prince Co., P.E.I. (R.R. Hurst, D.B.O. Savile).

LEAF SPOT (Phoma Betae). A slight infection was observed on the leaves of stecklings and mother plants of Tip Top at the Farm, Agassiz, B.C. (W. Jones). A moderate infection was found in one field of mangels grown for seed at Vernon, B.C. (G.E. Woolliams).

LEAF SPOT (Ramularia beticola). Infection was general causing moderate damage to the foliage of Tip Top at Agassiz, B.C. (W. Jones).

RUST (Uromyces Betae). A slight infection of uredinia was present at the Station, Sidney, B.C. on Feb. 1 (W. Jones).

ROOT ROT (various) caused a loss of 10% of the foundation seed plants in the University plots, Vancouver, B.C. (W. Jones).

MOSAIC (virus) affected 25% of the crop of one variety in the University plots, Vancouver, B.C. (W. Jones). A trace of mosaic (Beta virus 2) was found in a plot at the Station, Fredericton, N.B. (D.J. MacLeod). A trace of mosaic was observed in a field of Frontenac in Queens Co., P.E.I. (R.R. Hurst).

BLACK HEART (boron deficiency) was seen affecting the odd plant of Frontenac in Prince Co., P.E.I. (R.R. Hurst).

FASCIATION (cause undetermined). About 2% of the plants in a seed plot at the Fredericton Station, N.B., showed varying degrees of fasciation (D.J. MacLeod). An occasional plant was noted in a field of Frontenac in Prince Co., P.E.I. (R.R. Hurst).

SUGAR BEET

The report as follows on "Diseases of Sugar Beets in Southwestern Ontario in 1944" was contributed by Dr. A.A. Hildebrand, Dominion Laboratory of Plant Pathology, Harrow, Ont.

Because of excessive rainfall, seeding of sugar beets was below normal in April, but with improved weather plantings were abnormally heavy in May, and growing conditions were excellent. In general, disease as a factor reducing yield or impairing quality of beets was not as important this year as in several previous seasons.

BLACK ROOT (various fungi). Despite seemingly favourable soil conditions, black root accounted for a loss of some hundreds of acres this spring. It is difficult to appraise accurately the loss in acreage due to black root alone, since this year an unusually heavy infestation by flea-beetle coincided with incidence of the disease, especially in later plantings.

RHIZOCTONIA ROT (R. Solani). As usual this disease was of almost general occurrence throughout the district and would account for a total loss of about 2% of yield.

RHIZOPUS ROOT ROT (Rhizopus arrhizus). In 1942 Hildebrand and Koch reported (Can. Jour. Research 21 C:235-248. 1943) that sugar beets growing in an experimental plot at the Harrow laboratory were attacked and destroyed by a root rot caused by R. arrhizus Fischer. Early in September of the current year the disease was found for the first time in Canada in commercial stands in the southern part of Essex Co. Although the disease did not cause significant losses in the field, nevertheless, it constitutes a serious potential threat to beets assembled in piles at concentration points, especially under conditions conducive to "sweating" and heating.

DODDER. Also in September, dodder was found parasitizing beets in certain fields of Essex Co.

CERCOSPORA LEAF SPOT (C. beticola). This year for the first time in many seasons, Cercospora leaf spot was virtually absent, only a few scattered leaf infections having been noted throughout the whole district.

Other Observations

LEAF SPOT (Cercospora beticola) was moderate at Guelph, Ont., being less severe than in 1943 (J.D. MacLachlan).

RUST (Uromyces Betae) was fairly general on the foliage in the plots at the Station, Sidney, B.C., on Feb. 2 and Nov. 1 (W. Jones).

SUNFLOWER

POWDERY MILDEW (Erysiphe Cichoracearum). A slight infection of the oidial stage was general at Morden, Man. (W.L. Gordon).

DOWNY MILDEW (Plasmopara Halstedii) was heavy at the Station, Kapuskasing, Ont., on Aug. 10 (J.W. Groves). A 10-15% infection was observed in one field at Ste. Anne de la Pocatiere, Que. On most plants the infection occurred in the seedling stage, but on a few, infection was secondary. The disease appeared in a field in a 5-year rotation. In a neighboring field

sown this year for the first time to sunflowers, no mildew was observed although the same seed was used. It would appear that the organism may live several years in the soil (C. Perrault).

RUST (Puccinia Helianthi). A severe infection was general on the leaves of sunflower at Morden, Man. (W.L.G.). At Winnipeg, the variety Sunrise was severely rusted. In a greenhouse test, Sunrise was attacked by the rust strain from Helianthus annuus, but not by the strain from H. Maximiliani (A.M. Brown).

WILT (Sclerotinia sclerotiorum). A few plants were killed in the plots at Lethbridge, Alta. (M.W.C.). It caused moderate damage as a stem rot in one planting at Morden, Man. (W.L. Gordon). About 10% of the plants were infected in a 5-acre field at Ste. Anne de la Pocatier, Que. (C. Perrault).

FOOT ROT (Verticillium sp.). About 10% of plants were reported toppling over in a plot at the Station, Kapuskasing, Ont., apparently because the lateral roots were largely rotted off. No wilting had been noticed perhaps because of the wet weather. According to Dr. J.W. Groves, the organism is distinct from either V. Dahliae or V. albo-atrum (D.B.O. Savile).

BORON DEFICIENCY was moderate in a plot of Mennonite, but only a trace was present in an adjacent plot of Sunrise at the Station, Fredericton, N.B. The symptoms in Mennonite corresponded to those described by Schuster and Stephenson and D.B.O. Savile (P.D.S. 27:37). Cracking of the stem and petioles was also noticed (D.J. MacLeod).

CULTIVATED GRASSES

AGROPYRON - Wheat Grass

Ergot (Claviceps purpurea). Affected heads of western rye grass (A. trachycaulum) were received from Meadow Lake, Sask. (H.W.M.). A trace was recorded in A. repens in Queens Co., P.E.I. (R.R. Hurst).

Powdery Mildew (Erysiphe graminis). A moderate infection occurred on A. repens at Lower South River, Antigonish Co., N.S. (J.F. Hockey).

Leaf Spot (Phyllachora graminis). A severe infection was found in a roadside stand of A. repens at Edmonton, Alta. (M.W. Cormack).

Stem Rust (Puccinia graminis) was very severe on A. repens, particularly on plants growing near barberries at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Leaf Rust (Puccinia Clematidis) was moderate to severe on A. repens growing near fields of cereals at Truro and Lower South River, N.S. (J.F. Hockey).

AGROSTIS - Bent Grass

Ergot (Claviceps purpurea). An affected specimen of Creeping Bent (A. stolonifera) was received from Nappan, N.S. (J.F. Hockey).

BROMUS - Brome Grass

Rust (Puccinia Clematidis). A heavy infection was observed on B. carinatus grown for a cover crop in the Station orchard, Summerland, B.C. The rust was identified by Dr. G.H. Cummins (H.R. McLarty, I.L. Conners).

Leaf Blotch (Pyrenophora Bromi). A moderate infection was found in 3 fields of awnless brome grass (B. inermis) in Alta.; infection was also moderate to severe in several roadside stands at Edmonton (M.W.C.).

Scald (Rhynchosporium Secalis). A slight infection was present in the plots of B. inermis at Edmonton, Alta. (M.W. Cormack).

Leaf Spot (Selenophoma bromigena). Infection was moderate in a field of B. inermis at Strathmore, Alta. (M.W. Cormack).

CALAMAGROSTIS - Reed Grass

Ergot (Claviceps purpurea) in C. inexpansa caused abortion in cows on a farm located near Unity, Sask. (H.W.M.).

DACTYLIS GLOMERATA - Orchard Grass

Rust (Puccinia graminis). A 10% infection was found on wild D. glomerata in Queens Co., P.E.I. (R.R. Hurst).

FESTUCA

Leaf and Stem Spot (Phytomonas agropyri (O'Gara) Bergey et al.). A slight infection was found in the plots of Creeping Red Fescue at Olds, Alta., and a trace at Edmonton. Bacteria were very numerous in the diseased tissues and the isolates obtained were apparently P. agropyri (M.W. Cormack).

HOLCUS LANATUS

Twist (Dilophospora Alopecuri) was common on H. lanatus in some areas in N. Saanich Co., B.C. (W. Jones).

PHLEUM PRATENSE - Timothy

Leaf Spot (Heterosporium Phlei) was present in all 6 fields examined in Alta.; infection was a trace in 1, slight in 3 and moderate in 2. Infection was slight in the plots at Edmonton and Olds (M.W.C.).

Rust (Puccinia graminis var. Phlei-pratensis) was reported as follows: general in the Lower Mainland, B.C. in Aug. (W. Jones); infections on wild stands 10% at Montague, 25% on Wood Islands, 40% at Summerside, P.E.I., in Sept. (R.R. Hurst).

POA - Bluegrass

Rust (Puccinia Poae-sudeticae). Infection was slight to moderate on P. pratensis in the plots at Edmonton, Alta. (M.W. Cormack).

LAWNS

Snow Mould (low-temperature basidiomycete) mildly attacked a few lawns in Saskatoon, Sask., and on the University campus, mostly on the protected northern exposures. The trouble was inconspicuous compared with the 1943 attack. No Typhula sp. was observed on grasses in 1944 (T.C. Vanterpool).

Winter Injury destroyed a number of lawns (Agrostis stolonifera) of several years standing at Charlottetown, P.E.I., the injury was due to the formation of ice pockets during the early spring (R.R. Hurst).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia Asparagi) was found on garden escapes near irrigation flumes on the Station, Summerland, B.C. (G.E. Woolliams). A slight general infection was noted in a large planting at Morden, Man., on Sept. 14. In a smaller, isolated planting, every stem was covered from top to bottom with lesions, which were not typical of rust. Microscopic examination revealed that the pustules were largely parasitized by Darluca filum. In some instances no urediniospores were present in the lesions, the Darluca apparently completely suppressing the rust. Some of the lesions on the stem were also inhabited by a Coniothyrium sp. (spores 5-7.5 x 2.5-3 microns) (W.L.G.).

FOOT ROT and YELLOWING affected odd plants at Morden, Man.; Fusarium oxysporum was isolated (W.L. Gordon).

BERRY DECAY. Spores of Fusarium Scirpi var. acuminatum were abundant on the shrunken berries at Morden, Man. (W.L. Gordon).

BEAN

GREY MOULD (Botrytis cinerea) was general as a rot on Masterpiece in a garden at the Farm, Agassiz, B.C. (W. Jones). It was fairly prevalent as a pod rot in the variety plots at Beaverlodge, Alta. (G.B. Sanford). Grey mould was present in a large number of plantings of beans in Queens Co., P.E.I. It was believed that the Botrytis was secondary following severe root and cotyledon rot, the cause of which was not determined (R.R. Hurst).

ANTHRACNOSE (Colletotrichum Lindemuthianum). Severe infections were reported in gardens at Edmonton and Vermilion, Alta. (A.W. Henry). Anthracnose was severe on Tendergreen and New Long Tendergreen and moderate on the pods of Round Pod Kidney Wax at Morden, Man.; a trace was recorded at Winnipeg (W.L.G.). The disease was observed in every planting seen in Lincoln Co., Ont., but damage to the pods was insignificant (J.K. Richardson). Anthracnose was prevalent at Guelph on susceptible varieties such as Kidney Bean (J.D. MacLachlan).

In general, anthracnose was less severe than usual in the region of Montreal, Que. Nevertheless a 60% infection was present in some fields among the 30 visited (E. Lavallee). Two fields, moderately infected, were found in 12 inspected in the Montreal district, Que. (R.O. Lachance). Anthracnose affected 75-100% of the pods of the susceptible varieties, Commodore, Stringless Refugee Wax, New Stringless Valentine, Unrivalled Wax, Full Measure, The Prince, Asgrow Stringless, Green Pod and Early Six Weeks at Fredericton, N.B. (S.F. Clarkson). Anthracnose frequently caused severe damage in P.E.I. on a large number of varieties (R.R. Hurst).

BACTERIAL BLIGHTS (Halo Blight, Pseudomonas medicaginis var. phaseolicola and Bacterial Blight, Xanthomonas phaseoli). Halo blight developed to a limited extent in plantings grown from diseased seed at Grand Forks, B.C., but there was no natural spread to healthy plants (G.E. Woolliams). The bacterial

blights were common throughout Alta. and they were reported to have caused severe damage in gardens at Brooks, Edmonton and Wabamun. They were severe on some varieties at Edmonton, Olds, and Lethbridge. "Calapproved" seed obtained from California in 1944 was apparently infected. In tests with this seed at Edmonton and Lacombe, severe infection developed in Black Valentine and Bountiful and there was a trace to slight infection in Dark Red Kidney and Tendergreen (M.W.C.).

Bacterial blight along with halo blight was common in gardens at Saskatoon and in the University plots; moderate damage was caused chiefly by halo blight in Sask. 1966, a field bean. These blights were reported from several other points (H.W.M., T.C.V.). The bacterial blights are the most destructive diseases of beans in Man.; infection was severe throughout Man. (W.L.G.). Halo blight was somewhat later in appearing in 1944 than in 1943, and although it was general, it apparently caused little loss in snap beans in Lincoln Co., Ont. (J.K. Richardson). Bacterial blight was epidemic and caused severe damage to string beans in the Leamington district, Ont. (L.W. Koch). Bacterial blight infection varied from 15 to 100% in the 30 fields examined in the Montreal district, Que. The severity of the disease was distinctly related to the source of seed. The disease causes heavy losses in gardens and in fields of canning beans (E. Lavallee). The situation was similar in plantings being grown for seed in the Montreal district (R.O. Lachance). A trace of halo blight was recorded in one planting and bacterial blight infection was a trace to 10% in others in Queens Co., P.E.I. (R.R. Hurst).

STEM ROT (Rhizoctonia Solani). Affected specimens were received from Vernon, B.C. (G.E. Woolliams).

SCLEROTINIA ROT (S. sclerotiorum) affected about 1% of the pole bean plants being grown for seed in a planting at Vernon, B.C. (G.E. Woolliams). It was severe on bush beans in low spots in a field at Vernon, B.C. (H.R. McLarty). The disease occurred as a pod rot in the variety tests at Beaverlodge, Alta. (G.B. Sanford).

MOSAIC (virus) was fairly general among market gardens in Lincoln Co., Ont. (J.K. Richardson). Mosaic affected about 1% of the plants of Canadian Wonder, Kidney Red and Commodore, while 50% of the Tapery bean (Phaseolus acutifolius var. latifolius) were diseased in the Botanical Garden, Montreal, Que. (J.E. Jacques). Mosaic was found in a few fields in the Montreal district, the highest infection being 5% in a field at Iberville (E. Lavallee). Infection was moderate in 2 plantings at the Station, Fredericton, N.B. (D.J. MacLeod); and a trace in a planting in Queens Co., P.E.I. (R.R. Hurst).

FROST, in June, caused severe damage, with the result that much of the crop required replanting in Queens Co., P.E.I. (R.R. Hurst).

BROAD BEAN

SEED ROT. Seed imported from California germinated poorly when sown at Winnipeg, Man. Interior was affected by soft rot bacteria and Penicillium grew abundantly on the outside (J.E. Machacek).

MOSAIC (virus). A trace was found in one garden in Fredericton, N.B. (D.J. MacLeod).

POD BLACKENING. A blackening of pods and leaves was very severe on broad beans in the test plots at Summerland and in the southern Okanagan Valley, B.C. It is thought to be caused by unfavourable weather conditions; the crop cannot be grown successfully here on account of this trouble (H.R. McLarty).

BEET

SCAB (Actinomyces scabies) affected up to 25% of the roots, many severely so, in gardens at Kentville, N.S. (J.F. Hockey). Traces of scab were present in one planting in Queens Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola) was reported as follows: general on the foliage of garden and seed crops in the coastal section of B.C. (W. Jones); infection slight to severe in the University plots, Edmonton, Alta. (M.W.C.); traces at Morden and Winnipeg, Man. (W.L. Gordon); moderate infection on Flat Egyptian, little or none on Detroit Dark Red in plots, Division of Horticulture, C.E.F., Ottawa, Ont. (D.B.O. Savile); general, but causing little damage in the Montreal district, Que. (E. Lavallee); severe infection on Crimson Globe in Queens Co., P.E.I. (R.R. Hurst).

BLACK LEG (Phoma Betae). A slight infection as a leaf spot was present at Grand Forks, B.C. (G.E. Woolliams). Black leg was severe in beets in storage at Portage la Prairie, Man.; some of the remaining beets rotted completely in the soil when planted (J.E. Machacek).

DOWNY MILDEW (Peronospora Schachtii) caused severe damage to 3 seed crops in the Fraser Valley, B.C. in May; systemic and secondary infections were prevalent. The disease was also prevalent on the foliage of stecklings for next year's crop in late summer and autumn in the same areas (W. Jones).

RUST (Uromyces Betae) was general in a few gardens in North Saanich Co., B.C.; the damage was slight (W. Jones).

MOSAIC (Beta virus 2). Two plants affected by mosaic were found in a plot at the Fredericton Station, N.B. (D.J. MacLeod).

CROWN ROT (boron deficiency) affected a root here and there in plantings in Queens Co., P.E.I. (R.R. Hurst).

BROCCOLI

BLACK LEAF SPOT (Alternaria oleracea). Infection was general on the leaves and to some extent on the pods of Foundation seed plants of Italian Green Sprouting broccoli at the Farm, Agassiz, B.C. (W. Jones).

DOWNY MILDEW (Peronospora Brassicae). Infection was general on the foliage in Jan. 1944 at the Station, Sidney, B.C. (W. Jones).

CABBAGE

BLACK LEAF SPOT (Alternaria oleracea) slightly infected the leaves of Foundation seed plants of Copenhagen Market at the Farm, Agassiz, B.C. (W. Jones). A moderate infection was found in a garden at Edmonton, Alta. (L.E. Tyner).

The pods of Penn. State were moderately to severely spotted by an Alternaria in a planting in Kamouraska Co., Que. (R.O. Lachance).

DOWNY MILDEW (Peronospora Brassicae) was sporulating abundantly in January on foliage of plants set out for seed production, at the Station, Sidney, B.C.; the plants became infected while they were still in flats in cold frames. Downy mildew was also severe on the foliage and general on the pods of Copenhagen Market at Brentwood. Air drainage was poor in the field (W. Jones).

BLACK LEG (Phoma lingam) caused severe damage in most greenhouses where seed was untreated in Essex Co., Ont. Some of the infected plants went unnoticed until after they had become established in the field (L.W. Koch).

CLUB ROOT (Plasmodiophora Brassicae). A slight infection was observed at Armstrong, B.C. (G.E. Woolliams). Club root is the most important disease of cabbage on the Islands of Montreal and Jesus, Que.; losses vary from a trace to 80% (E. Lavallee). A slight, general infection was observed in a planting of Late Flat Dutch in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL LEAF SPOT (Pseudomonas maculicola) was fairly heavy on a single leaf of red cabbage from the prisoner-of-war camp, Bowmanville, Ont.; the seed was of German origin (L.T. Richardson).

SCLEROTINIA ROT (S. sclerotiorum). An entire lot of Danish Ballhead in storage became affected and were rendered useless in Queens Co., P.E.I. (R.R. Hurst).

BLACK ROT (Xanthomonas campestris). Half of the plants in a plot of Foundation seed were affected in the Pike Lake district, Sask. (R.J. Ledingham, W.A.F. Hagborg). Black rot caused severe damage on cabbage in the Winnipeg area (Fort Garry, East St. Paul and St. Vital) and at Morden, Man. This is the first report of black rot on cabbage to the Survey from Man. (W.L. Gordon). A slight infection of black rot was found on Danish Ballhead plants growing in close proximity to infected turnips at the St. Catharines Laboratory, Ont. (J.K. Richardson).

BROWN HEART (boron deficiency). A trace was seen in one planting in Queens Co., P.E.I. (R.R. Hurst).

FROST. Plants were checked in one low-lying field at Brentwood, B.C. (W. Jones).

CARROT

LEAF BLIGHT (Alternaria Dauci) was general in one garden and caused moderate damage to the foliage at Agassiz, B.C. (W. Jones). The disease was present on a specimen received from Br. M.-Anselme, Mont Rolland, Que. (I.L.C.).

BLACK ROT (Alternaria radicina) was developing at Grand Forks, B.C., in January, among roots grown from untreated seed or from treated seed, but where the roots had been put in unsterilized storage houses; no rot was showing among roots grown from treated seed and stored in either new storage houses or ones that had been properly disinfected (G.E. Woolliams). Black rot was severe in storage at Portage la Prairie, Man. (J.E. Machacek).

ROT (Botrytis cinerea) was severe in a grocery store, Charlottetown, P.E.I., in carrots brought into the province (R.R. Hurst).

LEAF SPOT (Cercospora Carotae). Some fields were quite severely affected in the Armstrong district, B.C., by leaf spot, both the blades and the petioles being attacked. Only the central younger leaves were unaffected, while older leaves died prematurely. This is the first year the disease has been observed in the Interior of B.C. (G.E. Woolliams). Infection was moderate to quite severe on Chantenay stecklings in a plot of the Division of Horticulture, C.E.F., Ottawa, Ont. in that part near an overhead irrigation pipe; at a greater distance the infection was slight and scattered. No Cercospora was seen on stecklings of Amsterdam and Imperator in adjoining plots (R.G. Atkinson). Infection was moderate in a private garden at Ottawa and at Cyrville (D.B.O. Savile, L.T. Richardson); and fairly severe on material received from Br. M.-Anselme at Beauceville, Que. (I.L.C.).

SCLEROTIAL ROT (S. sclerotiorum). Two affected roots were received on Nov. 20 from the Division of Horticulture, C.E.F., Ottawa, Ont. (H.N. Racicot).

BACTERIAL BLIGHT (Xanthomonas carotae) was general in the seed crops of all varieties, especially at Grand Forks and at Kelowna, Vernon, Armstrong, and other points in the northern Okanagan Valley, B.C. Infection was mostly confined to the leaves in 1944, although there was also some blighting of the umbels. The disease also affected the leaves of the root crop; infection of the roots has not been observed (G.E. Woolliams). Bacterial blight was widespread on plantings of several varieties in East St. Paul, Winnipeg, Man.; infection was general but moderate at Morden and a trace at Brandon (W.L.G.). About 10% of the plants were noticed to be yellowing and wilting in a plot of Chantenay of the Division of Horticulture, C.E.F., Ottawa, Ont. The roots were easily pulled up and the secondary roots were mostly rotted away, while at their point of origin black sunken lesions occurred. The plants eventually succumbed. Only a trace of bacterial leaf blight was noticed (R.G. Atkinson). Bacterial blight as it appeared on these roots agreed well with the account given by P.A. Ark and M.W. Gardner (Phytopathology 34(4):416-420. 1944) of the bacterial blight organism on the carrot root in California. According to them the disease is carried by the seed from infected umbels and may be controlled by 10 min. in hot water at 52° C. or 10 min. in 1:1000 bichloride of mercury. In the Soledad area of California, soil infection rendered the hot water treatment of commercial seed ineffective (I.L.C.). Bacterial blight caused 20% defoliation in a small garden in Westboro, Ont. by the end of July (D.B.O. Savile).

YELLOWS (Callistephus virus 1). About 10% of the stecklings planted out in the Grand Forks area, B.C., showed infection in the spring; affected plants were rogued out early in the season and in July the disease could not be found in the seed crop. In September, yellows was found in the steckling crop, infection varying from 2 to 50% (G.E. Woolliams). A trace to 5% of the plants were affected by yellows in several gardens at Edmonton, Alta. In one garden, 70% of plants from seed of South American origin were affected, while plants in adjacent plots from other sources were healthy (G.B. Sanford). Yellows affected 7% of the carrots in a field southwest of Edmonton and although no counts were recorded, it appeared to be about equally prevalent in the Lethbridge district. Yellows has been observed on carrots for several years, but it appeared to be more prevalent this year than in the past. Yellows was also provalent in China asters in most parts of Alta. this year and what appeared to be the same disease was noted on petunia, clarkia, marigold and cosmos (G.F. Manson).

Yellows was common and moderate to severe throughout Sask. (H.W.M.). Carrot yellows was first seen on July 15. About 25 plantings were seen during the summer, mostly at Saskatoon, but also at Regina, Moose Jaw and Indian Head. Officers of the Entomological Laboratory also reported yellows at Emma Lake, Craven and Battleford. The average infection was placed at 30%. According to Dr. A.P. Arnason, leaf hoppers were unusually abundant this year (R.J. Ledingham). The disease was widespread in Man. and in many instances severe; up to 100% of the plants being affected (W.L.G.). Over 90% of the carrots were affected by yellows in a half-acre planting in the Holland Marsh, Bradford; the planting was near a crop of potatoes (J.K. Richardson, H.N. Racicot). Yellows was affecting a trace (about 1 in 800) of the stecklings in the plots of the Division of Horticulture, Ottawa, on Aug. 30. Infection apparently occurred late in the season; the yellowed plants were best recognized by the marked development of fine secondary roots along the main root (R.G. Atkinson). A trace was also found in 2 out of 3 fields inspected in the Ottawa area (L.T. Richardson). Yellows is widespread in the Montreal district, Que. At Rosemont, 50% of the carrots were affected in one planting (E. Lavallee, H.N. Racicot). At the Substation, Ste. Clothilde, Chateauguay Co., a trace of yellows was present on July 13 in a seed crop of about ¼ acre; however, about 1% were rogued out in the spring. No yellows was found in other plants, although a thorough search was made. By Aug. 18, 1-2% of the carrots being grown as stecklings for next year's crop had become affected by yellows, and had been rogued out (H.N. Racicot). The low incidence of the disease is believed to be due according to F.S. Browne, Division of Horticulture, to a good kill of the early leaf hoppers. The seed crop was sprayed when the plants were about 6 inches high and as the first leaf hoppers began to be noticed. Under his direction, nicotine sulphate with a casein spreader was applied to the foliage at the rate of 1 qt. of nicotine sulphate to 100 gal. of water. About 12 oz. of the casein spreader were emulsified in a small amount of water and added to each 100 gallons. The spray was applied under about 40 lb. pressure with a boom covering several rows at one time fitted with fine nozzles. The spraying was done in the evening when there was no wind. The spray issued from the nozzles in a very finely dispersed condition. As the sprayer moved through the field the hoppers were disturbed and were soon wet flying through the mist surrounding the sprayer. The same materials were added to the Bordeaux and poison applied to potatoes and celery (I.L. Conners).

Yellows was general in fields in York, Sunbury, Queens, Kings, Westmorland, Albert and Carleton Co., N.B.; infection varied from 2 to 27% (D.J. MacLeod). Carrot yellows was more prevalent in N.S. in the dry year of 1944 than in the wet season of 1943. A survey of 20 commercial plantings revealed yellows affecting 1.5-41% of the plants, most fields averaging 15-20%. In the variety trials at Kentville, 4 months after seeding the infection was: Amsterdam Ottawa C 28%, Touchon 23.5%, Imperator 19.6%, Imperator E 265, 15.5%, Stokes Supreme Danvers 15%, Tendersweet 10.6% and Chantenay Ottawa E 10.3%. Yellows was most prevalent in the wild hosts, Leontodon, Plantago, Chrysanthemum, Matricaria, Daucus and Taraxacum, but it was also found in Spergula, buckwheat and lettuce (J.F. Hockey). Almost 100% of the carrots in a planting of Chantenay and Danvers Half Long in P.E.I. were affected by yellows and virtually worthless; yellows was also noticed in several gardens at Charlottetown (R.R. Hurst).

CAULIFLOWER

GREY MOULD (Botrytis cinerea) was prevalent in several seed crops in the Victoria district, B.C., and caused moderate damage as a die back of some of the seed-bearing stalks (W. Jones).

SOFT ROT (Erwinia carotovora). Two plants affected by soft rot were brought to the Charlottetown Laboratory, P.E.I. for diagnosis (R.R. Hurst).

CLUB ROOT (Plasmodiophora Brassicae) is the most important disease of cauliflower in the Montreal district, Que.; losses vary from slight to severe (E. Lavallee). A slight general infection occurred in Snowball in a garden at Charlottetown, P.E.I. (R.R. Hurst).

WIRE STEM (Rhizoctonia Solani) was common on and caused moderate damage to young plants in flats at Victoria, B.C., which were later to be set out for stecklings (W. Jones). About 5% of 3,000 cauliflower plants were severely lesioned at the base at Winnipeg, Man. on May 17 (W.A.F. Hagborg). Wire stem is often found in hot beds in the Montreal district, Que. Damage is usually severe where the soil has not been disinfected with formalin (E. Lavallee).

BLACK ROT (Xanthomonas campestris) caused severe damage in St. Vital, Winnipeg, Man.; about 40% of the plants were unsaleable, while the others were lightly infected (J.E. Machacek). Some leaf infection was noted on cauliflowers growing near infected turnips in Lincoln Co., Ont. (J.K. Richardson).

MOSAIC (virus). About 5% of the plants in a seed crop of Veitch's Autumn Giant were affected in the Victoria district, B.C. (W. Jones).

BROWN HEART (boron deficiency). In one planting of Snow Queen in Queens Co., P.E.I., 65% of the plants were severely affected by brown heart; the trouble was also seen on cauliflowers for sale on the market and in stores at Charlottetown (R.R. Hurst).

CURD ROT (complex, followed by Erwinia carotovora) was severe in 1 seed crop of Snowball and slight in several other seed crops in the Victoria district, B.C. (W. Jones).

CELERY

EARLY BLIGHT (Cercospora Apii). A moderate infection of early blight developed late in the season in the Laboratory plots, St. Catharines, Ont., but late blight was not observed (J.K. Richardson). A 50% infection caused moderate damage in a planting in York Co., N.B. (J.L. Howatt).

ROOT ROT (Rhizoctonia Solani, etc.) caused slight damage in a planting in York Co., N.B. (J.L. Howatt).

LATE BLIGHT (Septoria Apii-graveolentis) caused considerable damage in a few truck gardens about Victoria, B.C. (W. Jones). The disease was present this year in the Armstrong district, B.C., but was easily controlled where the plants were adequately sprayed (G.E. Woolliams). Late blight was somewhat less prevalent in 1944 than in the previous year in Lincoln Co., Ont., probably on account of the low precipitation early in the summer (J.K. Richardson). Late blight was widespread in the Montreal district, Que.; infection became severe particularly towards the end of the season (E. Lavallee). Late blight was heavy on two leaves received from Br. M.-Anselme from Beauceville, Que. (D.B.O.S.). A trace was recorded in a planting in York Co., N.B. (J.L. Howatt).

YELLOWS (Callistephus virus 1). Several plants were moderately affected in the plots at Lethbridge, Alta. (M.W.C.). Yellows was found affecting celery plants brought to the Laboratory by Mr. Kerr, Superintendent, Forest Nursery Station, Sutherland, Sask. on Aug. 5. Some 6 plants were so affected in a planting of 50-75, and the disease appeared to be spreading, particularly to adjacent plants (R.J. Ledingham).

BLACK HEART (non-parasitic) caused moderate damage to several varieties at the Forest Nursery Station, Sutherland, Sask. (H.W.M.). Black heart affected 75% of Paris Golden in a planting in Grey Co., Ont.; it caused severe loss in early planted celery, the weather being very warm and dry during July and August (G.C. Chamberlain). Masterpiece and Paris Golden were severely affected at the end of July and were a total loss at the Botanical Garden, Montreal, Que. (J.E. Jacques). One lot of celery was a complete loss in storage in January in Queens Co., P.E.I. (R.R. Hurst).

BORON DEFICIENCY was general throughout one seed crop in Queens Co., P.E.I., but was worse in patches. Affected plants showed a die-back (R.R. Hurst).

CELTUCE

LEAF SPOT (Alternaria sp. inedit) was found intermixed with spots due to Septoria Lactucae (see below) at Morden, Man. by W.L. Gordon. From a specimen kindly supplied by Dr. Gordon, spores were removed by J.W. Groves to inoculate successfully seedlings of celtuce and lettuce. Parallel inoculations from a culture of an Alternaria originally isolated from lettuce seed by Dr. Irene Mounce of the Saanichton Laboratory, B.C., proved that the two isolations were identical. The spores were those of an Alternaria of the large-spored

type, which Dr. Groves believes is probably an undescribed species. While Dr. Gordon recognized its close resemblance to A. Solani, it would seem better for the sake of uniform usage to refer to it as a species of the Brassicae type as done by Groves and Skolko for their new A. linicola (see p.27) and others (I.L. Conners).

LEAF SPOT (Septoria Lactucae). A moderate infection was found on some seed plants at Morden, Man. (W.L. Gordon). The host, is new to the Survey; the spores measured 19-31 x 1.4-1.6 microns (D.B.O. Savile).

CUCUMBER

SCAB (Cladosporium cucumerinum) was found causing slight damage to Perry's Special in greenhouses in Essex Co., Ont. in April and May; the later formed fruits were more frequently attacked than the early ones (L.W. Koch). Scab infection was severe and the damage considerable in several plantings in the Maugerville and Jemseg districts, N.B. (S.F. Clarkson).

ANTHRACNOSE (Colletotrichum lagenarium) severely affected a few plantations of cucmbers and muskmelons in Essex Co., Ont., and it appeared only late in the season. The disease was much milder than usual (L.W. Koch).

BACTERIAL WILT (Erwinia tracheiphila). A scattered infection was reported throughout a 5-acre field at Agincourt, Ont. (L.T. Richardson). Severe outbreaks were found in a few fields in the Montreal district, Que. (E. Lavallee). A slight infection occurred at the Station, L'Assomption, Que. (R.O. Lachance).

POWDERY MILDEW (Erysiphe Cichoracearum) caused moderate damage to Perry's Special in a greenhouse in Essex Co., Ont., in May (L.W. Koch).

WILT (Fusarium spp.) affected less than 1% of the plants in a planting at Summerland, B.C., but the affected plants died; the disease was much less severe than last year (H.R. McLarty). Wilt caused about 1% damage in the plots at Edmonton, Alta. (G.B. Sanford). The disease affected about 5% of a 1/8-acre planting in Lincoln Co., Ont. (J.K. Richardson).

ROOT KNOT (Heterodera marioni) was severe in one greenhouse at Haney, B.C. (R.J. Hastings).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) was severe on a specimen sent from Brandon, Man., by Dr. Bird (W.A.F. Hagborg, W.L. Gordon). A moderate infection occurred in localized areas in plantings with an overhead watering system in Essex Co., Ont. (L.W. Koch).

MOSAIC (virus). All plantations of cucumbers and muskmelons in Essex Co., Ont., showed some infection, the highest being 7% (L.W. Koch). A trace of mosaic (Cucumis virus 1) was present in 1 field in Sunbury Co., N.B. (D.J. MacLeod). A trace was seen in one planting in Queens Co., P.E.I. (R.R. Hurst).

FRUIT CHLOROSIS (cause unknown). In a small isolated planting at the Laboratory, St. Catharines, Ont., many of the fruits were a pale greyish yellow,

which was visible shortly after the fruit had set. The chlorotic fruits appeared to develop normally, but turned a greyish white instead of yellow when they ripened. Both normal and chlorotic fruits were present on some vines, while almost all the fruits were affected on others (J.K. Richardson).

FROST caused severe damage to cucumbers in Queens Co., P.E.I., in June, with the result that much of the crop had to be replanted (R.R. Hurst).

EGG PLANT

LEAF SPOT (Alternaria Solani). Infection was severe and general on Kissin and Hampshire 101-7-7 in the plots at Morden, Man. The disease was noted on the plants while they were still in the seed bed (W.L. Gordon).

FOOT ROT (Rhizoctonia Solani). A severe infection was reported in St. Vital, Winnipeg, Man. The pathogen was isolated (J.E. Machacek).

WILT (Verticillium Dahliae) affected about two thirds of the plants of Black Beauty in a plot at the Station, Summerland, B.C. (G.E. Woolliams, J.W. Groves).

HOPS

DOWNY MILDEW (Pseudoperonospora Humuli). A moderate infection was observed on hops at Brandon and Morden, Man. The disease was previously found in Man. in 1928 (W.L. Gordon). The early infection was as severe as in previous years in the Cazaville district, Que., but the disease was kept under much better control than formerly due apparently to the use of Bordeaux spray instead of a copper-lime dust (L.J.S. Laporte).

POWDERY MILDEW (Sphaerotheca Humuli) caused slight damage in well dusted fields in the Cazaville district, Que.; severe damage was seen in only one field, where almost no sulphur was applied (L.J.S. Laporte).

HORSE-RADISH

WHITE RUST (Cystopus candidus) was severe on horse-radish at the Botanical Garden, Montreal, Que.; the leaves were spotted, malformed and distorted (J.E. Jacques).

LEAF SPOT (Ramularia Armoraciae). A moderate infection occurred on plants in a garden where sprinklers were used, in the Summerland district, B.C. (H.R. McLarty).

LEEK

SOFT ROT (Erwinia carotovora). In a seed plot of the Division of Horticulture, C.E.F., Ottawa, Ont., 25 out of 144 seed stalks were affected by soft rot, the seed heads were poorly developed (R.G. Atkinson).

LETTUCE

LEAF SPOT (Alternaria sp. inedit). See discussion under Celtuce (p. 44).

DOWNY MILDEW (Bremia Lactucae) was general on New York 12 and caused moderate damage at Agassiz, B.C. On the other hand it caused only slight damage on the same variety at Sidney. The greater damage caused at Agassiz is attributed to the higher humidity prevailing at this point (W. Jones). Downy mildew was prevalent on the basal leaves of New York 515 at Armstrong. The disease was doubtlessly checked by the hot dry weather in July after a period of cool, showery weather during the spring months (G.E. Woolliams).

BOTTOM ROT (Rhizoctonia Solani) caused severe damage in some plantings in the Sarnia district, Ont. (L.W. Koch).

DROP (Sclerotinia sclerotiorum) caused moderate to severe damage in several gardens at Edmonton, Alta. Infection varied from a trace to severe in the varietal plots at Lacombe (M.W.C.). The disease caused slight damage in a garden at Saskatoon, Sask. (R.J. Ledingham).

LEAF SPOT (Septoria Lactucae Pk.). The discovery of this leaf spot on celtuce (q.v.) has lead to a study of the pathogen. Its correct name is Septoria Lactucae Peck, which was published in June 1879 whereas S. Lactucae Passer. used in P.D.S. 21:36, appeared in Oct. 1879. There is little doubt that these organisms as well as S. consimilis, S. lactucicola, S. Ludoviciana and S. unicolor are identical, having spores variously described as 1 to 2.5 microns wide. S. Mulgedii, with spores 4 microns wide, is evidently distinct (D.B.O. Savile).

YELLOWS (Callistephus virus 1) affected 1% of the plants of New York 12 in a seed plot at the Station, Summerland, B.C. (G.E. Woolliams). Yellows infected 7% of the plants in a late planting on a farm in Sunbury Co., N.B. Yellows was common on Leontodon autumnalis and Plantago major near this field of lettuce. Four severely affected plants were also noted in a plot at Fredericton, N.B. (D.J. MacLeod). An estimated 44% of the plants were affected in a planting at North Kingston, N.S., on Sept. 8. The planting was too old to be of any value (J.F. Hockey).

TIP BURN (non-parasitic) was observed at Grand Forks, Kelowna, and other points in the Interior of B.C.; the amount of injury varied from field to field, but in none did it exceed 20%. In a seed plot of New York 12 at Summerland, 95% of the plants were affected (G.E. Woolliams).

MELON

BACTERIAL WILT (Erwinia tracheiphila) was observed in Essex Co., Ont.; the damage was negligible (J.J. Miller).

ANTHRACNOSE (Colletotrichum lagenarium) severely infected and damaged

WILT (Fusarium spp.) affected up to 10% of the plants in fields of muskmelons in Essex Co., Ont. Watermelons growing in fields adjacent to those containing wilting muskmelons invariably showed no evidence of Fusarium wilt. Isolations of the pathogen were obtained (J.J. Miller). Although wilt was much less severe in the Aldershot area, Ont., than in 1943, losses were rather severe in some fields due to the death of vines just prior to cropping (J.K. Richardson).

DAMPING OFF (Pythium sp.) caused the loss of 10% of the potted plants in the late seedling stage in the greenhouse at the Station, Sidney, B.C.; the soil had not been sterilized and growing conditions were warm and moist (W. Jones).

FROST caused severe damage in June to melons in Queens Co., P.E.I. (R.R. Hurst).

ONION

PURPLE BLOTCH (Alternaria Porri) was very destructive to seed plants at Morden, Man. (W.L. Gordon). A specimen collected at Mont Rolland, Que., was received from Br. M.-Anselme (I.L.C.).

NECK ROT (Botrytis Allii) caused slight damage to White Portugal at the Station, Sidney, B.C. in October (W. Jones). The disease was quite general in Yellow Globe Danvers, Mountain Danvers and White Portugal onions in common storage in April in the Okanagan Valley and at Grand Forks, B.C.; losses ranged from 5 to 25%. Little loss from neck rot occurred in onions in cold storage. The new growth from bulbs set out for seed was attacked at the ground line in May, in several localities including Grand Forks, Tappen and Vernon. A cool backward spring apparently provided favourable conditions. Almost 1% of the scapes became lesioned late in the season just below the seed head in a field of Yellow Globe Danvers at Lavington, causing many of them to fall over (G.E. Woolliams). Neck rot caused moderate damage during curing and storage of several lots of onions at Edmonton, Alta. (M.W.C.).

SMUDGE (Colletotrichum circinans). Affected specimens of a white skinned variety were received from Welland Co., Ont. (G.C. Chamberlain).

BULB ROT (Fusarium oxysporum f. Cepae) was severe in 2 fields at Duncan, B.C. (W. Jones). Bulb rot, which is general in the Kelowna district, affected 3% of the bulbs of Yellow Globe Danvers and White Portugal in a field examined (G.E. Woolliams).

DOWNY MILDEW (Peronospora destructor) caused slight damage at Agassiz, B.C. In 1943 the disease was severe in the seed crop at the Sidney Station. Young bulbs were also affected. These young bulbs were planted for seed in 1944, but mildew was not found on the plants; the weather was dry throughout the growing season (W. Jones). Downy mildew was present again in the Grand Forks district and also occurred in the Okanagan Valley from Kelowna northward. Infection on the seed crops varied from slight to severe and in a few cases the disease caused a severe reduction in yield. Later in the season

mildew developed on the bulb crop in some fields but caused little reduction in bulb size (G.E. Woolliams). Downy mildew was severe in one garden at Edmonton, Alta. (G.B. Sanford). A trace was present in July in a seed crop at the Substation, Ste. Clothilde de Chateauguay, Que.; diseased plants are rogued out as they appear (H.N. Racicot); in August the infection was moderate and the damage slight at the same place (R.O. Lachance).

LEAF SPOT (Pleospora herbarum (Stemphylium botryosum) was general on seed stalks following downy mildew infection at Agassiz, B.C. (W. Jones).

SMUT (Urocystis Cepulae). Diseased specimens were received from Rosemont, Que. (L.T. Richardson). Smut affected 50% of the plants causing severe damage in a field at St. Laurent; the disease is apparently spreading for it was previously known only at St. Michel and Rosemont (E. Lavallee).

YELLOWS (Callistephus virus 1). What appeared to be aster yellows was found on onions in 1943 in some of the fields, where the crop was being grown for seed, in the Grand Forks area, B.C. The disease was definitely distinct from the loosely developed heads, considered to be a genetic weakness, that have been observed occasionally for several years in all sections of the Interior. Moreover, the new disease on onions was confined to the Grand Forks area, where yellows was present on carrots, parsnips and lettuce. In fact carrot yellows was quite prevalent in the district and was present in nearby fields of carrots. There can be little doubt that it was aster yellows for the symptoms appear to be identical with the disease described and illustrated by Russell Larson and J.C. Walker (Wis. Agr. Exp. Sta. Bull. 463, May, 1944). Affected heads are sterile. The disease was not seen in 1944, but observations were more limited this past season (G.E. Woolliams).

Aster yellows was first observed in Man. on Aug. 2, 1944, when it was found in a field of Yellow Globe Danvers in East St. Paul. Later the disease was seen repeatedly in both onions grown for seed as well as for sets in the Winnipeg area. The disease apparently attacks onions in all stages of growth. In young plants the leaves are upright and virescent, while the necks are thickened and the bulbs fusiform. In seed-bearing plants, one or more stalks may be virescent and the flower head may be completely, or only in part, affected. The disease appears to be the same as that described for aster yellows on onions in U.S.D.A. Farmers' Bull. 1060 (revised June, 1944) (J.E. Machacek). Specimens from both B.C. and Man. were received; they agree well with the description and illustration in Bull. 1060. The disease has now been observed in Wisconsin, Idaho (Bull. 1060) and in Maine and Massachusetts (Pl. Dis. Reporter 28(28):882. 1944) (I.L. Conners).

PARSNIP

SCAB (Actinomyces scabies). A few scab lesions were present on Hollow Crown parsnips grown in the Laboratory disease garden, Charlottetown, P.E.I. (R.R. Hurst).

LEAF SPOT (Ramularia Pastinacae) was general in seed crops in the coastal section of B.C.; the damage was slight (W. Jones). A slight infection was reported in stecklings at Armstrong, B.C. by Geo. Perry, Dom. Seed Inspector

(G.E. Woolliams). A slight infection was present in a garden at Winnipeg. Both spore states were obtained from the same spot (W.L. Gordon). A trace was observed at North Kingston, N.S. (J.F. Hockey).

SCLEROTINIA ROT (S. sclerotiorum). A slight outbreak occurred in some parsnips in storage in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC and WITCHES' BROOM (virus) each affected a few plants in a private garden, Saskatoon, Sask. (T.C. Vanterpool).

YELLOWS (Callistephus virus 1) affected a small number of plants in seed crops in the Grand Forks area, B.C. (G.E. Woolliams). Yellows was severe on Hollow Crown at Morden, Man.; it also affected the odd plant at Brandon (W.L. Gordon). A trace was present in a plot at the Station, Fredericton, N.B., and in a field in Queens Co. (D.J. MacLeod). Yellows infected 4.5% of the parsnips in a 1½ acre field of Hollow Crown within 25 yards of a carrot field with 41% of the plants affected by yellows at North Kingston, N.S. (J.F. Hockey).

PEA

LEAF and POD SPOT (Ascochyta Pisi). A trace was found in Alta. in 7 fields and a slight infection in 5 out of 25 fields of peas, which were grown for export to the United Kingdom. Infection was slight to moderate in several gardens at Edmonton and in the plots at Lacombe, Lethbridge and Olds (M.W.C.). A survey of the Nipawin pea area revealed the disease present in very small amounts; a slight infection was also recorded in a garden and in the University plots, Saskatoon, Sask. (H.W.M.). A trace was recorded at Canard, N.S. (J.F. Hockey) and in Queens Co., P.E.I., where the disease was unimportant in 1944 (R.R. Hurst).

LEAF SPOT (Cladosporium pisicola). A trace was observed in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe Polygoni) was present on most garden varieties at Summerland, B.C., but it did not seriously affect production this year; it was not serious in field plantings in the Armstrong district (H.R. McLarty). Infection was a trace in 3 fields, slight in 2 and moderate in 1 out of 25 examined (see above) in Alta. The disease was severe in several gardens at Edmonton and slight at Beaverlodge (M.W.C.). Powdery mildew was moderate in 2 fields in Man.; a slight infection occurred on some plants of Australian winter peas in a plot at Morden (W.L.G.). A trace was recorded in one planting in Queens Co., P.E.I. (R.R. Hurst).

WILT (Fusarium spp.) caused severe damage in one field on Lulu Island, B.C. (W. Jones). A very heavy root rot infection was present in foundation stock in the plots, Division of Horticulture, C.E.F., Ottawa, Ont., probably on account of the high temperatures prevailing. In eleven varieties from 30 to 100% of the plants were affected. In the other 7 in the block, infection was very slight in Smallton, a trace in Laxal and confined to a few plants in Entel, Linblue, Robany, Tiny and Tomall (R.G. Atkinson).

MYCOSPHAERELLA BLIGHT (M. pinodes (Ascochyta pinodes). A trace was present on the leaves of Australian winter peas at Morden, Man. (W.L. Gordon).

DOWNY MILDEW (Peronospora Pisi) occurred to a limited extent only in the north Okanagan Valley, B.C. (G.E. Woolliams).

BACTERIAL BLIGHT (Pseudomonas pisi) was found on peas growing in the north Okanagan Valley, B.C., and sent to the Laboratory by H.E. Waby, District Agriculturist. The seed originated outside the province. This is the first record of its occurrence in the B.C. Interior, although it is probable that disease has occurred before on imported seed (G.E. Woolliams). Infection was trace in 5 fields, slight to moderate in 2 and severe in 2, located at Rainier, Alta., on Gradus and Little Marvel. Infection was also a trace to moderate in the garden plots at Edmonton and a trace in Early Blue field peas at Lacombe (M.W.C.). Bacterial blight was moderate in 2 and severe in 3 fields in Man.; a general moderate infection occurred on Australian winter peas at Morden (W.L.G.).

ROOT ROT (Rhizoctonia Solani) caused moderate damage in 2 fields at Rainier, Alta. (M.W.C.). A moderate infection was observed in a planting at Portage la Prairie, Man.; patches of the plants were unthrifty and some were wilted. Brown cankers were present at the base of the stems. A slight infection occurred at Winnipeg (J.E. Machacek).

LEAF BLOTCH (Septoria Pisi). Infection was a trace to slight at Lacombe, Alta. and a trace at Beaverlodge and Bon Accord (M.W.C.). A slight infection was present at Saskatoon, Sask. (H.W.M.) and on garden peas at Morden, Man. (W.L.G.).

RUST (Uromyces Fabae). A slight infection was found in one garden in North Saanich, B.C. (W. Jones). A heavy infection occurred on American Wonder in a garden in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (Pisum virus 2). A trace was present in 3 private gardens in Fredericton, N.B. (D.J. MacLeod). Mosaic affected 2 plants in a 50 ft. row in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT (complex cause) caused considerable damage in a few fields on Lulu Island, B.C.; Rhizoctonia was prevalent on the affected root tissue (W. Jones).

MARSH SPOT (manganese deficiency). Severely affected peas grown in the Montreal district, Que., were brought in for diagnosis. Soil analysis revealed a highly alkaline reaction (pH 8.2), which would seem sufficient to immobilize the manganese in the soil (J.E. Jacques).

PEPPER

LEAK (Pythium ultimum) affected less than 1% of the plants of California Wonder in a plot at the Station, Summerland, B.C. (G.E. Woolliams).

STEM GIRDLING (Rhizoctonia Solani). Several flats of plants in a greenhouse at St. Vital, Winnipeg, Man., showed severe stem girdling accompanied by retarded growth and wilting. The organism was isolated by J.E. Machacek (W.A.F. Hagborg).

INFECTIOUS CALOROSIS (virus). A trace was present on California Wonder at the Station, Summerland, B.C. (G.E. Woolliams).

MOSAIC (virus) in comparatively small amounts was observed in several localities in Lincoln Co. and at Ancaster, Ont. (J.K. Richardson). Seven plants showing mosaic (Solanum virus 2) were found in a field in Sunbury Co., N.B. (D.J. MacLeod). Mosaic affected 5% of the sweet pepper plants in a planting at Lower Canard, N.S. (J.F. Hockey).

LEAF ROLL (non-infectious) affected 7% of the plants in a field in Sunbury Co., N.B. The affected plants showed an upward rolling and increased firmness of the leaves with a dwarfing of the plant. Scions of these plants were grafted to the President potato, Bonny Best tomato and Capsicum annum. After 60 days, no evidence of a virus appeared in the grafted plants (D.J. MacLeod).

SUN SCALD (non-parasitic) caused a severe browning on the exposed side and blossom end of 2% of the fruits in a planting at Lower Canard, N.S. (J.F. Hockey).

POTATO

The Plant Protection Division, Science Service, have supplied the compilations on the extent of the seed potato industry, the acreages of the leading varieties passing inspection, the number of fields which failed to pass inspection, and the average percentage of the diseases - black leg, leaf roll, and mosaic - found in the fields. All fields entered for certification are planted with foundation or foundation A seed.

As shown in Table 4, there has been a remarkable increase in the percentage of the crop passing inspection with the adoption of the regulation that a field to be entered for certification must be planted with foundation or foundation A seed. In order to qualify for certification in these classes the tolerance for all diseases, particularly for the virus diseases, have been greatly reduced. To meet the requirements for foundation seed, the field must be planted in tuber units; for foundation A the regulation is not compulsory, but it is probably advantageous to the grower to do so in most instances.

This remarkable improvement in the percentage of crop passing inspection may not be due entirely to the improved quality of the seed being used. In 1943 aphids were relatively scarce in the principal seed production areas in eastern Canada, and in consequence the spread of virus diseases may have been below the normal expectation.

There has been no appreciable change in the bacterial ring rot situation in certified seed; Quebec still has the largest number of rejections.

Table 4: Seed Potato Certification: Number of Fields and Acres Inspected, 1944.

Province	Number of Fields		Fields Passed	Number of Acres		Acres Passed
	Entered	Passed	%	Entered	Passed	%
P.E.I.	3,785	3,609	95.3	14,507	13,885	95.6
N.S.	286	268	93.7	630	594	94.2
N.B.	1,858	1,745	93.9	10,966	10,315	94.0
Que.	938	586	62.5	1,856	959	51.6
Ont.	729	644	88.3	1,753	1,527	87.1
Man.	123	82	66.6	267	207	77.5
Sask.	79	70	88.6	91	62	68.1
Alta.	176	146	82.9	320	251	78.4
B.C.	526	417	79.3	1,243	701	64.4
TOTAL:	8,500	7,567	89.0	31,633	28,601	90.4
Previous Yearly Totals						
1943	9,562	5,520	57.7	34,947	19,148	54.8
1942	7,947	5,023	62.2	29,981	18,875	62.9
1941	9,813	6,404	65.3	37,668	24,405	64.8
1940	12,388	8,676	70.0	48,111	34,094	70.1

Acres Entered		Acres Passed	
1943	34,947	1943	19,148
1944	31,633	1944	28,601
Decrease of 3,314 or 9.5%		Increase of 9,453 or 49.4%	

COMMON SCAB (Actinomyces scabies) was more prevalent in B.C. in 1944 than in the previous year and in a few fields it was fairly severe; the increase was attributed to more favourable soil conditions due to the dry weather during the growing season (H.S. MacLeod). Smooth skinned varieties were more free from scab in Alta. than they have been in the last few years (J.W. Marritt). Scab appeared to be in general more prevalent in Sask. than in 1943; in several fields scab was so severe that grading for seed is impracticable. In one crop of Early Six Weeks grown north of Regina almost every tuber was affected by a skin scurf resembling light scab which gave a very unattractive appearance to the crop (A. Charlebois). Slight scab was encountered in most lots of tubers inspected in Man. (W.A. Cumming). Scab was about the same as usual in Ont., but many lots of Katahdin showed sufficient superficial scab to make grading unprofitable (J.W. Scannell). Scab was of minor importance in Que. and caused slight damage. A 20-80% infection occurred in a few fields along the lower St. Lawrence and all tubers were scabby in a few lots in the Montreal district (B.

Baribeau). Scab was prevalent on potatoes in limed soil or on old potato ground in N.B. (C.H. Godwin). Common scab was present in a third of the tuber lots inspected in N.S.; an average of 2% of the tubers were affected. Samples were received from several tablestock fields where the tubers were moderately checked and russetted. Actinomyces was isolated (J.F. Hockey, W.K. McCulloch). Scab was more or less prevalent in all parts of P.E.I.; in some fields it was quite severe (S.G. Peppin). In one lot of Green Mountain, where the land had received 4000 lb. of waste stone lime in 1943, the tubers were so severely scabbed that the crop was worthless (R.R. Hurst).

EARLY BLIGHT (Alternaria Solani) was present in varying amounts especially at the coast and in the southern part of the B.C. Interior, but the damage was slight (H.S. MacLeod). Infection was severe in several plantings of early varieties at Edmonton, Alta. and moderate in the plots at Olds (M.W.C.). The disease appears to have been more prevalent in the northern districts of Sask. than in previous years. It apparently caused the premature death of the vines of early varieties north of Battleford and Prince Albert (A. Charlebois). A slight infection was present on Bliss Triumph in an irrigated plot at the Scott Station (H.W. Mead). A slight infection was recorded in Man. and Northern Ont. (W.A. Cumming). Early blight caused only slight damage in Que. except in the Eastern Townships, where the yield was reduced 10% on account of the premature death of the vines (B. Baribeau). The disease was rather prevalent in late-planted fields in N.B. (C.H. Godwin). Early blight was common everywhere in N.S. The weather was generally dry and favourable for the disease, but scattered showers kept even susceptible varieties, such as Irish Cobbler, growing with the result that heavy crops were harvested. Only a few tubers affected by Alternaria rot were reported (W.K. McCulloch). A few fields showed a light to moderate infection late in the season in P.E.I. (S.G. Peppin). A scattered infection was seen in Irish Cobbler in the Laboratory bins in January 1944 (R.R. Hurst).

Table 5. Seed Potato Certification: Acreages Passed by Varieties, 1944.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Green Mountain	4,073	48	3,394	858	69	5	46	8,493
Irish Cobbler	7,155	180	602	87	141	131	3	8,299
Katahdin	1,625	196	4,860	15	1,052	7	13	7,768
Bliss Triumph		37	1,420			17		1,474
Sebago	990	70	1		55			1,116
Netted Gem					3	255	496	754
Chippewa	4		10	13	169		12	208
Warba		16	1		14	37	59	127
White Rose							83	83
Houma	32		7		4	3	1	47
Sequoia	3	40					1	44
Early Epicure						11	31	42
Other Varieties	3	5	22	2	20	53	56	161
TOTAL	13,885	592	10,317	975	1,527	519	801	28,616

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1944.

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Adjacent Diseased Fields	Black Leg	Foreign Varieties	Misc.	Total
P.E.I.	37	43			29	6	27	34	176
N. S.	3				3		8	4	18
N. B.	20	5	31	25	14		11	7	113
Que.	27	35	148	49	36	33		20	348
Ont.	3	5	5	11	8	6	11	36	85
Man.	2		9	14	3	2		11	41
Sask.					3			6	9
Alta.	2			11	4	2	5	6	30
B. C.	38	13			23	7	3	25	109
TOTAL:	132	101	193	110	123	56	65	149	929
Rejections as a percentage of fields:									
Entered	1.5	1.2	2.3	1.3	1.4	0.7	0.8	1.8	11%
Rejected	14.2	10.8	20.8	11.8	13.2	6.0	7.0	16.2	100%

Table 7. Seed Potato Certification: Average Percentage of Disease found in Fields, 1944.

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	.04	.007	.03	.18	.09	.12	-	.13	.09
Leaf Roll	.32	.19	.40	.22	.06	-	.02	.11	.35
Mosaic	.17	.05	.10	.24	1.6	3.17	.15	.02	.29
Fields passed: (final inspection)									
Black Leg	.01	.006	.01	.03	.01	.14	-	.02	.04
Leaf Roll	.09	.08	.13	.13	.02	-	.016	.07	.20
Mosaic	.04	.02	.07	.13	.02	.04	-	.01	.15

GREY MOULD (Botrytis cinerea) caused the premature death of the leaves of plants in the Laboratory greenhouses, Fredericton, N.B., in June. The infection centred on areas in the leaf where portions of the flower adhered (J.L. Howatt).

BLACK DOT (Colletotrichum atramentarium) was found causing the death of 5% of the plants on several varieties in a planting on the lower St. Lawrence, Que.; no rot was observed at digging time (B. Baribeau).

RING ROT (Corynebacterium sepedonicum) was not found in any crop grown in B.C. in 1944. Only 6 cases have been found in B.C., the first being in 1942, and it is believed that each one has been eradicated (H.S. MacLeod).

The survey for bacterial ring rot conducted in Alta. in 1944 has shown that definite progress has been made toward control of this disease. Ring rot is still mainly confined to the irrigated areas centering on Lethbridge and Brooks, and to the market gardens of Calgary, Drumheller and Medicine Hat. These sections are now all constituted pest areas under the Agricultural Pests Act and a virtual quarantine exists in these districts. A special precautions area was established this year in the last large commercial potato growing area in Alta. centering on Edmonton. Two farms were found infected in this district.

The 1944 survey was the most satisfactory ever carried out and covered a greater area than any previous survey. In all, 1,010 farms were visited and ring rot was found on 241, affecting 1,616 acres. This was an increase of only 6 farms over the previous year although 75 more farms were visited. Thus there was a significant reduction in the rate of spread.

Marked progress has been made in reducing the intensity of ring rot infections. In 1939, when the first survey was undertaken, fields showing 25 to 35% of the plants diseased were very common. For the first 3 years there was little change in intensity, but in 1943 a considerable decrease occurred in the number of diseased plants per acre, while in 1944 the average intensity in all diseased fields was 4%, with only 45 acres showing more than a 10% infection in the field.

The reduction in the spread and intensity of bacterial ring rot in 1944 is attributed to the supplying of large quantities of disease-free seed potatoes to growers in the pest areas and to the extension and more vigorous enforcement of the quarantine regulations (J.L. Eaglesham). Bacterial ring rot was not found in any fields entered for certification in Alta. However, it was present on 2 farms on which seed potatoes were being grown (J.W. Marritt).

In late August, 15 farms were visited in the Pike Lake area, Sask., to survey for ring rot. Most of these farms had been visited in 1943 and some in 1942. Bacterial ring rot was found on 8 farms and infection varied from a trace to 5-10%, a decrease in comparison with 1943. In an area embracing Moose Jaw and Regina, the disease was found for the first time in 4 fields out of 9 inspected. Other new points were Dodsland and Carmel. The Dodsland grower had

entered for certification. Besides the Pike Lake area, casual observation in the Estevan district seemed to indicate that the disease was spreading in that district (A. Charlebois). Nine fields out of 124 entered for certification in Man. were rejected on account of ring rot and 14 others were disqualified because ring rot was present in other fields of the same farm. Bacterial ring rot was not found in northwestern Ont. in 1944 (W.A. Cumming).

In 1944, bacterial ring rot was detected by the Gram stain test in 14 out of 26 samples of potatoes from fields entered for certification in Man. Of the 14 samples, 9 were collected during field or bin inspection and 5 after these inspections were made. Of these 5, 1 was found in tubers of the 1943 crop submitted for indexing, 2 in tubers of the 1943 crop when they were cut for sets in 1944, and 2 in tubers of the 1944 crop submitted for indexing. It would seem that bacterial ring rot may escape careful field and bin inspections and not be detected until later. In 1944 a heavy attack of late blight increased the difficulty of detection during field inspection (W.A.F. Hagborg).

During a field survey of commercial plantings of table stock potatoes, at digging time in Man., bacterial ring rot was found in 13 fields out of 45 visited. The percentage of tubers visibly affected by the disease ranged from a trace to 8%. It is probable the bacterial ring rot was more abundant, but the presence of tubers rotted by Phytophthora infestans, Pythium sp. or soft rot bacteria made detection difficult. Potatoes being offered for sale in the retail trade have also been surveyed for ring rot. At the begining of each month, in November and December 1944 and January 1945, a 10-lb. lot of table-stock potatoes was purchased from each of 10 different retail grocers in Winnipeg. These tubers were examined for various defects and an attempt was made to estimate the loss from rotting. Ring rot was detected in 2 lots in November, 3 in December and 4 in January. The infection ratings for these samples were: November 1/53, 1/30; December 3/29, 4/26, 5/36; January 2/35, 2/29, 3/43, 7/31. (J.E. Machacek).

Bacterial ring rot was found in 5 fields entered for certification and the disease was present in 11 cases in other fields on the same farm. A further check on the 5 fields found infected in 1944 has revealed that they were planted with certified seed that had been inspected early in 1943. One field that came under suspicion during the summer of 1944, was visited twice after the regular inspections before ring rot was found. It would appear that a definite period must elapse between the date of planting and the appearance of symptoms (J.W. Scannell).

Inspectors of the Crops, Seeds and Weeds Branch, Ont. Dept. of Agriculture, found bacterial ring rot on 465 farms, comprising 2800 acres of table-stock potatoes according to R.E. Goodin. In every case, samples were submitted to the St. Catharines or Ottawa Laboratories for examination. At first glance, there would appear to have been an alarming increase in 1944 over the previous year, when bacterial ring rot was found on 160 farms in 1400 acres of table-stock. However, the great increase in the number of cases recorded was due to the survey in 1944 being much more extensive than in 1943. The encouraging feature was that in 1944 ring rot was found on only 16 farms of the 160 where the disease was reported in the previous survey. Thus the value of the eradication campaign in this province has been clearly demonstrated in its first year. (L.T. Richardson).

There was very little change in the bacterial ring rot situation in Que. The weather conditions in the early part of the season were favourable for symptom expression, particularly in the lower St. Lawrence district. In 1944, the average intensity of infection in infected commercial fields of table stock was more than 10%, while in infected fields entered for certification it was below 0.6%. The disease was found in 148 fields entered for certification and in 49 other cases it was present on the same farm. Bacterial ring rot was found in 4.7% of the fields planted by hand in tuber units as against 15.7% in fields where a planter was used. The latter seed, however, is hardly as good quality (B. Baribeau). Fields of table stock were encountered in Kamouraska Co., where intensity of infection was 10 to 30% and in one field 40% of the plants were affected (A. Payette).

Bacterial ring rot was found in N.B. in 31 fields entered for certification and on 25 farms where fields likewise entered were located. The improvement over the previous year was attributed to the extra precautions growers took to insure that the seed they planted was sound, an interest inspired by the unusually favourable price anticipated for seed potatoes. In the spring of 1944, the price was $5.50 per barrel (C.H. Godwin).

Bacterial ring rot was not found this year in potatoes grown in N.S. It was found, however, in imported table stock in Halifax. Warnings were sent out against the use of table stock for seed purposes (W.K. McCulloch).

Bacterial ring rot was found by table stock and seed inspectors in 70 lots of table stock and 3 in certified seed in P.E.I.; most of the cases were located in the Freetown area, Prince Co., with a slight outbreak near Charlottetown. In certified seed, one was in a 1943 crop of Irish Cobbler, the other 2 were found in tubers of Katahdin. Samples were checked by the Gram stain method. (R.R. Hurst). A useful mimeographed account of the symposium on bacterial ring rot of potatoes held at the annual meeting of the Canadian Phytopathological Society in Toronto, June 26-28, 1944, has been issued by the Society.

BLACK LEG (Erwinia phytophthora) was more prevalent in B.C. in 1944 than in the previous year. Although it was found in 69 fields out of 526 inspected only one field was rejected (H.S. MacLeod). Black leg infected 60% of the plants in a planting of Warba on chocolate loam soil near the sea at Sidney, and caused severe damage; Burbank on the same soil and Warba on clay soil in the same field were not affected (W. Jones). Black leg was present in most fields inspected in the Brooks and Duchess districts, Alta., the highest infection being 11%. In the central and northern districts rainfall was excessive in June and low areas in potato fields were flooded; black leg tended to develop on the margins of such areas (J.W. Marritt). Infection was general around Edmonton, damage ranging from a trace to 20% (G.B. Sanford).

Black leg caused the least damage in years in Sask. The disease was present in less than 4% of the fields entered for certification and caused no rejections. Table stock was much less severely infected in areas where it is usually common (A. Charlebois).

Black leg was found in 11 out of 124 fields and caused the rejection of one in Man. The corresponding figures in northwestern Ont. were 18 out of 67 and one rejection (1.25% was present on 2nd inspection). A striking example of the spread of black leg was observed at Winkler, Man. One half of a 4½ acre field was planted with freshly-cut seed; a heavy rain prevented the immediate planting of the other half and the seed which had been cut already was stored in bags in an open shed for one week and then planted. On July 7, 5% of the plants were affected by black leg in the half of the field in which planting was delayed and 0.2% in the part which was planted immediately. The field was heavily rogued, yet on Aug. 11, the infection was now 10% in the late-planted section and 0.4% in the other. It may be noted: firstly, black leg spread rapidly in seed cut and left in the open for a week, and secondly, the spread was along the rows rather than sidewise into the adjacent relatively clean half, probably due to water lying between the rows following heavy rains (W.A. Cumming). Infection was moderate in a field at St. Adolphe and slight in St. James, Winnipeg (J.E. Machacek).

Black leg was not at all common in Ont. (J.E. Scannell). The disease was again prevalent in the Chicoutimi and Lake St. John districts, Que. Of the 33 fields rejected for black leg in Que., 30 were in those districts. In other districts of the province the disease was barely noticeable (B. Baribeau). Black leg was not found in many fields in N.B. (C.H. Godwin). The disease was little in evidence in N.S. in 1944; it was found in 7 fields entered for certification (W.K. McCulloch). Black leg was less prevalent than usual in P.E.I.; 6 fields were rejected (S.G. Peppin). The average infection in 25 fields of Green Mountain table stock was 0.5% and in 15 of Irish Cobbler it was a trace (R.R. Hurst).

WILT (Fusarium oxysporum) was found in 101 fields entered for certification in B.C. and caused the rejection of 4, an increase in prevalence and severity over 1943. The soil of the affected fields was quite dry, and temperatures were high during a considerable part of the growing season (H.S. MacLeod). Wilt was present in 20 fields of 124 inspected in Man. and one was rejected; in northwestern Ont., a slight amount of wilt was present in 2 out of 67 fields (W.A. Cumming). A severe infection was observed at Reston, Man. (J.E. Machacek). Wilt was not common in Ont. (J.W. Scannell). A few samples of tubers received in connection with the bacterial ring rot survey were found affected with wilt. Also a number of plants said to be affected by purple top from the Hillsburgh area yielded pure cultures of Fusarium spp. (J.K. Richardson). Wilt was observed in 4 fields of Green Mountain on the lower St. Lawrence, Que. Infection was slight, but many affected plants produced tubers affected with soft rot (B. Baribeau). Typical wilt symptoms were present in plants in an ill-drained spot in a field of Green Mountain at Ste. Anne de la Pocatiere; 2 species of Fusarium were isolated (A. Payette). A few fields were affected by wilt in Victoria, Co., N.B. (C.H. Godwin). About 5% of the plants were severely wilted in a field of Green Mountain in P.E.I. and many other plants were definitely affected but not wilted on Aug. 1 (R.R. Hurst).

WILT (Fusarium and Verticillium) was present in only 3 fields entered for certification in Alta. It was also much less in evidence in fields of table stock, particularly in southern Alta. than in 1942 and 1943 (J.W. Marritt). Wilt was present in 20% of the fields inspected and caused the rejection of 2 in Sask. Many garden plots were severely affected in southern and central Sask. (A. Charlebois), including the Saskatoon area (R.J. Ledingham).

STEM-END ROT (Fusarium Solani var. eumartii). A few scattered specimens were found in Que. (B. Baribeau).

SET ROT (Fusarium spp.) was reported in 2 fields in Temiscouata Co., Que. (B. Baribeau).

TUBER ROT (Fusarium spp.) a soft, very watery rot, which rapidly involved the whole tuber, was found slightly affecting tubers both in the field and in storage at Ste. Anne de la Pocatiere, Que. (A. Payette). Tuber rot was quite prevalent in shippers' warehouses in N.B. in the spring of 1944 (C.H. Godwin). Affected tubers were received from many parts of P.E.I. The disease caused severe losses in the winter of 1943-44, infection on Jan. 1, varying from a trace to half the crop.

PIMPLES (Oospora pustulans). A single affected tuber of Irish Cobbler was seen on the market, Charlottetown, P.E.I. (R.R. Hurst).

PSYLLID YELLOWS (Paratrioza cockerelli) was observed in a limited area in the Drumheller district, Alta. (G.F. Manson).

RHIZOCTONIA (Pellicularia filamentosa (Rhizoctonia Solani). Infection was slight to moderate on plants in 1944 in B.C., but it was less severe than usual; tubers were also less affected, but some lots will have to be heavily culled before certification (H.S. MacLeod). Moisture was optimum and killing frost were late in Alta. Accordingly most of the crop was immature when dug and tubers were unusually free from sclerotia (J.W. Marritt). Injury by rhizoctonia was severe in 9% of the fields inspected and moderate in 14% and slight in most of the others in Sask. (A. Charlebois). Rhizoctonia caused very little damage to the plants in Man. and northwestern Ont.; however, many lots in Man. showed a slight development of sclerotia on the tubers (W.A. Cumming). An affected plant was received from Berwick, Ont. (L.T. Richardson).

Only slightly affected plants were seen during field inspection in Que.; on bin inspection the percentage of affected tubers was negligible except for a few badly affected lots on the table stock markets in Quebec and Three Rivers (B. Baribeau). Rhizoctonia caused some misses in fields of Irish Cobbler and Bliss Triumph in N.B.; tuber infection was slight in the bins inspected up to Oct. 25 (C.H. Godwin). Rhizoctonia was common in every potato field in N.S., but the infection for the most part was slight. In fields planted in tuber units, there were many striking instances of finding all the plants in a unit missing and when the sets were uncovered, they bore the blackened remains of the sprouts; in most cases sclerotia could still be seen on the sets. The average infection on the tubers was about 3.5% (W.K. McCulloch). Scarcely any rhizoctonia was noted in the field in P.E.I., but a light to moderate development of sclerotia was found on some tubers at bin inspection (S.G. Peppin). In 3 fields, one each of Irish Cobbler, Green Mountain and Katahdin in July, 19% of the plants were injured or missing due to rhizoctonia. In August, the Pellicularia stage was observed occasionally on the same varieties (R.R. Hurst).

LATE BLIGHT (Phytophthora infestans) was not as prevalent nor as severe as in many previous years in B.C., although it was present in a considerable number of fields, especially at or near the coast. Weather conditions were unfavourable for its development and spread and it caused no serious damage. Good control was obtained by growers who sprayed sufficiently early and frequently. Most fields were harvested while the weather was fine and warm; loss from late blight rot was very slight (H.S. MacLeod). A slight infection was found again in fields in the Edmonton district, Alta., when they received their second inspection (J.W. Marritt). Late blight was found in several plantings at Edmonton in late August, but the disease made little progress during the dry period which followed. It was not found south of Edmonton, but an affected specimen was sent in from Star, northeast of Vegreville. No tuber rot was found at harvest time (M.W.C.).

The epidemic of late blight in 1944 was the heaviest ever recorded in Man. The present year is also the fourth one in succession that the disease has been epidemic. The weather during the latter part of the season was ideal for its spread. The losses in the Red River Valley, where most of the commercial crop is grown, were heavy; many growers left more than half of their crop on the ground at digging time. Warba, on account of its earliness, showed little tuber damage. Losses were also severe along the Assiniboine Valley both at Portage la Prairie and Brandon. Damage from excess water, along with late blight, caused severe losses in the Carman district. Nearly all areas in the province suffered some damage from late blight. In general, growers have not as yet realized the importance of spraying for this disease. Late blight was also quite prevalent in the 3 districts of northwestern Ont. (W.A. Cumming).

In Man. late blight was found first on July 15 on potatoes in two widely separated Victory gardens in Winnipeg. The disease was discovered shortly afterwards in commercial fields near Winnipeg, and before the end of August the fungus had apparently spread throughout the province.

The latter part of August was relatively dry and cool and there were abundant dews. The fungus apparently remained active although the potato foliage was not severely injured. Later when rains came in unusual abundance, in almost every locality, potato vines were severely attacked and at the same time sporangia from diseased foliage were washed down to the tubers. Rot in the tubers was abundant particularly where cracks in the soil above developing tubers had been an avenue whereby infection from the foliage easily spread to the tubers. In some areas of Man. the loss from tuber rot was 100% while in other areas it was less severe. No field visited by the middle of September was free from the disease. From the evidence at hand, it appears that probably 50% or more of all potatoes grown in Man. will have rotted before next spring. A severe infection was seen in several plantings at Kenora, Ont., on Aug. 31 (J.E. Machacek).

As the summer of 1944 was very dry in Ont., late blight did not appear to any extent until early September. Some growers sprayed or dusted until about Sept. 1, and then stopped with the result that their crops became infected. Growers who continued to spray or dust had fairly good control but the potatoes were very slow in maturing. Growers who did very little spraying or dusting during the season obtained crops that ripened up before September, with little or no blight present, although the yields were low (J.W. Scannell). About Swastika,

"quite a large number of people have taken to raising their own potatoes, but both last year and this, this disease has taken from 35 to 50% of the crop" according to Wm. E. Armstrong, Public School Principal (H.N.R.). For the first time in the past 25 years late blight caused unusually severe damage in the lower St. Lawrence district, Que. The disease was first observed in L'Islet Co. (60 miles east of Quebec City) on Aug. 9, but it made little or no visible progress during the rest of the month. On the other hand, from Sept. 9 to 16 the disease spread very rapidly destroying all the foliage of fields for 400 miles. Then followed a week of rain, which washed the spores down to the tubers; in many fields up to 30% of the tubers were affected, and the average was 15-20%. In the Gaspe Peninsula late blight appeared Aug. 22 and was quite severe on the foliage and tubers. Sebago was badly affected when it was grown in close proximity to Dakota Red, Early Rose, McIntyre Blue and Western Red in Gaspe Co. Upon digging, the tubers of Sebago were more severely affected than those of the other coloured varieties. Infection was also observed on the foliage and tubers of President. In other districts of Que. late blight was present but tuber infection was very slight (B. Baribeau).

Late blight became quite serious in N.B. during September after a dry summer. In unsprayed fields tuber rot was severe; in some cases 22% of the tubers were affected (C.H. Godwin).

Storage losses as high as 50% were reported in the fall of 1944 in many potato stocks in N.B. While many factors were responsible for this heavy loss undoubtedly the most important was late blight rot. That late blight should be so destructive this year was puzzling to many growers and dealers in view of the fact that the season appeared to be unfavourable for blight development. However, there is no mystery in the situation when all factors are properly considered.

To begin with, last season's potato crop suffered severely from late blight rot and in consequence, more blight-infected sets were planted this spring than usual. Given favourable weather conditions, a severe blight epidemic was inevitable. Rainy weather during the last week in July was conducive to infection and in a few coastal localities blight began to assume alarming proportions as early as July 23. The hot, dry weather in August drastically suppressed the spread of the disease but the blight was maintained during this period to a slight extent over wide areas on the stems of infected plants.

In consequence of the hot dry summer, spraying was curtailed or improperly timed. Early varieties such as Irish Cobbler and Bliss Triumph matured rapidly and by the middle of September, a considerable acreage of these varieties was ready for harvest, or had been harvested. At this time little blight was visible on the foliage, hence early harvested crops showed but slight infection at digging time or later in storage.

With the advent of cooler weather in September and an abundant rainfall of nearly 5 inches, moisture conditions became more favourable for blight development, although temperature conditions were not optimal. At this time large acreages of potato vines were still alive although growth had ceased. Two light frosts occurred in late September but injury was confined to the

upper part of most vines. After these frost sporulation of the blight fungus became abundant on the lower leaves of the potato plants. This infection on the whole was overlooked by the grower who thought that the dying foliage was suffering from frosts exposure.

The abundant rainfall in October and favourable temperature conditions during the early part of the month enhanced sporulation on those leaves of the plants uninjured by frost. By this time most of the fields were water-soaked and environmental conditions were most favourable for the survival of blight spores. On the whole, in few fields were the vines killed artificially, and digging began on an extensive scale when viable spores were still abundant on the foliage, or on, or in the soil. As a consequence many potatoes were infected before or inoculated at digging time. Many rotten or freshly inoculated tubers were admitted to storage. Owing to the wet condition of the land, tubers were commonly stored with a great amount of adhering soil. The soil impeded drying and air circulation with the result that breakdown was extensive and rapid in storage (J.L. Howatt).

Late blight was not general in N.S. and was first reported on September 8. Yields were reduced but slightly and the average tuber rot was 0.5%. Well sprayed crops gave heavy yields of sound tubers (W.K. McCulloch). Late blight was very prevalent on Green Mountain in the western part of P.E.I., lighter in the central part, but more or less prevalent on Katahdin in the eastern section. Rot was severe in many cases (S.G. Peppin). In 10 fields of Green Mountain table stock in Queens Co., 10% of the seed pieces were decayed due to late blight rot in the sets. Late blight was heavy in several cull piles examined in late June or July. Late blight caused slight to severe damage to the vines in September, affecting the leading varieties including Sebago. A heavy outbreak of tuber rot occurred in storage in November due mainly to digging the crop while viable spores are still present. There was almost no rot where the vines were killed off (R.R. Hurst).

LEAK (Pythium ultimum). Some affected tubers were graded out at Vancouver during early fall from shipments from the lower mainland, B.C. (W. Jones). A few tubers of Netted Gem and Katadhin grown at the Summerland Station were affected (G.E. Woolliams). A tuber rot (Pythium sp.) developed in field and storage at Ste. Anne de la Pocatiere, Que., causing considerable loss in certain lots of tubers from the experimental plots. The rot was favoured by excessive humidity and possibly high temperature (C. Perrault).

SCLEROTINIA ROT (S. sclerotiorum) affected a few plants in 2 fields at Cloverdale, B.C. (W. Jones).

SILVER SCURF (Spondylocladium atrovirens) was present on a tuber received from Lethbridge, Alta. (H.N. Racicot). At bin inspection silver scurf was present in Que. but no severe cases were observed (B. Baribeau). Silver scurf was noted in N.B. on tubers from fields planted to potatoes 2 years in succession (C.H. Godwin). Silver scurf was observed on the 1943 crop in storage in N.S. Infection was slight on Earlaine, Irish Cobbler and Katahdin, but it was heavier on Warba, amounting to 30% in one bin (W.K. McCulloch). A light to moderate infection was already present in some sections in P.E.I. in the early part of the shipping season; usually it is not seen until later (S.G. Peppin).

POWDERY SCAB (Spongospora tuberosa) was found on tubers from several fields in the Fraser Valley, B.C., particularly in the Cloverdale district (H.S. MacLeod). Infection exceeded 50% in a few cases in Temiscouata Co., Que., and it was also occasionally severe in Kamouraska and L'Islet Co. and the Montreal district. The disease has not been reported from other districts (B. Baribeau). Powdery scab was not reported during the regular inspections in N.B. (C.H. Godwin), nor in N.S., and so far only 3 infected tubers have been seen (W.K. McCulloch). The disease was found in one lot of Green Mountain on the market, Charlottetown, P.E.I. (R.R. Hurst).

WILT (Verticillium albo-atrum). Infection was observed in several fields in Alta. and was apparently general (G.B. Sanford). One lot was rejected in P.E.I. on account of the field containing 10% of wilted plants; small amounts were also recorded in several other fields (S.G. Peppin). About 65% of the plants were infected in one field of Irish Cobbler table stock; it was also noted in 20 other fields (R.R. Hurst).

CALICO (virus). Several plants from a field of Green Mountain in P.E.I. were affected by a virus disease identified as calico by D.J. MacLeod (R.R. Hurst).

LEAF ROLL (virus) was found in 250 fields inspected and was the cause of rejection of 38 in B.C. Several of the larger fields were rejected due to current season infection; the fields were located in the Fraser Valley where the aphid population was much larger than in any previous year. (H.S. MacLeod). Leaf roll was the cause of rejection of 15% of the fields inspected in Alta. The percentage of affected plants was high in garden plots, victory gardens and markets about Edmonton, Calgary, Medicine Hat and Red Deer; elsewhere little leaf roll occurred (J.W. Marritt). Leaf roll was fairly common in city gardens in Sask., with a high percentage of affected plants in some plantings (R.J. Ledingham). About 10% of the fields inspected were rejected for leaf roll (A. Charlebois). Only 2 fields were rejected for leaf roll in Man. A small percentage of leaf roll plants, mostly in Chippewa, was noted in northwestern Ont. (W.A. Cumming). Leaf roll was not prevalent in Ont. (J.W. Scannell). In comparison with previous years only 2.8% of the fields inspected in Que. were rejected on account of leaf roll. The fact that little marginal seed from outside the province was planted may have been a factor (B. Baribeau).

Only 40 fields were rejected for leaf roll in N.B. in 1944; the average infection in 858 inspected was 0.4% (C.H. Godwin). Leaf roll was common in table stock fields of Green Mountain and Irish Cobbler in York, Sunbury, Queens, Westmorland and Carleton Co.; infection ranged from 3 to 17% in the fields examined. Only a trace was present in the seedlings at the Alma Substation. Two of these seedlings, when tested, showed the type strain of Solanum virus 14. Net necrosis was observed unusually early this year in N.B. Certain Green Mountain potatoes exposed to leaf roll infected stock showed severe net necrosis one week after they were harvested. The symptoms ranged from a slight necrosis of the phloem at the stem end to almost complete involvement of the vascular system of the tuber. Katahdin, Chippewa and Houma grown at the same location showed no net necrosis (D.J. MacLeod). Only 3 fields, the lowest percentage since 1937, were rejected for leaf roll

in N.S. Two reasons may be given: the unfavourable conditions for aphids in 1943 and the general use of better seed. More table stock growers than usual bought certified seed last spring. Consequently leaf roll was not very noticeable anywhere (W.K. McCulloch). Leaf roll was present in all varieties in P.E.I., but the percentage of affected plants was much less than in the previous 4 years. Only 37 fields were rejected in 1944 compared with 1,174 in 1943 (S.G. Peppin). Although leaf roll was less prevalent in fields entered for certification, average percentage of leaf roll was 19% in 25 fields of Green Mountain table stock and 12% in 12 fields of Irish Cobbler. Net necrosis was observed in several samples brought in for diagnosis. All samples yielded plants affected by leaf roll in greenhouse trials (R.R. Hurst).

MILD MOSAIC (Solanum virus 3) was common in table stock fields of Green Mountain in York, Sunbury, Queens, Westmorland and Carleton Co., N.B. During a hot dry period (temperature 90-96° F.) in August, mild mosaic symptoms were largely masked. In early August a mild type of mosaic appeared in Katahdin and Green Mountain, which could be detected for 2 weeks, after which it gradually disappeared. This mosaic was due to Solanum virus 1 (L and N strains) D.J. MacLeod).

MOSAIC (virus) was found in 179 fields inspected and was the cause of rejection of 13 in B.C. (H.S. MacLeod). The disease was present in only 9% of the fields entered for certification in Alta. Its occurrence in table stock was similar to that of leaf roll (q.v.) J.W. Marritt). Mosaic was seen in 28% of the fields entered for certification in Sask. It is the most common disease in Sask. (A. Charlebois). Mosaic was common in city gardens in Sask. (R.J. Ledingham). Three small plots were rejected in Man. because they were adjacent to a field of Bliss Triumph, in which all plants were affected by mosaic. In Northwestern Ont., 2 fields of Green Mountain from the same seed showed 100% infection (W.A. Cumming). Little mosaic was present in fields entered for certification in Ont. (J.W. Scannell).

Only 3.7% of the fields entered for certification were rejected for mosaic in 1944 in comparison with 13.9% in 1943 (B. Baribeau). In discussing the low incidence of virus diseases in fields entered for certification Mr. Baribeau drew attention to the population studies made from the potato aphid survey in Que. by Mr. R.P. Gorham, Dominion Entomological Laboratory, Fredericton, N.B. I am not at liberty to quote these figures, but it would appear that fluctuations in percentage of fields rejected for mosaic is directly correlated with the population of Macrosiphum solanifolii in the previous year; similarly the percentage of fields rejected for leaf roll is directly correlated with the population of Myzus persicae. The remarkable falling off in the percentage of rejections for mosaic and leaf roll in 1944 is undoubtedly in part the result of the greater degree of freedom from virus disease required in the production of foundation and foundation A seed, which must be used for a field to be eligible for certification. However, the low percentage of rejections realized in 1944 was greatly favoured by the low population of aphids and it is most unlikely that the percentage of rejections will continue at this low level. While no immediate increase in leaf roll is anticipated, it would appear that rejections for mosaic will be on the order of 5-10% in 1945 (I.L.C.). Mosaic caused the rejection of 5 fields in N.B.; this is the lowest number of rejections on record (C.H. Godwin). The percentage of mosaic was the lowest on record in the fields

inspected in N.S. and none were rejected. The principal factors responsible have been discussed under leaf roll. Moreover, nearly all the larger growers plant their foundation seed plots with greenhouse indexed tubers (W.K. McCulloch). Only 43 fields were rejected in P.E.I. in 1944 compared with 378 in 1943. Very little mosaic was found mostly in Green Mountain, although a well-defined mosaic occurred more frequently in Katahdin than previously (S.G. Peppin). In Green Mountain table stock average percentage of affected plants was 41%, with one field showing 72%; the average infection in 15 fields of Irish Cobbler was 16%. Mosaic was found in some fields of eye-indexed and tuber-unit material in Kings Co., infection varying from a trace to 100%; it was plain that the virus was carried without symptoms during certain periods and yet was clearly evident at others. The damage was nil (R.R. Hurst).

PURPLE TOP (virus). Symptoms were more prevalent in tuber units of Katahdin than in those of Chippewa or Vick's Extra Early at Olds, Alta. (G.B. Sanford). The disease was widely distributed in both table stock and potatoes being grown for seed in Alta. Symptoms began to develop in early August and the percentage of affected plants increased during the month, but not during September. Soft tubers were found under most of the affected plants late in the season. Purple top was recorded in 31% of the fields inspected (J.W. Marritt). Purple top was observed in 26% of the fields examined in Sask. In a field of Warba, 26% of the plants were affected. In other affected fields particularly of the early varieties, up to 2% of the plants showed symptoms (A. Charlebois). Purple top was first seen in a field of foundation stock on July 29 at Saskatoon and according to the grower had been present for a week. About 5% of the plants were affected. Dr. A.P. Arnason, Dom. Entomological Laboratory, Saskatoon, reported an unusually heavy population of leaf hoppers. Purple top was present in the Pike Lake area, near Saskatoon, and affected plants were also seen in the Moose Jaw and Regina districts (R.J. Ledingham).

Purple top was much more prevalent in Man. in 1944 than in any previous year, being observed in 82 fields out of 124 inspected; usually not over 1-2% of the plants were affected, but in one at Findlay, over 50% of the plants showed symptoms. This field was at least a mile from any other potatoes, but with hay on all sides. It is thought that the leaf hoppers moved to the potatoes when the meadow was cut for hay. In northwestern Ont., 13 fields showed over 15% purple top and were rejected. In a small plot of Sebago at Oxdrift, Ont., all plants were affected (W.A. Cumming). Purple top was more prevalent in Ont. in 1944 than in the previous year when it was first observed (P.D.S. 23:67). There were few fields in which an occasional affected plant could not be found and in some fields infection exceeded 1%. Sebago appears to be most susceptible, followed by Katahdin and Chippewa and then by the older varieties, Dooley, Green Mountain and Irish Cobbler. In all cases, one or more spongy tubers were present in the affected hill (J.W. Scannell). Purple top was observed in a field of President table stock in Kamouraska Co., Que., and in Sebago in Gaspe Co. The disease seemed worse on low land or damp parts of the field, infections varying from a trace to 1% (B. Baribeau).

In a field of Katahdin in Carleton Co., N.B., 3% of the plants showed symptoms of bunch top (purple top). A trace showed wilt symptoms.

Bunch top was common in seedlings at the Alma Substation. In most cases the plants showed a rolling and dwarfing together with a purpling and yellowing of the foliage. A few plants showed severe rolling and distortion without loss of normal colour of their foliage. Tubers from seedlings that showed severe bunch top symptoms in 1943 at Alma produced plants with the typical symptoms of the disease. The virus from four of these seedlings and from a Katahdin source was transmitted to Lycopersicum esculentum, Datura Stramonium and Nicotiana rustica, in which it produced a vein clearing and a severe distortion of the foliage. The virus obtained from these sources does not correspond to the type strain of Collistephus virus 1 (D.J. MacLeod). Purple top is believed to be responsible for some of the misses in fields of Katahdin. The sets, in some instances, produced bunches of small tubers at the eyes. Purpling of the top observed in Irish Cobbler and Bliss Triumph fields was probably due, however, to extreme heat (C.H. Godwin). Purple top was more in evidence than usual in N.S. It was common in Katahdin, Sebago and Sequoia, from 0.1 to 3% being rogued from some fields (W.K. McCulloch). Purple top appeared to be widespread in P.E.I. in late July, but no serious damage was recorded (R.R. Hurst).

SPINDLE TUBER (virus) was present in very small amounts in both seed or table stock in Alta., although it appeared to be increasing in table stock fields in southern Alta. (J.W. Marritt). A few affected plants were noted in 3% of all fields examined in Sask., and suspected tubers were occasionally seen during bin or shipping inspections (A. Charlebois). Spindle tuber was recorded several times (R.J. Ledingham). One field was rejected in Man. on account of spindle tuber (W.A. Cumming). Spindle tuber was observed in many fields in Que., but the number of diseased plants was low. A high percentage of affected tubers was found in Nicolet Co. on bin inspection or at digging from fields planted on dry soil (B. Baribeau). Spindle tuber was not reported in the field in N.S. and very few off-shape tubers were seen during grading (W.K. McCulloch). The disease was seen in P.E.I. in some 25 fields, mostly of Katahdin and Sebago (S.G. Peppin). Average percentage of affected tubers was 1% in 25 fields of Green Mountain table stock and 0.5% in 15 of Irish Cobbler (R.R. Hurst).

WITCHES' BROOM (virus) was found in 65 fields inspected in B.C. in 1944, but the percentage of affected plants was very small (H.S. MacLeod). A small amount of the disease was present in one field inspected in the Lacombe district, Alta. (J.W. Marritt). Two affected plants were observed in one table stock field in Nicolet Co., Que. (B. Baribeau). One plant affected by witches' broom was present in imported seed from Nebraska in the tuber-index greenhouse, at the Fredericton Station, N.B. (C.H. Godwin). The virus was transmitted to Green Mountain, Lycopersicum esculentum and Nicotiana Tabacum (Samsun). Typical symptoms were produced on these hosts. A plant from Ont. sent by H.N. Racicot also showed the disease. In both cases the virus was identified as Solanum virus 15. (D.J. MacLeod).

YELLOW DWARF (virus). A single affected plant was seen in a ½ acre garden at Alliston, Ont. (H.N. Racicot). Yellow dwarf was found affecting tubers in 2 different lots of Green Mountain grown in the Division plots, Ottawa (L.T. Richardson).

BLACK HEART (non-parasitic) was affecting a few tubers in a shipment of Green Mountain at Charlottetown, P.E.I. in March, 1944. (R.R. Hurst).

ENLARGED LENTICILS (improper storage) affected about 15% of the tubers in a lot of Green Mountain in storage in Oct. 1944. (R.R. Hurst).

FROST. A patchy but widespread frost occurred on Aug. 23 in Sask.; the damage varied (A. Charlebois). Frost caused little damage in Que. in 1944 compared with the previous year; a loss of 10% of the crop was unusual (B. Baribeau). Frost caused considerable loss in N.B. to the 1943 crop. Extreme cooling of the tubers at harvest and in storage resulted in a condition similar to black heart (C.H. Godwin). About 10% of the tubers were severely injured in a lot of Green Mountain due to the tubers having been previously in contact with lumps of frozen earth (R.R. Hurst).

GIANT HILL was not as prevalent nor as severe in B.C. in 1944 as in some previous years; no field was rejected (H.S. MacLeod). Giant hill was observed in table stock in many potato-growing districts in Que. In tuber-unit plots many units showing giant hill were rogued and the tubers destroyed. The number of giant hills observed seemed to be increasing, especially in Green Mountain (B. Baribeau). Giant hill was very conspicuous in Green Mountain in N.S. at the time of 2nd inspection, particularly in fields planted in tuber units. One field with 4% giant hill was rejected (W.K. McCulloch). An occasional affected hill was seen in Green Mountain table stock in P.E.I. (R.R. Hurst).

HEAT INJURY. During a hot dry spell in August, when the temperature reached 96° F., a number of seedlings, and the varieties Green Mountain, Katahdin, Irish Cobbler and Bliss Triumph, showed at the Station, Fredericton, N.B., a severe rolling and wilting, from which they slowly recovered in the next two weeks. Houma and 2 seedlings originating in Maine grown near these potatoes, showed no evidence of heat injury. The injury was also prevalent in Green Mountain, Irish Cobbler and Katahdin in York, Carleton and Sunbury Co. Aug. 11-18 (D.J. MacLeod).

HOLLOW HEART (non-parasitic) affected 2% of the tubers in a lot of Irish Cobbler table stock in Kings Co., P.E.I. (R.R. Hurst). Hollow heart was present in some lots in which large-size tubers were produced in N.B.; they were present where a large amount of fertilizer had been applied or growing conditions were exceptionally good (C.H. Godwin).

INTERNAL DISCOLORATION. The most prevalent discoloration in potato stocks in Alta. occurred as a yellow ring mostly confined to the stem end. It may be associated with purple top (q.v.) (J.W. Marritt).

LIGHTNING INJURY was observed in 2 fields, one in Brant Co. and the other in Simcoe Co., Ont. The affected area did not exceed 2 rods square in each field (J.W. Scannell). Lightning destroyed most of the plants in an oval area of about 100 sq. ft. in a field of foundation Green Mountain in N.B. Some plants were completely destroyed while others appeared burned on one side only. Many tubers bore irregular, surface depressions and a severe necrosis of parts of the interior. Soft rot rapidly completed their destruction. In several cases injury was more severe at the eye end of the tuber. Some tubers showed no injury, but these usually produced weak plants when grown later (D.J. MacLeod). Lightning injury was severe in a small area in a field of Irish Cobbler in P.E.I. (R.R. Hurst).

LOW TEMPERATURE INJURY. Tubers all internally discoloured light to dark grey due to low temperature injury but not from actual freezing, were received April 2, 1945, from South River, Ont. (H.N. Racicot). Two cases of low temperature injury in N.B. were brought to the attention of the laboratory. The tubers showed typical frost necrosis and often the eyes were dead. Injured tubers were planted in the greenhouse and field. The plants were generally weak and matured late. 90% of the Green Mountain plants showed the "maple leaf" effect, a condition where the leaflets are fused giving the leaf a maple leaf shape. Some plants outgrew the trouble. This distortion of the leaf is caused apparently by some injury to the eye, which prevents the leaflets from developing normally. Some leaves were severely ruffled. Only a trace of maple leaf appeared in the plants from frosted Katahdin tubers (D.J. MacLeod).

Temperatures of 28° and 25° F. on Oct. 30 and 31 respectively, caused considerable low temperature injury to undug potatoes near the surface of the ground in P.E.I. Severe injury occurred in the few instances where the crop was dug and left on the ground overnight, Varying amounts of injury were observed in transit shipments of leading varieties causing damage to a trace to 20% of the tubers in January, 1944. In one lot of Green Mountain in storage in February, 1944, the tubers had turned sweet and were only valuable as seed. This was due to cold seeping through the ceiling of the storage bin (R.R. Hurst).

MAGNESIUM DEFICIENCY was common, although slight to moderate, in table stock fields in York, Sunbury, Queens and Westmorland Co., N.B. It was present chiefly in fields to which no fertilizer was applied or where magnesium was not included as an amendment to the fertilizer used (D.J. MacLeod). Magnesium deficiency is a serious disorder in P.E.I. Spraying with Bordeaux containing magnesium sulphate saved a large number of fields. Fertilizer fortified with magnesium gave perfect correction, but losses reached serious proportions in all parts of P.E.I. in many fields, to which magnesium had not been applied (R.R. Hurst).

NET NECROSIS was found in several crops inspected in 1944, but in most instances the affected tubers were only slightly affected and the number was small. A few crops have been rejected so far. Where the trouble varies considerably in different parts of the same crop, it is believed it is due to heat or drought rather than caused by a parasite (H.S. MacLeod). Net necrosis was not found in Alta. except in centres where there was a high percentage of leaf roll (J.W. Marritt). Very little net necrosis was observed in Que. in 1944, about 4% of the tubers showing necrosis or internal discoloration. In trials in the winter of 1943-44, 16,270 tubers were judged healthy and 3,497 were affected to different degrees with net necrosis. All these tubers were planted; in the first crop 4.9% of leaf roll plants were observed and in the second 30.8% (B. Baribeau). Net necrosis was less severe in N.B. than in the previous 5 years. A few isolated lots, however, were infected to a considerable extent (C.H. Godwin).

POTASH DEFICIENCY was observed in 2 fields in Queens Co., P.E.I. (R.R. Hurst).

PURPLE DWARF affected 9% of the fields entered for certification in Alta.; the average infection was less than 1%. A high percentage of plants were affected in 2 fields of table stock in central Alta. (J.W. Marritt). From 1 to 2% of the plants of Katahdin were affected in victory gardens at Lacombe and Innisfall (G.B. Sanford). Purple dwarf was found in 14% of the fields inspected in Sask.; infection seldom exceeded 0.5% (A. Charlebois).

SPINDLING SPROUT was observed in N.B. in a number of tubers from Katahdin and Sebago plants, which showed severe bunch top in 1943. Three tubers produced plants which developed bunch top symptoms; 17 produced normal plants. Spindling sprout has been observed in tubers from plants affected with leaf rolling, bunch top and witches' broom symptoms (D.J. MacLeod). A lot of tubers of Irish Cobbler brought in showing spindling sprout in P.E.I. produced leaf roll plants in the greenhouse (R.R. Hurst).

SPRAIN (cause undetermined) was found in a lot of Irish Cobbler table stock grown in Victoria Co., N.B.; 76 tubers so affected were grown in the greenhouse and all produced normal plants. Three of these plants were critically analyzed; only Solanum virus 1 (G strain) and Solanum virus 4 were found in the leaves, stems and tubers examined. A condition resembling sprain was produced in Irish Cobbler when scions from Green Mountain bearing Solanum virus 3 were grafted on the former. This latter virus could not be recovered from the affected Irish Cobbler (D.J. MacLeod). Every tuber of a lot of Irish Cobbler brought to the Laboratory in P.E.I. was affected by sprain; all the affected tubers produced healthy plants (R.R. Hurst).

STEM-END BROWNING appeared early in the spring in N.B. and a high percentage of tubers were affected in a few lots (C.H. Godwin). It was also recorded in one lot of Irish Cobbler in March 1944 in P.E.I. (R.R. Hurst).

SUN SCALD appeared to have affected several fields of Irish Cobbler and Warba intended for the early market in N.S. Most of the top leaflets, particularly of Warba, were killed. A heavy rain in the night was followed by a burst of hot sunshine next day. Shaded parts of the field were not affected (W.K. McCulloch).

PUMPKIN

CURLY TOP (Beta virus 1) affected 30% of the plants in a plot of Connecticut Field at the Station, Summerland, B.C. (G.E. Woolliams).

YELLOWS (virus). A condition resembling yellows was found in pumpkin and squash at the Station, Fredericton, N.B., and in a field of squash in Sunbury Co. Scions from diseased plants were grafted to healthy pumpkin, squash, cucumbers and melon (Cucumis Melo). The disease was repeatedly induced in the pumpkin and squash but no symptoms appeared in cucumber and melon in three attempts to induce the disease in the latter hosts. The first symptom in squash and pumpkin was a clearing of the veins of the youngest leaves. Then followed a chlorosis and downward cupping of these leaves as they came to occupy an intermediate position on the vine. Later, as they grew older, they became very pale with prominent veins. Finally they slowly wilted and fell off. Infected vines grew slowly. The new growth bore very dwarfed chlorotic leaves and gradually developed many pale spindling shoots growing at right angles to the main stem. The vine thus had a bushy appearance and the terminal growth a staring upright habit. The flowers were dwarfed and a paler yellow than normal. Fruit were formed sparingly or entirely suppressed. Infected plants matured early. The virus is believed to be a strain of Callistephus virus 1 (D.J. MacLeod).

FROST caused severe damage to Small Sugar and other varieties of pumpkin in Queens Co., P.E.I., in June (R.R. Hurst).

RADISH

Groves and Skolko (Can. J. Research C, 22: 227-231. 1944) have described Alternaria Raphani sp. nov., which they have isolated from radish seed originating in B.C., Ont. and Que., and from seed imported from the United States. They have also isolated the fungus from spots on the pods. The fungus is probably an important pathogen of radish (I.L. Conners).

WHITE RUST (Cystopus candidus) caused a slight infection on the leaves of some seed plants at Morden, Man. (W.L. Gordon).

DOWNY MILDEW (Peronospora Brassicae). Infection was moderate on the leaves and moderate to very severe on the stems and pods of 90% of the plants in a 1/10-acre seed plot of Saxa belonging to Division of Horticulture at Ottawa, Ont. Many pods were quite small with shrivelled tips. A slight infection of white rust was also present on the pods of a few plants near infected weeds. In seed plots of Scarlet Turnip White Tip, infection was a trace to slight on the leaves and on a few pods (R.G. Atkinson).

CLUB ROOT (Plasmodiophora Brassicae) severely affected 10% of White Icicle in a garden in Queens Co., P.E.I. (R.R. Hurst).

BROWN HEART (boron deficiency). A trace was observed in Early Scarlet Globe in a garden in Queens Co., P.E.I. (R.R. Hurst).

PROLIFERATION (cause unknown). Less than 1% of the Scarlet Globe plants were affected in a seed plot at the Station, Summerland, B.C. (G.E. Woolliams).

STERILITY (cause unknown). A trace was observed in one garden in Queens Co., P.E.I. (R.R. Hurst).

RHUBARB

LEAF SPOT (Ascochyta Rhei). A moderate to severe infection was widespread at Morden, Man. (W.L. Grodon). Part of this collection was deposited at Ottawa. Examination revealed pycnidia to be scarce and containing few spores. Spores of Ascochyta type were 15.0-17.5 x 3.0-4.2 microns and the Phyllosticta type 3.2-5.5 x 1.5-2.0 microns. Despite the many reports of rhubarb leaf spots due to Ascochyta and Phyllosticta received in past years, only one other is backed by a specimen in the herbarium. This collection was made by H.N. Racicot at Lennoxville, Que., Sept. 1930, and assigned to A. Rhei. Different pycnidia in this specimen yielded spores as follows: Ascochyta type - 5.0-6.0 x 3.0-3.5 microns, 10.0-14.2 x 2.0-4.3 microns, 13.5-19.3 x 2.5-4.7 microns; Phyllosticta type - 4.3-9.7 x 1.5-2.6 microns. As the Phyllosticta spores were also found extruded in cirri on the leaf, they are not merely immature Ascochyta spores. On the other hand the Ascochyta spores were septate in the pycnidium. In addition

to the black pycnidia in necroctic tissue, which may yield all spore types in the same spot there were often inconspicuous nearly hyaline Phyllosticta pycnidia in the surrounding green tissue. It seems reasonable to assume that Phyllosticta Rhei Ell. & Ev. 1889, P. Halstediana Allescher (P. Rhei Ell. & Ev. 1891) and Ascochyta Rhei Ell. & Ev. are all the same organism. It is likely that Phyllosticta straminelle auct. sensu Stevens is simply one more phase of a variable organism. Phyllosticta straminella Bres., described from Rumex in Saxony, probably does not occur in North America (D.B.O. Savile).

ANTHRACNOSE (Colletotrichum erumpens auct. sensu Stevens). A moderate infection was general on the petioles of rhubarb at Morden, Man. (W.L. Gordon). It is difficult to see why the rhubarb organism should have been assigned by F.L. Stevens (Ill. Agr. Exp. Sta. Bull. 213. 1919) to this species, which Saccardo described from dead stems of Ruscus (Liliaceae). Spores were 21-25.5 x 2.2-2.8 microns. Associated with the ascervuli, were pycnidia with spores 2.5-4.5 x 1.2-1.8 microns; possibly they represent a microconidial stage (D.B.O. Savile).

LEAF SPOT (Ramularia Rhei). A severe infection was found in one garden at Edmonton, Alta. (L.E. Tyner). A slight infection was present intermixed with that of Ascochyta Rhei at Morden, Man. (W.L. Gordon). Spores were 0-3 septate, 7.1-35 x 2.0-3.0 microns. Two severely spotted leaves were received from Fr. M. Anselme, Beauceville, Que.; the fungus was abundant on one leaf (D.B.O. Savile). Previously this leaf spot was known only from the Peace River district, Alta., and P.E.I.

CROWN ROT (cause unknown) has not been as conspicuous in the past few moister years in Sask. as it was in the drier thirties (T.C. Vanterpool).

SALSIFY

WHITE RUST (Cystopus cubicus). All plants were more or less infected in plantings in the Montreal district, Que., but the damage did not appear severe (E. Lavallee). All leaves of Sandwich Island were badly rusted at the Botanical Garden, Montreal (J.E. Jacques). Heavily infected leaves were received from Fr. M. Anselme, Beauceville (I.L. Conners).

SPINACH

DOWNY MILDEW (Peronospora Spinaciae). A trace was found in a seed crop of Bloomsdale at Lavington, B.C. (G.E. Woolliams). It was abundant on the lower leaves in a planting at Winnipeg, Man. (J.E. Machacek).

YELLOWS (Callistephus virus 1). Two plants showing yellows were found in a garden at Fredericton, N.B. (D.J. MacLeod).

SQUASH

POWDERY MILDEW (Erysiphe Cichoracearum) found on one plant of Golden Hubbard at the Station, Summerland, B.C. (G.E. Woolliams).

CURLY TOP (Beta virus 1) affected 50-100% of Golden Hubbard, 20-50% of Kitchenette, and 25% of Green Hubbard in plots at the Station, Summerland, B.C. (G.E. Woolliams).

FROST caused severe damage to Hubbard and Table Queen in a garden in Queens Co., P.E.I., in June (R.R. Hurst).

SWEET CORN

EAR ROT (Fusarium moniliforme) destroyed 27% of the ears in Golden Giant and Golden Bantam in a planting in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL STALK ROT (Phytomonas dissolvens). Infection was slight to moderate in gardens at Edmonton and Lethbridge, Alta. (M.W.C.).

SMUT (Ustilago Maydis) was reported as follows: trace at Medicine Hat, Alta. (L.E. Tyner); infection general in plants in the Niagara Peninsula, Ont., but less noticeable than in 1943 (J.K. Richardson); trace recorded with specimens from Lunenburg, and Kings Co., N.S. (J.F. Hockey).

NITROGEN DEFICIENCY. An apparent lack of nitrogen, the plants being a yellowish-green colour, was very striking in Earligold and Golden Bantam in a planting in Queens Co., P.E.I. The diagnosis was confirmed by the diphenylamine test (R.R. Hurst).

SWISS CHARD

LEAF SPOT (Cercospora beticola) was moderate late in the season in 2 plantings in the Ottawa district, Ont. (D.B.O. Savile).

TAMPALA

ROOT ROT (Fusarium sp.) was severe, killing the plants in patches in a planting of tampala (Amaranthus sp.) in the University Horticultural plots at Edmonton, Alta. An unidentified species of Fusarium was consistently isolated from the rotted roots and crowns. Root rot was not observed in one other planting (M.W. Cormack).

TOBACCO

The account given below by Dr. L.W. Koch was the result of surveys conducted in the old and new tobacco belts of Ont. and from information supplied by Mr. R. Bordeleau, Assoc. Superintendent, Experimental Station, L'Assomption, Que., concerning diseases of tobacco in Que.

Diseases in the Seedbed

YELLOW PATCH (excessive nutrients) was less severe than usual and fewer cases were reported both in the old and new tobacco belts. A few seedbeds were destroyed as a result of this trouble, but in many other instances the condition occurred in mild form and was followed by almost complete recovery of the seedlings. It is thought that the prevailing high seedbed soil temperature favoured normal "breakdown" processes of the fertilizers and allowed more normal and continuous growth of seedlings than usual.

DAMPING-OFF (Pythium sp., Rhizoctonia sp. etc.) caused the loss of seedlings (burley) in some cotton-covered beds in Essex Co. shortly after germination. A survey of seedbeds during the transplanting season indicated also that damping-off was the most serious disease of flue-cured tobacco seedlings in the new tobacco belt. Many growers feel that more satisfactory control measures, e.g., spray materials, should be available for this disease.

BLACK ROOT ROT (Thielaviopsis basicola) caused little damage in seedbeds of Essex Co. However, in the new tobacco belt a short survey indicated that this disease is much more prevalent and serious in permanent A-beds than is generally realized by the growers. Of six cases of infected seedlings, only one of these showed symptoms sufficiently striking to be visible to the grower; the other cases were all mild. Infection appeared to have originated from contaminated walls. It is planned to watch this disease carefully in the new tobacco belt in order that it may not increase.

FRENCHING in mild form was observed in several seedbeds.

BLACKLEG (Erwinea? aroideae) was recorded from the Cottam and Rodney areas on seedlings of burley tobacco. Damage was slight.

DOWNY MILDEW or BLUE MOULD (Peronospora tabacina) was neither reported nor observed this past year following its re-occurrence in 1943. Weather conditions may have proved limiting.

MUSHROOMS caused moderate damage to seedbeds of burley tobacco in certain areas of Kent Co. where the practice of using manure as a base for the seedbeds is continued. A limited number of species consistently appear to be the offenders in affected seedbeds.

Diseases in the Field

BROWN ROOT ROT (cause undetermined) was severe in fields of susceptible varieties of burley tobacco in Essex Co where corn was the preceding crop. In the burley varietal resistance plots at Harrow differences were much more pronounced than last year. The new variety, Haronova, appeared to have some measure of resistance to brown root rot in spite of the fact that all other varieties showing any resistance to black root rot are susceptible to brown root rot.

BLACK ROOT ROT (Thielaviopsis basicola) caused less damage throughout both tobacco belts of Ont. and also in Que. than for many years. In infested soils of Essex and Kent Co., Ont., even susceptible varieties appeared to suffer little damage from this disease. The reason for this was, of course, unusually high temperatures early in the season accompanied by moderate or low rainfall.

MOSAIC (virus) caused moderate damage on flue-cured tobacco in Ont., but only in fields where tobacco was grown the previous year. The same was true in Que. While mosaic, both common tobacco virus 1 and cucumber mosaic, could be found in almost every tobacco field, the loss sustained was light because most of the disease was the result of late infection.

STREAK (virus) caused considerable loss in burley tobacco fields of the Blenheim-Erieau district. Sweet clover has been reported as the host in which the disease is carried over winter, but it is probable that some other host or hosts may also be responsible. The following facts concerning this disease are apparent in Ont.: (1) It consistently causes damage in a certain locality near Blenheim each year. (2) In other districts infection is usually limited to scattered plants throughout a field. (3) Infection and resultant damage is consistently more severe at the borders of affected fields.

FRENCHING (cause undetermined) was more common than usual both in the old and new tobacco belts of Ont. Generally speaking, the more poorly-drained fields showed more frenching than others, though where the disease occurred in field of uneven topography its presence was not consistently limited to low areas. Tests failed to show any correlation between incidence of frenching and soil reaction.

SORE SHIN (Rhizoctonia Solani) caused important damage in many flue-cured tobacco fields of both the old and new belts of Ont. Incidence of infection ranged up to 6% and damage varied widely. Close examination of plants in fields where the disease was present showed diseased plants to be leaning in one direction or another with lesions of varying size at the ground level. In cases of severe infection nearly mature plants were so weakened that they often broke off completely at the point of infection in a wind.

This disease has, during the past few years, become much more serious than formerly. It would seem that either an unusually virulent strain of Rhizoctonia is operating in tobacco fields recently or another organism is involved.

ANGULAR LEAF SPOT (Pseudomonas angulata) was almost entirely absent from tobacco fields in Ont. during the past season. Mild damage was sustained in some fields in Que., especially those which were harvested late.

RING SPOT (virus) was observed on scattered plants in many fields throughout Ont. Damage was negligible.

TOMATO

EARLY BLIGHT (Alternaria Solani) was reported as follows: general on several varieties at the Farm, Agassiz, B.C.; Alacrity appeared to be the most susceptible (W. Jones); affected specimens received from Trail, B.C. (L.T. Richardson); slight infection in several gardens at Edmonton, Alta. (M.W.C.); slight infection at Scott, Sask. (H.W.M.); in general less severe in Lincoln Co., Ont., than in 1943 (J.K. Richardson); infected specimens received from Bobcaygeon, Ont. (L.T. Richardson); often observed in Montreal district, Que., but damage slight (E. Lavallee); heavy in many plantings in P.E.I. (R.R. Hurst).

STEM CANKER (Botrytis cinerea). Some 200-300 plants (0.1%) were affected by extensive stem cankers in a very large greenhouse planting in Louth Twp., Ont. The affected plants were a total loss. The disease appeared in spite of thorough soil sterilization and fumigation (G.C. Chamberlain).

LEAF MOULD (Cladosporium fulvum). Vetomold 121 is being grown in nearly all greenhouses in the Victoria district, B.C., and is proving resistant. The disease was severe in Alsa Craig and slight on Vetomold in one greenhouse at Haney, B.C. (W.R. Foster and J. Bosher). A severe infection occurred in a greenhouse at Lacombe, Alta., apparently as a result of poor ventilation (W.C. Broadfoot). Leaf mould was general and severe on Grand Rapids and Vetomold 121 in a fall crop at Simcoe, Ont. (G.C. Chamberlain). In the fall crop of greenhouse tomatoes in 1943 there appeared a hitherto unencountered strain of Cladosporium fulvum. This strain causes sporulating infections on Red Currant (Lycopersicum pimpinellifolium), which appears highly susceptible in young plants and decreasingly so as the plants approach maturity. V-121 is moderately to highly susceptible as are also Vetomold and Stirling Castle. L. hirsutum and L. hirsutum var. glabratum are highly resistant. In parallel inoculations with the older strains of C. fulvum V-121 retained its high degree of resistance to Form V and Vetomold its immunity to Forms I and III (D.L. Bailey). A moderate infection was present on a greenhouse crop of Earliana in Queens Co., P.E.I. in April (R.R. Hurst).

BACTERIAL CANKER (Corynebacterium michaganense). One seed crop of Kondine Red at Grand Forks, B.C., was almost a complete loss due to the widespread occurrence of bacterial canker throughout the planting. The disease was also present at Vernon (G.E. Woolliams). Slight to moderate damage occurred in the variety test at Lethbridge, Alta. Some of the affected plants appeared to recover later in the season (E. Anderson). Bacterial canker destroyed all plants in a garden, at Saskatoon, Sask. The plants were raised from the owner's seed in a commercial greenhouse, where the disease was severe in 1943 and again in 1944 causing a 25% reduction in yield. It was also found in a garden at Prince Albert (R.J. Ledingham). Most plantings were affected by bacterial canker to a varying degree in an area of one square mile south and west of Leamington, Ont. One grower stated that 20% of the fruit in his plantation was spotted (L.W. Koch).

FUSARIUM WILT (F. oxysporum f. Lycopersici) moderately affected 3% of the plants of Vetomold 121 in a greenhouse in May in Essex Co., Ont. (L.W. Koch).

LATE BLIGHT (Phytophthora infestans). A moderate infection of the fruit was recorded from Dauphin, and Grandview, Man., and Kenora, Ont. (J.E. Machacek). It was recorded "as quite common" at Toulon, Man., this year. Similarly "nearly all the tomato crop in the Rainy River district (Ont.) has been lost through this disease" (L.T. Richardson). Not a trace of late blight was found in the Montreal district, Que., although heavy losses occurred in 1942 and 1943 (E. Lavallee). For the second consecutive year late blight was general on tomatoes in eastern Que. (A. Payette). Late blight became general and destructive to tomatoes throughout N.B. after Sept. 15 (J.L. Howatt). Late blight was in general less destructive in P.E.I. than in recent years; 4 cases of severe damage were recorded (R.R. Hurst).

CANKER (Phytophthora parasitica) caused damage on Bounty in several greenhouses in Essex Co., Ont. It appeared always soon after on the later "transplantings". In certain trays the loss of plants was heavy, while in others in the same greenhouse the plants escaped entirely (L.W. Koch).

BACTERIAL SPECK (Pseudomonas tomato) severely infected 75% of the plants, in flats, of Earliana, Bison and John Baer at St. Adolphe, Man. Part of Bison seed was home grown and the pulp was removed without previous fermentation. The rest of the Bison seed and that of the other varieties were obtained from various seed houses. Infection was slight in East Kildonan, and slight but general at Morden (W.A.F. Hagborg).

DAMPING-OFF (Pythium etc.). Seedling beds of early tomatoes suffered severe damage in April and May in Essex Co., Ont.; it was severe in every greenhouse on "flat bed" (L.W. Koch).

LEAF SPOT (Septoria Lycopersici). Infection was moderate and general at East Kildonan and Manitou, Man.; and severe at Brandon and Morden (W.L.G.). During the early part of the picking season little or no leaf spot was evident in Essex Co., Ont.; by the end of the season, however, the disease was severe in some plantations (L.W. Koch). Leaf spot caused almost complete defoliation of one variety and the death of some of the lower leaves in a second at Alliston, Ont. (H.N. Racicot). Diseased specimens were received from Sioux Lookout, Ont., and Lacole, Que. (L.T. Richardson). Leaf spot was widespread and more or less severe in the Montreal district. Some fields suffered severe defoliation by the end of August (E. Lavallee).

WILT (? Verticillium albo-atrum) severely affected 4 plants in the Laboratory greenhouse, Charlottetown, P.E.I., in April (R.R. Hurst).

BACTERIAL SPOT (Xanthomonas vesicatoria). Rather severely affected fruits were received from the Army camp at Niagara, Ont. (J.K. Richardson).

FERN LEAF (virus). A few plants were severely affected in a greenhouse at Edmonton, Alta. (M.W.C.).

MOSAIC (virus) was reported as follows: prevalent chiefly in greenhouses of Chinese growers in the Victoria district, B.C. (W. Jones); odd plants infected at Brandon, Man. (W.L. Gordon). In a planting for seed purposes in Louth Twp., Ont., percentage of infected plants were: Stokesdale 80%, John Baer 4%, Suttons

Best of All 3%, and Bounty and Vetomold 1% (G.C. Chamberlain). Mosaic was present in several plantings in the Charlottetown area, P.E.I., but it was of little importance (R.R. Hurst).

PURPLE TOP (virus) affected 3 plants in a field in Sunbury Co., N.B. The virus corresponded to that described in P.D.S. 23: 77 (D.J. MacLeod). A trace was seen in Earliana in a planting in P.E.I. (R.R. Hurst).

SPOTTED WILT (virus) caused severe damage in a greenhouse at Edmonton, Alta. Specimens were sent to Dr. G.H. Berkeley; he identified the principal virus as that of spotted wilt, although cucumber mosaic and potato "X" viruses were also present (G.B. Sanford). The disease very severely affected Globonie, Labrador and Tangerine at the Botanical Garden, Montreal, Que.; the crop was a total loss (J.E. Jacques).

YELLOWS (Beta virus 1) was quite general throughout the Grand Forks and South Okanagan districts, B.C. From 1 to 3% of the plants were affected in seed crops at the Station, Summerland, B.C. (G.E. Woolliams). Up to 5% of the plants were affected in some fields in the Summerland district. The disease was more severe than usual probably because the vector overwintered abundantly as a result of a mild winter (H.R. McLarty).

BLOSSOM-END ROT (non-parasitic) was reported as follows: common in gardens on Vancouver Island, B.C. (W. Jones); damage moderate at Dauphin, Man., and severe to tomato hybrids in a greenhouse at Morden (J.E. Machacek); early crop severely damaged in Essex Co., Ont., some loss occurring in most plantations throughout the entire early tomato district with the early sets more severely affected than the later (L.W. Koch); recorded from several points in eastern Ont. (H.N. Racicot, L.T. Richardson); more severe than usual as a result of the dry season (E. Lavallee); occurred sparingly in P.E.I. (R.R. Hurst).

CHILLING. Tomato seedlings in cold frames of one grower suffered from exposure to sudden chilling winds in May in Lincoln Co., Ont. The seedlings showed as a result chlorosis of the leaf, purpling and stunting of the tips; the plants recovered later (G.C. Chamberlain).

MAGNESIUM DEFICIENCY caused moderate to severe damage in several plantings in Queens Co., P.E.I. (R.R. Hurst).

TURNIP

SCAB (*Actinomyces scabies*). Traces were seen on Swede turnips in Queens Co., P.E.I. (R.R. Hurst).

GREY LEAF SPOT (*Alternaria Brassicae*) caused moderate damage as a superficial canker on sides and crowns of roots in storage at the Station, Sidney, B.C. (W. Jones). Infection was a trace to severe on the varieties at Olds, Alta. (G.B. Sanford). It was observed in several fields in the Guelph district, Ont., in early Oct.; the damage was nil (J.D. MacLachlan).

STORAGE ROT (Botrytis cinerea) caused 10% damage to Ditmars at Deep Brook, N.S. (J.F. Hockey).

POWDERY MILDEW (Erysiphe Polygoni). A trace was observed in a field of Ditmars in P.E.I. (R.R. Hurst).

DOWNY MILDEW (Peronospora Brassicae) was general on the foliage of Laurentian stecklings from a 10-acre field which had been overwintered in the field at Ladner, B.C. It was also general on 2 seed crops at Ryder Lake (W. Jones). A slight infection was seen at East St. Paul, Winnipeg, Man. Tips of the inflorescence were swollen and abundant oospores were found in some parts (J.E. Machacek). Downy mildew was quite prevalent in various districts in Ont. in July, but it disappeared during the extended dry period later in the season (J.D. MacLachlan).

BLACK LEG (Phoma lingam). Plants were affected in one large patch in an acre field of Laurentian at Ste. Anne de la Pocatiere, Que. (R.O. Lachance). The disease affected from a trace to 27% of the Swede turnip roots in fields examined in Prince and Queens Co., P.E.I. (R.R. Hurst).

CLUB ROOT (Plasmodiophora Brassicae) was widespread in P.E.I. both in gardens and farm fields on Laurentian and other varieties. In many fields the destruction of young plants caused severe loss. One plant of Barbarea vulgaris showing club root infection from Queens Co. was brought in for identification (R.R. Hurst).

STORAGE ROT (Rhizoctonia Solani) caused considerable damage in one storage clamp at Milner, B.C. See Lauritzan, J.I., J. Agr. Research 38(2):93-108. 1929 (W. Jones).

SCLEROTINIA ROT (S. sclerotiorum) affected the roots of a few Laurentian seed plants in a field at Ladner, B.C. (W. Jones).

BLACK ROT (Xanthomonas campestris). Marginal leaf infections were general in a planting of Swede turnips at Morden, Man. (W.L. Gordon). The causal organism was isolated and found to be pathogenic on Swede turnip and cabbage. The typical symptoms of the disease were also produced on the same hosts with a cabbage isolate. This is the first record of its occurrence on Swede turnip in Man. (W.A.F. Hagborg). Approximately 95% of the seed planted in western Ont. in 1944 was disinfected. Clean crops were obtained from seed treated with mercuric chloride or semesan. The disease was not of economic importance except where the seed was untreated or where arasan had been used (J.K. Richardson). Black rot was observed in several fields including some in which treated seed was sown. In most fields, the foliage and subsequent root infection occurred late in the season (J.D. MacLachlan). Some seed crops of Swede turnips were clean, others showed a trace to 8% of the plants infected when the fields were inspected in N.S. in August. A trace was found in stecklings in October (J.F. Hockey). Traces were found in some seed stocks of Swede turnips and in some fields grown for the roots in P.E.I., but the disease caused very slight damage (R.R. Hurst).

MOSAIC (virus) affected 25% of the plants of Canadian Gem in date-of-seeding rows at the Station, Sidney, B.C. (W. Jones).

STERILTY (virus) was common in seed plots in N.B. in 1944; infection ranged from 1 to 27% (D.J. MacLeod). An occasional affected plant was observed in a field of Laurentian in Prince Co., P.E.I. (R.R. Hurst).

BOLTING (cause unknown). An occasional plant was seen affected in one field of Ditmars in P.E.I. (R.R. Hurst).

BROWN HEART or WATER CORE (boron deficiency) was very severe in many turnip districts of Western Ont. Presumably a factor was the long dry period during the growing season. More than 500 acres were sprayed. Records from a large portion of this acreage show that almost complete control was obtained where a thorough coverage of the leaves was secured. In many instances, however, control was unsatisfactory where a low pressure sprayer with only one nozzle per row was used. Plot tests indicate that a borax dust mixture will give good control even under severe water-core conditions (J.D. MacLachlan). Brown heart caused slight to severe damage to Swede turnips in P.E.I. In one planting all the roots were affected and in a second 43%. There were many complaints of the presence of brown heart in roots on the local market or being sold from house to house, but very few reports of its occurrence in turnips inspected for export were received (R.R. Hurst).

MAGNESIUM DEFICIENCY. A case of magnesium deficiency in Laurentian was observed in P.E.I.; the condition was corrected by an application of magnesium sulphate (R.R. Hurst).

VEGETABLE MARROW

GREY MOULD (*Botrytis cinerea*) caused the decay of a few seed on some plants at Duncan, B.C. Sclerotia were present on the surface of the seed (W. Jones).

WILT (*Erwinia tracheiphila*) affected a few plants at Starrs Point, N.S.; striped cucumber beetles were relatively abundant (J.F. Hockey).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

LEAF SPOT (Cylindrosporium Pomi Brooks (Mycosphaerella Pomi Passer.). A moderately severe leaf spot on a crab apple (?Malus baccata hybrid) at Morden, Man., yielded a Cylindrosporium with spores 48-78.5 x 2-4 microns and 1-2 septa; microconidia 4-6.5 x 1.5-2 microns were also present. Although M. Pomi is generally mentioned as causing a fruit spot of apple and a fruit blotch of quince, the perfect stage was produced by Walton and Orton (Science 63:236. 1926) from apple leaves. Brooks (Bull. Torr. Bot. Club 35:453. 1908) described the spores as being 15-80 x 2-2.5 microns. Brooks and Black (Phytopath. 2:63-72. 1912) proved the connection between the Cylindrosporium and an evident micro-conidial stage that they identified with Phoma Pomi Passer. Previously reported on apple fruit from N.B. (P.D.S. 3:30. 1923). Probably insignificant in well sprayed orchards (W.L. Gordon, D.B.O. Savile).

DIE-BACK (Daldinia grandis) occurred to some extent at Morden, Man., near graft incisions; the fungus fruited on the diseased areas (J.E. Machacek).

FIRE BLIGHT (Erwinia amylovora) was again severe in all susceptible varieties at Lethbridge, Alta. Moderate to severe damage was seen in crab apples at Staveley and in apples and crab apples at Edmonton (M.W.C.). Blight was common and often severe in city gardens at Saskatoon, Sask.; it was also severe at Scott, causing extensive reduction in fruit set (H.W.M.). It was severe on a young tree at Saskatoon, the heaviest infection seen since 1933 (T.C. Vanterpool). Moderate twig and spur blight occurred in a planting of Dolgo at Winnipeg, Man. Blight was severe and general at Morden; Schizophyllum commune and Polyporus Tulipiferae often occurred on trunks and branches of infected trees (W.L.G.). A trace of blossom and twig blight was seen on Tolman Sweet, Ontario, Fameuse and King in the Niagara Peninsula, Ont. (G.C. Chamberlain). In an orchard at Britannia Heights blight was severe on Fameuse and Atlas, moderate on Wealthy and Golden Russet, slight on Melba, Cortland and Peerless, and absent from McIntosh, Lobo and Lawfam in July; it had been severe in all trees except those of Lawfam in 1943. In general blight was much less severe in the Ottawa district than in 1943. A specimen was received from Bothwell and small amounts were seen at Pointe Fortune and Chute a Blondeau. Traces were seen at Ste. Clothilde, Barrington, Hemmingford, Covey Hill, Ste. Chrysostome, St. Urbain, Ste. Martine, Ste. Philomene, and Chateauguay, Que. One affected tree was seen at Montreal, and specimens were received from Rosemere, Que. (H.N. Racicot). Two trees of Yellow Transparent at Ste. Rose, Laval Co., Que., showed twig blight and large branch cankers (J.E. Jacques). No heavy infections were seen in southwestern Que., but blight seems to have spread in many orchards (L.J.S. Laporte).

FLY SPECK (Leptothyrium Pomi) was heavy in an abandoned orchard in P.E.I. (R.R. Hurst).

TWIG BLIGHT (Nectria cinnabarina). Tubercularia vulgaris was abundant on branches of a crab apple at Morden, Man; most of the branches were dead or dying; perhaps killed or weakened by winter injury (W.L. Gordon). Four slightly infected trees were seen in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Neofabraea malicorticis) has caused considerable losses during the last two or three years in the Salmon Arm district, B.C.; its severity depends upon fall weather conditions, since infection occurs at that time (H.R. McLarty).

PERENNIAL CANKER (Neofabraea perennans) has not been of much importance on trees in the Okanagan Valley, B.C., since the introduction of the woolly aphis parasite, Aphelinus mali. Some bull's eye rot occurs in storage, but severe orchard damage is rare (H.R. McLarty).

LEAF SPOT (?Phyllosticta limitata) was slight at Brandon and moderate at Charleswood, Man.; spores 4-7 x 3 microns (W.L. Gordon).

BLACK ROT (Physalospora obtusa) caused slight damage on a few trees at the Experimental Station, Sidney, B.C. (W. Jones). A slight to moderate leaf infection was general at Morden, Man.; Sphaeropsis Malorum was identified with three types of spot, (1) a small, circular spot a few mm. diam., (2) a larger, zonate, roughly circular spot about 1 cm. diam., and (3) an extensive, marginal, zonate spot (W.L. Gordon).

CANKER (Physalospora obtusa). Sphaeropsis Malorum was isolated in March, 1944, from both bark and wood of cankers on Fameuse trees at Whitby, Ont. (See P.D.S. 23:81. 1944 under Winter Injury). How much killing was due to winter injury and how much to the parasite is uncertain (R.S. Willison).

CROWN ROT (Phytophthora Cactorum). No change was seen in the general picture in the Okanagan Valley, B.C., about 2% of the mature trees being affected (R.E. Fitzpatrick).

POWDERY MILDEW (Podosphaera spp.). P. leucotricha caused slight damage at the Experimental Station, Sidney, B.C. (W. Jones). A 50% infection was seen on young McIntosh trees in York Co., N.B. (S.F. Clarkson). P. Oxyacanthae was generally light, but heavy on some trees at Morden, Man.; it was heavily parasitized by Cicinobolus Cesatii (W.L. Gordon). Only P. leucotricha has been reported on apple in Canada previously, but we have practically no herbarium material to support earlier reports. Contributors are asked to submit specimens when mature material can be found, to aid us in assessing the incidence of these two species.

BRANCH ROT (Schizophyllum commune) was seen on a few trees in a home orchard in N. Saanich Co., B.C. (W. Jones).

BROWN ROT (Sclerotinia fructicola) was widespread and destructive to fruit, especially crab apples, in the Winnipeg, Man., district; 75% of a purchase of Dolgo crabs were unfit for use 48 hours after picking (W.L. Gordon).

PINK ROT (Trichothecium roseum) caused severe damage to apples of an unidentified variety in Queens Co., P.E.I. (R.R. Hurst).

SCAB (Venturia inaequalis) was not severe in the northern Okanagan Valley, owing to the dry weather; it was, as usual, most prevalent on McIntosh. The three regular sprays, pink, calyx, and cover 2-3 weeks after calyx, generally gave good control; but rain in early September resulted in much pin-point

infection on McIntosh (G.E. Woolliams). Infection was severe in many apples and crab apples at Edmonton and Olds, Alta. At Edmonton, moderate to severe infection occurred in gardens some distance from the plots where the disease was first seen in 1943 (M.W.C.). Lesions were present on young apples sent in from Lloydminster, Sask. (H.W.M.). Slight to severe scab occurred on the leaves of several varieties at Morden, Man.; less occurred on the fruit. A trace was seen on the leaves of a crab at Winnipeg (W.L. Gordon).

Scab was prevalent in many orchards in central Ont. In poorly sprayed orchards 20-30% of the fruit was severely scabbed by June 30. In the Laboratory orchard, St. Catharines, unsprayed trees yielded no scab-free fruit, and 75% of the crop had fallen by the end of July (G.C. Chamberlain). Little scab occurred in the Ottawa district owing to the dry weather (D.B.O. Savile). Damage was slight in well sprayed orchards in southwestern Que. (L.J.S. Laporte). Specimens of late pin-point scab on McIntosh were received during the winter from Dunham, Que. (H.N. Racicot).

In the St. John River Valley, N.B., approximately 50% of the perithecia in the leaves were fully developed on May 17. Initial ascospore discharge occurred on May 27 during the full bloom stage. The bloom period was short and sprays were applied during the critical period of ascospore discharge. Dry weather following these timely early sprays simplified the satisfactory control of apple scab throughout the season. The field spray experiments indicate to date that ferric dimethyldithiocarbamate (Fermate) gives better control of scab in either wet or dry seasons than the standard recommended fungicides, without the spray injury often caused by the latter (S.F. Clarkson).

Although ascosporic inoculum was available for a longer period than usual, nearly eleven weeks, the weather was unfavourable to scab infection in Nova Scotia in 1944. Even in unsprayed trees scab was difficult to find during the summer. The first new infections were found June 5. The dry season to the end of August prevented further spread of the fungus. During September and October some late infection on the fruit was apparent, but in no case was it found to exceed 5% (J.F. Hockey).

In three orchards near Charlottetown, P.E.I., leaf infection of McIntosh averaged 15% in June; but in September only traces could be seen in well-sprayed orchards of this variety (R.R. Hurst).

MOSAIC (?virus) was seen on one tree at Lethbridge, Alta. (W.C. Broadfoot). A well defined mosaic without any distortion was seen on three Bethel trees at the Experimental Station, Fredericton, N.B. A seedling produced at the Station showed a marked mottling and crinkling of the leaves and a general dwarfing (D.J. MacLeod). A 10% infection was seen in an unidentified variety in Queens Co., P.E.I. (R.R. Hurst).

BITTER PIT (non-parasitic) was seen in Baldwin and Spy in Lincoln Co., Ont. It was prevalent in Baldwin, disfiguring up to 50% of a light crop (G.C. Chamberlain). Bitter pit was seen in many orchards in various parts of Ont. on Spy, Baldwin and Stark; it was especially noticeable on young Spy trees just starting to bear (J.E. Howitt). Affected specimens of Linda were received from Brittannia Heights, Ont.; the crop was stated to be light (H.N. Racicot).

DROUGHT SPOT and CORKY CORE (boron deficiency). A few samples were received from orchards in the Okanagan Valley, B.C., that had not been treated with boron (H.R. McLarty). Corky core was severe in Gravenstein, McIntosh and Wagener in an orchard at Melvern Square, N.S. The orchard had received borax at 2 lb./100 gal. in a spray in 1943. Smaller amounts of the trouble were seen in other orchards (J.F. Hockey). Four per cent corky core was found in a hamper of McIntosh purchased at Charlottetown, P.E.I. (R.R. Hurst).

LEAF SCORCH (cause unknown) did no serious damage in the Okanagan Valley, B.C., although some was seen in many orchards (R.E. Fitzpatrick).

SILVER LEAF (cause unknown) was moderate to severe in the horticultural plots at Edmonton, Alta.; heart rot was found in other trees. Silver leaf followed winter injury in a number of trees at Beaverlodge (M.W.C.). Slight to severe silvering occurred on various trees at Morden, Man. (W.L. Gordon). A number of trees of McIntosh and Cortland in the spray plots at the Experimental Station, Fredericton, N.B., had their leaves completely silvered (S.F. Clarkson). Four trees in the seedling nursery at Kentville, N.S. were completely silvered (J.F. Hockey). Silver leaf was seen in P.E.I. on Lobo after Red Delicious had been grafted on them (R.R. Hurst). There does not appear to have been any clear association with Stereum purpureum in any of these outbreaks. In view of the many cases of silver leaf observed, especially in Que. in 1934, associated with black heart due to winter injury but not with Stereum or any other fungus, it seems preferable to list this trouble as due to Stereum only when the association is clearly indicated. Silvering of the foliage must be regarded as a symptom of a disorder in the trees rather than as a disease (D.B.O. Savile).

SPRAY INJURY. In Grantham Twp., Ont., extensive marginal burning developed on Spy and Ontario following the calyx application of ½ strength lime sulphur and wettable sulphur. No injury was found where flotation sulphur had been used at the same time on McIntosh. The weather was damp and cool (G.C. Chamberlain). Severe russetting of various varieties occurred in N.B. when Bordeaux mixture 8-25-100 or 5-15-100 was used for the first cover spray in mid June (S.F. Clarkson).

SUN SCALD. A trace was seen in Lobo at Ste. Anne de la Pocatiere, Que. The same trouble was stated to have been serious in one orchard near Quebec (R.O. Lachance).

WINTER INJURY. Pith injury was universal in many year-old trees in Queens Co., P.E.I. Low temperatures following sub-cooled rain are thought to have been responsible (G.C. Warren). A severe die-back of McIntosh in Queens Co. was also attributed to severe cold; about 40 twigs were killed in each of several trees (R.R. Hurst).

PEAR

FIRE BLIGHT (Erwinia amylovora) was more prevalent than usual in the Okanagan Valley, B.C. About 25% of the trees were infected in one orchard in Kelowna. Several growers are using the zinc chloride solution

with fair to good success (H.R. McLarty, G.E. Woolliams). It was general and destructive at Morden, Man. (W.L. Gordon). A seven-year-old Bartlett orchard of 300 trees in Lincoln Co., Ont., was so severely involved that all the trees were removed early in 1944. The disease started in a few trees at one end in 1942 and spread throughout the block in 1943. In many instances the disease spread from spurs right down into the trunks. Cultivation and fertilization probably contributed to the heavy loss. Blight caused extensive killing of spurs and twigs of Bartlett and Flemish Beauty at Vineland Horticultural Station. The disease was epidemic in a number of young orchards in the west end of the Niagara Peninsula, particularly where it was prevalent in 1943; much less infection occurred in the eastern part where development is earlier (G.C. Chamberlain). Fire blight was seen in many orchards in the St. Thomas area and in the Essex peninsula; in some, many of the trees had already been ruined (J.E. Howitt).

LEAF SPOT (?Mycosphaerella sentina). A light to moderate spotting occurred on some trees at Morden, Man.; minute, immature, sparsely scattered pycnidia were seen, and the spots resembled those described for Septoria piricola (W.L. Gordon).

POWDERY MILDEW (Podosphaera leucotricha) is commonly present in all varieties in the Okanagan Valley, B.C., but caused no serious damage in 1944. The pink spray is sufficient to prevent fruit russetting (H.R. McLarty, R.E. Fitzpatrick).

SCAB (Venturia pirina) was general and moderately heavy in neglected orchards in coastal B.C. (W. Jones). It caused heavy loss in an orchard of Flemish Beauty in the Oliver district, where the fungus was apparently stimulated by the heavy dews in the river bottom land. It also occurs in the northern Okanagan Valley (H.R. McLarty). Thirty-five per cent of the fruit of inadequately sprayed Flemish Beauty in Lincoln Co., Ont., were unsaleable owing to severe and extensive blemishes (G.C. Chamberlain). Scab was heavy in an orchard of Flemish Beauty in Queens Co., P.E.I. (R.R. Hurst).

STONY PIT (virus) is present in most of the Bosc orchards in the Okanagan Valley, B.C., but this is not an important variety. It is also seen in Anjou and Winter Nelis. The severity varies from year to year in a given tree. (H.R. McLarty, R.E. Fitzpatrick).

BLACK END (cause unknown) was present to some extent in most plantings in the Okanagan Valley, B.C. (R.E. Fitzpatrick).

CORKY CORE (boron deficiency). Corky areas were seen in the flesh of Bartlett pears in an orchard in Louth Twp., Ont. The trouble, which had not been seen previously in this orchard, was thought to be due to boron deficiency (G.C. Chamberlain).

QUINCE

FIRE BLIGHT (Erwinia amylovora). Moderately severe twig blight was seen in a few young trees in Grimsby Twp., Ont. (G.C.Chamberlain).

B. STONE FRUITS

APRICOT

CORYNEUM SPOT (C. Beirinckii) was quite general in the Summerland district, B.C., but not further south in the Oliver and Osoyoos districts (H.R. McLarty). Specimens were received from Morden, Man. (J.E. Machacek).

LEAF SPOT (Phyllosticta circumcissa). A trace of a shot-hole type of spot was seen on Scout at Morden, Man.; spores were 4-6 x 2-2.5 microns; first record in P.D.S. on this host (W.L. Gordon).

BROWN ROT (Sclerotinia fructicola) caused considerable damage to the crop at Morden, Man. (W.L. Gordon).

BLACK HEART (Verticillium Dahliae) was seen for the first time in the Okanagan Valley, B.C. Damage was severe in one orchard, 20% of the trees being affected (R.E. Fitzpatrick).

RING SPOT (virus). One additional infected tree was found at Summerland, B.C. (T.B. Lott).

FRUIT SPOT (cause unknown). A fruit spot not due to Coryneum was seen in the Okanagan Valley, B.C.; damage was slight (R.E. Fitzpatrick).

GUMMOSIS (cause unknown). Many trees at Morden, Man., were dying and large balls of gum were exuded at soil level (W.L. Gordon).

SPRAY INJURY. Severe damage occurred in a 20-acre orchard in the Okanagan Valley, B.C., where the operator apparently failed to include lime in a leaf arsenate--lime sulphur spray; the orchard was almost completely defoliated (H.R. McLarty).

CHERRY

BLACK KNOT (Dibotryon morbosum) severely damaged sour cherries in Queens Co., P.E.I. It is abundant on wild cherries, but is not very troublesome in well sprayed orchards (R.R. Hurst).

LEAF SPOT (Higginsia hiemalis) lightly infected the upper leaves of Montmorency in Pelham Twp., Ont., in July; later the infection became general and conspicuous, in this and other orchards. The disease was evident in a young orchard of Schmidt's Bigarreau in Barton Twp., which was sprayed once only; otherwise little leaf spot was seen on sweet cherries (G.C. Chamberlain). Leaf spot was present in sour cherries in Essex Co., the St. Thomas area and Prince Edward Co., but caused less defoliation than in some years (J.E. Howitt).

POWDERY MILDEW (Podosphaera Oxyacanthae) was found on young, unsprayed trees of Montmorency in Grantham Twp., Ont., causing stunting of twigs (G.C. Chamberlain).

BROWN ROT, BLOSSOM and TWIG BLIGHT (Sclerotinia fructicola and S. laxa). Considerable blossom blight due to S. laxa occurred in some orchards in Keating Co., B.C. (W. Jones). In an orchard of Montmorency in Louth Twp., Ont., where bloom was heavy and the trees closely planted, 80-90% infection by S. fructicola occurred and stem rot caused almost complete loss of the crop. In general, infection ran 15-20%. Up to 75% infection was seen in Windsor and Schmidt's Bigarreau in Grimsby Twp., following heavy fogs during bloom; infection started usually in the calyx cup and involved the stem; it tended to be worse in short stemmed varieties and on trees heavy in bloom. Losses averaged 20-30% (G.C. Chamberlain). Blossom blight was serious throughout Lincoln, Welland and Wentworth Co., in all stone fruits, especially cherries, largely as a result of wet foggy weather during the blossom period; more rot occurred than for several years, but the loss was difficult to assess since the weather was also unfavourable for fruit setting (C.B. Kelly).

VERTICILLIUM WILT (V. Dahliae) was seen for the first time on cherries in the Okanagan Valley, B.C. (R.E. Fitzpatrick). Two 4-year old trees in a planting of 30 Windsor sweet cherries were affected by V. sp. in Grantham Twp., Ont., symptoms were wilting and defoliation, dying of branches, and gum exudation from trunks (G.C. Chamberlain).

BACTERIAL BLIGHT (Xanthomonas pruni) was severe in cherry, peach and plum varieties in the experimental nursery blocks at the Laboratory, St. Catharines, Ont. (R.S. Willison).

LAMBERT MOTTLE (virus). No increase was observed in this disease of Lambert cherries in the Okanagan Valley, B.C. (T.B. Lott).

LITTLE CHERRY (virus). Experiments by the B.C. Dept. of Agriculture have verified earlier indications that this disease is due to a virus. Cherries in the Nelson area are generally affected. Reports of small cherries were received from Creston, but the cause was not determined. The disease has not yet reached the Okanagan Valley (H.R. McLarty, T.B. Lott).

MOTTLE LEAF (virus). No spread of this disease was observed in the Okanagan Valley, B.C. (T.B. Lott).

NECROTIC LEAF SPOT (virus) was abundant in the five orchards of Montmorency under observation in Ont. Infection ranged from 9.0 to 44.8% in plantings of from 66 to 432 trees. The affected trees are stunted (G.C. Chamberlain).

RASP LEAF (virus). No spread in the Okanagan Valley, B.C., was observed in 1944 (T.B. Lott).

TATTER LEAF (virus) was found in two orchards in the Niagara Peninsula, Ont., causing considerable leaf tattering and fruit stunting; Black Tartarian seems to be particularly susceptible (G.C. Chamberlain).

TWISTED LEAF (virus). No spread in the Okanagan Valley, B.C., was observed in 1944 (T.B. Lott).

YELLOWS (virus) is common in Montmorency and Richmond in the Niagara Peninsula, Ont. Trees that showed heavy leaf fall in 1943 suffered only slight defoliation in 1944 (G.C. Chamberlain).

CHLOROSIS (iron deficiency). Prunes and other fruit trees suffer from chlorosis in certain orchards in the Okanagan Valley, B.C.; the trouble is thought to be due to unavailability of iron, but no effective remedy has yet been found (H.R. McLarty). In a localized area in Louth Twp., Ont., lime-induced chlorosis affected several trees; the foliage was particularly pale on the current year's growth (G.C. Chamberlain).

CRINKLE (bud sport) is common in the Okanagan Valley, B.C., on Bing, Black Tartarian and Republican. Some growers believe that is is spreading, but our experimental evidence is to the contrary (H.R. McLarty, T.B. Lott).

WINTER INJURY. In Barton Twp., Ont. 82% of buds of Windsor and 71% of Schmidt's Bigarreau were killed. Twigs examined on March 6, 1944, showed discoloration of cortex, especially in and at the base of bud spurs (G.C. Chamberlain).

PEACH

SCAB (Cladosporium carpophilum) was more prevalent than usual in Ont., especially in Rochester and Fisher in which fruit spotting resulted (G.C. Chamberlain).

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). In a block of Rochester in the Laboratory orchard, St. Catharines, Ont., one plot sprayed with Bartlett's standard wettable sulphur showed 1.9% blossom blight, a second plot given the same spray + Orthox spreader showed 3.1% infection, and the unsprayed control 4.0% infection. In an Elberta block in the same orchard no apothecial groups appeared under trees where cyanamide was applied at 300 lb./acre, compared with 0.37 groups/tree in the untreated plot; but blossom blight was actually higher in the cyanamide plot than in the control. A sprayed commercial orchard of Elberta at St. Catharines divided into 3 plots, yielded the results shown in Table 8 (R.S. Willison).

Table 8: Effect of Ground Treatment on Peach Blossom Blight.

Treatment	Cyanamide	Disced	Untreated
Apothecial groups/tree	0.125	0.0	4.3
Blossom blight, %	2.6	3.0	4.9

These results suggest that small experimental plots are unsatisfactory for this type of experiment, especially when the rate of infection is relatively low; small plots may be very erratically affected by outside sources of inoculum. It is also suggested that ground treatments will never be effective to the extent of allowing a reduced spray program unless they are universally adopted over rather wide areas (D.B.O. Savile).

The basic incidence of brown rot was higher than usual in the Niagara Peninsula, Ont., owing to the large amount of blossom blight (see also cherry and plum), but was not serious at harvest time. Table 9 summarizes spray experiments in the Laboratory orchard, St. Catharines.

Table 9: Effect of Sprays on Incidence of Brown Rot (%).

Variety	Check	Poorest Spray Plot	Best Spray Plot
Rochester	44.8	40	3.8-6.0
Elberta	70.4	40	8.7

The Elberta crop ripened about normally until half the crop was picked; ripening was then so rapid that the remainder was too soft for the fresh fruit market, but was excellent for canning and processing (R.S. Willison).

POWDERY MILDEW (Sphaerotheca pannosa) was present in many orchards in the Okanagan Valley, B.C., but rarely caused damage to fruit (H.R. McLarty, R.E. Fitzpatrick).

LEAF CURL (Taphrina deformans) was fairly general around home gardens in coastal B.C., and caused considerable damage to unsprayed trees (W. Jones). It was unusually abundant in parts of the Okanagan Valley, notably the Oliver district, but the total damage was small (H.R. McLarty, R.E. Fitzpatrick). In the Niagara Peninsula, Ont., small amounts were seen in all varieties, especially Elberta; damage was slight except in orchards damaged by wet and cold in 1942-43 (C.B. Kelly). A scattered infection was seen on Elberta in Grimsby Twp.; early infection was largely confined to terminal growth where spray coverage was poor (G.C. Chamberlain). In unsprayed orchards throughout Ont. many trees were again defoliated by this disease (J.E. Howitt).

WILT (Verticillium Dahliae) was observed for the first time in the Okanagan Valley, B.C. (R.E. Fitzpatrick).

BACTERIAL BLIGHT (Xanthomonas pruni) was present in 90% of the 120 trees in a block of Elberta in Louth Twp. bordering Lake Ontario; defoliation was less than in 1943 and no fruit infection occurred. Valiant and Vidette were not infected (G.C. Chamberlain).

WESTERN X DISEASE (virus). The situation in B.C. may be summarized as follows: Mapped orchards. In 1940, 13 orchards including 4,020 trees were

mapped for the study of the spread of this disease. In 3 orchards there has been little or no spread. In the other 10 orchards including 2,457 trees, spread has been slight but steady. The percentage of disease in these orchards rose from 2.7% in 1940 to 4.3% in 1941, 5.5% in 1942, 6.1% in 1943, and 7.7% in 1944. These figures were obtained by expressing the total number of trees that had shown the disease as a percentage of the total number of trees originally present in the orchards. As in other years the orchards were examined twice in the latter part of the summer. As formerly the expression of the disease was variable and some trees that had previously shown the disease did not show those symptoms that make definite diagnosis possible. Some of these trees were weak and thin. New infections have occurred with little relation to former infections except in part of one orchard where a very definite local spread appears to be indicated.

In 3 mapped orchards in Okanagan Falls, Summerland and Peachland, single diseased trees were found in 1940. In the Okanagan Falls orchard, slight spread occurred in 1941 only. In the Summerland and Peachland orchards, no spread has occurred.

Unmapped orchards. In the years 1940 to 1943 inclusive, the disease was not observed north of Okanagan Falls except in single trees in Summerland and Peachland. In 1944 the disease was found in Kaleden and on the opposite side of Dog Lake, on the flat in Penticton, and in two orchards in Summerland. These places are respectively about five, ten and twenty miles north of the area in which the disease was previously known to occur. It was not found on the benches in Penticton, in Maramata, Peachland and Westbank in the Okanagan Valley, or in Keremeos and Cawston in the Similkameen Valley (T.B. Lott).

X DISEASE (virus). Five new cases were seen in the four orchards surveyed annually in Lincoln Co., Ont. Three of these constituted confirmation of trees suspected of being infected in 1943. Percentage of infection in the four orchards was 0.7%, 0.24%, 0.35%, and 0.6% (G.C. Chamberlain).

DIE-BACK (boron deficiency). Several cases of die-back were seen in the Okanagan Valley, B.C., where boron had been applied 3 years ago. It appears that a boron application will not be effective in peaches for as long a period as in apples (H.R. McLarty).

SPRAY INJURY. In several orchards in Clinton Twp., Ont., where Elgetol (1-80) was used in the dormant spray for leaf curl control, lateral buds were killed and dropped off. The spray penetrated and killed a small area of wood below the bud. Terminal buds were not generally affected (G.C. Chamberlain).

PLUM

SHOT HOLE (Cercospora circumcissa) was widespread and destructive to leaves of plums and plum x cherry hybrids at Brandon, Man. A moderate infection occurred at Winnipeg (W.L. Gordon).

BLACK KNOT (Dibotryon morbosum) was severe in a few trees in a farmyard at Cloverdale, B.C. (W. Jones). A single infected Japanese plum tree (P. salicina) was seen in Wentworth Co., Ont.; these varieties seldom show the disease. Isolated and scattered infections were seen on Italian prune in Niagara Twp.; Stanley prune is quite susceptible (G.C. Chamberlain). A specimen was received from Renfrew, Ont. (H.N. Racicot).

SHOT HOLE (Higginsia prunophorae (Cylindrosporium prunophorae) was severe on Cooper at Morden, Man. (W.L. Gordon). A slight infection was seen on several varieties at Ste. Clothilde, Que. (H.N. Racicot). A shot hole was light at Edmonton and Oliver, Alta., and moderate at Lacombe, but no organism could be found (M.W.C.). A trace of an unidentifiable shot hole was also seen in Queens Co., P.E.I. (R.R. Hurst).

LEAF SPOT (Phyllosticta virginiana (Ell. & Halsted) Tassi) was moderately heavy on an Assiniboine seedling at Morden, Man.; spores rod-shaped 4.5-5 x 1 micron; first record in Man. on cultivated plum; see also Sand Cherry and Prunus (W.L. Gordon).

BLOSSOM BLIGHT and BROWN ROT (Sclerotinia fructicola). From a trace to 20% blossom infection occurred in most varieties in the Niagara Peninsula, Ont. (See under Cherry). In Grand Duke, which is very susceptible, blossom infection was 30-40% (G.C. Chamberlain). Brown rot affected 100% of the fruit at Bonny River, Charlotte Co., N.B. (S.F. Clarkson). In mid August brown rot infection was heavy on twigs in P.E.I. and caused severe cankers; later the fruit was severely affected, especially Victoria of which it was difficult to find any sound fruit (R.R. Hurst).

PLUM POCKET (Taphrina communis). Specimens were sent in from Bounty, Sask. (H.W.M.). A specimen was received from Rideau Ferry, Ont. (H.N. Racicot). One case was reported from Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas pruni) caused leaf spotting and defoliation of young trees of a European variety at the Laboratory, St. Catharines, Ont. (G.C. Chamberlain).

MASKED VIROSIS. Some apparently healthy Shiro trees, 1-2 years old, were indexed on peach in 1943 at the request of the grower. On peach in the spring of 1944 delayed foliation, dwarfing and ring spotting of the leaves was seen; in August a striking mosaic pattern appeared. Present information suggests that this is distinct from all the known virus diseases of stone fruits in Ont. (R.S. Willison).

PRUNE DWARF (virus). No spread was seen in the Okanagan Valley, B.C. (T.B. Lott).

CHLOROSIS (excess lime) was severe on some trees at Winnipeg, Man. At Brandon, chlorosis was general and severe on plums, plum x cherry hybrids, and other stone fruits. Owing to the severity of chlorosis and leaf spots, half the stone fruit orchard has been cleared (W.L. Gordon).

DEFOLIATION and FRUIT DROP. This trouble, reported last year on Italian prune, is thought to have been connected with the winter injury of 1942-43, as most of the affected trees were in low or poorly drained areas. Most of the trees have recovered, though a few of the more severely affected still show symptoms. Some of the marking and rolling of leaves may be attributable to mites (R.S. Willison).

SPRAY INJURY. Extensive injury due to Bordeaux mixture, was seen in 8 orchards in Lincoln Co., Ont., on Shiro which is very susceptible; yellowing, shot hole and defoliation occurred. Humid weather at the time of spraying is thought to have aggravated the damage (G.C. Chamberlain).

SAND CHERRY

SHOT HOLE (Cercospora circumscissa) was widespread and destructive on sand cherry and sand cherry hybrids at Brandon, Man. (W.L. Gordon).

LEAF SPOT (Coryneum Beijerinckii) was moderately heavy at Morden, Man., on Grace Wright; it was also present on a hybrid sand cherry x Red June (P. salicina) P-2-12 (W.L. Gordon).

LEAF SPOT (Phyllosticta virginiana (Ell. & Halsted) Tassi). A moderate infection occurred at Morden, Man. on a cross of sand cherry x Red June P-2-12. First record in the Survey. See also Plum and Prunus (W.L. Gordon).

POWDERY MILDEW (Podosphaera Oxyacanthae) was heavy on Grace Wright at Morden, Man. (W.L. Gordon).

BROWN ROT (Sclerotinia fructicola). A specimen was received from Renfrew, Ont.

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was found in black currant plantings in various parts of the Okanagan Valley, B.C. (G.E. Woolliams). At Morden, Man., rust was light on Boskoop Giant, heavy on Kerry and moderate on Magnus black currants; was light to moderate on Climax and light on White Imperial white currants; infection was heavy on Ribes glandulosum and moderate to heavy on R. hudsonianum (W.L. Gordon). Boskoop Giant in a nursery at Goderich, Ont., was almost completely defoliated (G.C. Chamberlain).

Rust was reported on black currants from many new locations in Ont.; it seems to be increasing (J.E. Howitt). Serious defoliation was caused by blister rust at Frelighsburg, Que. (L.J.S. Laporte). Only slight damage was caused in Queens Co., P.E.I. (R.R. Hurst).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was heavy and general on Boskoop Giant, Kerry and Magnus black currants, Climax and White Imperial white currants and on red currants, and slight on Ribes glandulosum and R. Hudsonianum at Morden, Man.; it was also severe on black currants at Charleswood, Man. (W.L. Gordon).

CLUSTER CUP RUST (Puccinia Pringsheimiana) was heavy on black currants at Craik, Sask. (H.W.M.).

POWDERY MILDEW (Sphaerotheca mors-uvae) slightly infected black currants at Kelwood, Man. (J.E. Machacek). At Morden it was light on Boskoop Giant and White Imperial, and was heavy on the new growth of Climax (W.L. Gordon). Infection was estimated at 90% at Frelighsburg, Que., and damage was very heavy (L.J.S. Laporte).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola). At Morden, Man., infection was a trace on spineless gooseberry, moderate on Ribes Cynosbati and slight on R. oxyacanthoides (W.L. Gordon).

ANTHRACNOSE (Drepanopeziza Ribis) was heavy on English gooseberry and Ribes Cynosbati at Morden, Man. (W.L. Gordon). It was moderately heavy on Abundance and Pixwell at Kapuskasing, Ont. (J.W. Groves).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was heavy at Morden, Man., on English gooseberry, spineless gooseberry and Ribes oxyacanthoides (W.L. Gordon).

LEAF SPOT (Phyllosticta Grossulariae). A trace was found on English gooseberry at Morden, Man., with spores 4-7 x 2.5-3 microns; a trace was also seen on Ribes Cynosbati, with spores mostly 4-5 x 1 micron but sometimes 5-6 x 3 microns; Grove draws attention to the co-existence of both spore types. Previously reported only in B.C. (W.L. Gordon).

CLUSTER CUP RUST (Puccinia Pringsheimiana). A trace occurred at Edmonton, Alta. (G.B. Sanford).

POWDERY MILDEW (Sphaerotheca mors-uvae) occurred on leaves and fruit at the Experimental Station, Summerland, B.C.; much fruit was spoilt. It was most prevalent on Oregon Champion (G.E. Woolliams).

D. RUBUS FRUITS

BLACKBERRY

ANTHRACNOSE (Elsinoe venota) was heavy on leaves of wild blackberry under cultivation at Morden, Man. (W.L. Gordon).

ORANGE RUST (Gymnoconia Peckiana). A specimen was received from Knowlton, Que. (H.N. Racicot).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was heavy on some leaves of Siberian dewberry (?Rubus caesius) at Morden, Man. (W.L. Gordon).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) was seen occasionally in Queens Co. and once in Kings Co., P.E.I.; damage was sometimes severe (R.R. Hurst).

DODDER (Cuscuta Gronovii) heavily infested a nursery planting at Charleswood, Man. Adjacent Canada thistle and golden rod were also attacked. This is the same infestation mentioned in P.D.S. 23:103, under Aster. Mr. E.G. Anderson has confirmed the identity of the dodder as C. Gronovii or the doubtfully distinct C. curta; he states that such an unusual habitat for this species is sometimes explained by the custom of using black muck from infested swamps to enrich the soil of gardens etc. (W.L. Gordon).

SPUR BLIGHT (Didymella applanata). A moderate infection was reported from Edmonton and St. Albert, Alta. (A.W. Henry). Moderate infections were seen on Madawaska at Morden, Man.; Taylor was slightly affected. A general moderate infection occurred at Winnipeg (W.L. Gordon). In Ont. spur blight was commonly found in Latham plantings where cane growth or weeds were heavy (G.C. Chamberlain). A neglected planting at Woodstock, N.B., showed extensive cane and bud injury (D.J. MacLeod). Spur blight was reported from Yarmouth and Kings Co., N.S. (J.F. Hockey). An entire fruiting plantation of Viking was destroyed in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta) was moderate to heavy on Rideau and Indian Summer at Morden, Man., but little occurred on most red raspberries. Some canes of wild red raspberry under cultivation were moderately infected. Infection was moderate to heavy on the following black or purple varieties: Manchurian Briar, Morrison, Porter #1, Porter #2, Bristol, Dundee, Quillan, Logan, Marion, and Black Beauty (W.L. Gordon).

CANE BLIGHT (Leptosphaeria Coniothyrium). Specimens of affected Latham canes were received from Kent Co., Ont. Drying up of fruiting canes was stated to have caused 30% reduction of crop. Pycnidia and perithecia occurring on the canes close to the crowns suggested that winter injury may have been a predisposing factor (G.C. Chamberlain). A specimen was received from Craigville, Ont. (L.T. Richardson).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was moderate and general at the University, Winnipeg, Man. At Morden it was moderate on Latham, Rideau, Viking, Madawaska and Ottawa; and was slight and widespread on other varieties and on cultivated wild raspberry (W.L. Gordon).

YELLOW RUST (Phragmidium Rubi-idaei) was general on Cuthbert in coastal B.C., but caused slight damage (W. Jones).

LATE YELLOW RUST (Pucciniastrum americanum). At Morden, Man., infection was moderate on Ottawa, and a trace to slight on other varieties and on cultivated wild raspberries (W.L. Gordon). Late rust was common on both wild and cultivated plants in Kings Co., N.S. (J.F. Hockey). Two light infections were reported on Viking in Queens Co., P.E.I. (R.R. Hurst, R. Bagnell).

POWDERY MILDEW (Sphaerotheca Humuli). Specimens were received from Prince Albert, Sask. (H.W.M.). Mildew was moderately severe in nursery plantings of Latham in Ont. Latham is extremely susceptible under nursery conditions (G.C. Chamberlain).

WILT (Verticillium albo-atrum) attacked several plants of Washington in a plantation near Victoria, B.C. (W. Jones). Wilt was found in a Viking plantation near Forest, Ont.; affected plants were completely defoliated by Sept. 5 (G.C. Chamberlain). Traces were found in Lloyd George and Viking in Queens Co., P.E.I. (R.R. Hurst).

DECLINE (virus) was general in Cuthbert in coastal B.C. (W. Jones).

LEAF CURL (virus) severely affected 5% of the plants in two gardens at Summerland, B.C. (H.R. McLarty). Two per cent of Cuthbert in a planting near Woodstock, Ont., were infected and severely stunted (G.C. Chamberlain).

MOSAIC (virus) infected 40% of Ottawa (O 275) in a variety test at the Experimental Farm, Agassiz, B.C. (W. Jones). Nearly 100% of Taylor in the plots at the Experimental Station, Summerland, were infected; none was seen in other varieties (H.R. McLarty). Mosaic was a factor in Cuthbert and Viking plantations in Ont. intended for certification; infection was 1-5% (G.C. Chamberlain). Infection was 1% in a Latham planting in Sunbury Co., N.B., and 2% in a Viking planting in York Co. Mosaic was common in wild raspberries in Sunbury, York, Queens, Westmoreland and Carleton Co. (D.J. MacLeod). A Viking plantation in Queens Co., P.E.I., showed 16% infection (R.R. Hurst).

E. OTHER FRUITS

GRAPE

DEAD ARM (Fusicoccum viticola) was seen in 15 varieties in a vineyard in Lincoln Co., Ont.; infection was less than 1% but more than is usual in well-managed vineyards (C.B. Kelly). Light infections were seen on Concord in a number of vineyards in Lincoln and Welland Co. (G.C. Chamberlain).

LEAF SPOT (Phyllosticta spermoides Pk.) was heavy and destructive on cultivated Vitis vulpina at Morden, Man.; spores were 3-5 x 1 micron (W.L. Gordon). Known from Man. and Ont., but not previously reported in P.D.S.; this fungus is evidently confined to V. vulpina.

DOWNY MILDEW (Plasmopara viticola) was present on the leaves of some varieties at Morden, Man. It was severe on Vitis vulpina at Morden and Roland, but was not seen on the wild grapes at Winnipeg. This is the first Man. record on V. vulpina; the fungus was previously reported on cultivated grapes in 1927

only (W.L. Gordon). An affected specimen of V. yulpina was received from London, Ont. (L.T. Richardson). In a vineyard in Niagara Twp. 25% of the clusters of Fredonia were affected; downy mildew was seen in several other vineyards of this variety (G.C. Chamberlain). A little downy mildew developed early in the season on V. vulpina at Ottawa, but soon disappeared with the onset of dry weather (D.B.O. Savile).

POWDERY MILDEW (Uncinula necator). At the Experimental Station, Summerland, B.C., some powdery mildew was present in 75% of the European varieties; fruit infection caused heavy loss in 50% of these varieties. Some mildew was present on leaves of American varieties, but there was no fruit injury (H.R. McLarty). Powdery mildew was moderately heavy on Agawam and Fredonia in Pelham Twp., Ont., causing shelling of fruit (G.C. Chamberlain).

CHLOROSIS (cause unknown) severely affected several plants at Lethbridge, Alta. (M.W.C.).

STRAWBERRY

FRUIT ROT (Botrytis sp.) caused a soft rot of 5% of the fruit of Premier in Louth Twp., Ont., following heavy rain and prolonged fog; the loss was greater where growth was heavy (G.C. Chamberlain). It was very destructive to the late season crop in P.E.I. (R.R. Hurst).

LEAF SCORCH (Marssonina Fragariae (Diplocarpon Earliana). A specimen was received from Morden, Man., late in September; first Man. record on cultivated strawberry (W.L. Gordon). Material was collected near Ste. Anne de la Pocatiere, Que. by H.N. Racicot and C.E. Perrault (I.L. Conners).

LEAF SPOT (Mycosphaerella Fragariae). A specimen was received from Regina, Sask. (H.W.M.). A moderate, general infection occurred at Morden, Man. (W.L. Gordon). A scattered infection occurred in many plantings of Senator Dunlap in Queens Co., P.E.I., but did not cause appreciable damage (R.R. Hurst).

LEAF SPOT (Phyllosticta fragariicola Desm. & Rob.). A trace was found on cultivated strawberries at Morden, Man., and a considerable amount on wild strawberry; it was associated with Ramularia Tulasnei and may, as Grove has suggested, be connected with it; Ph. obscurans (E. & E.) F. Tassi is probably synonymous (W.L. Gordon).

POWDERY MILDEW (Sphaerotheca Humuli). A light infection occurred on Senator Dunlap in Queens Co., P.E.I. (R.R. Hurst).

JUNE YELLOWS (genetic breakdown). Four scattered infections of Premier were seen in Grantham Twp., Ont. (G.C. Chamberlain). All plants in a small planting of Dick were affected in P.E.I. (R.R. Hurst).

FROST INJURY. Up to 10% of the early buds of Senator Dunlap were killed in some sections of Queens Co., P.E.I. (R.R. Hurst).

NITROGEN DEFICIENCY. In two plantings of Senator Dunlap near Montague, P.E.I. the leaves were yellowish and small; they later developed red margins and many withered (R.R. Hurst).

POTASH DEFICIENCY caused moderate damage in three plantations in Queens Co., P.E.I.; the leaves developed a purplish cast (R.R. Hurst).

ROOT ROT (cause unknown) was prevalent in several fields in the Saanich district, B.C. (W. Jones).

WINTER INJURY. In some plantings of Senator Dunlap, Premier, and Catskill in York and Queens Co., N.B., 50-100% of plants showed severe root and crown damage (S.F. Clarkson).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Needle Blight (Rehmiellopsis bohemica Bub. & Kab.) was found causing considerable injury to A. balsamea in Richmond Co., N.S., and was also seen elsewhere in Cape Breton Island. This European disease was reported in Me., Mass. and N.Y. in 1933, but has not previously been reported from Canada. See Waterman and McKenzie, Phytopath. 23:108-109. 1933; Waterman and Aldrich, Plant Dis. Reptr. 24:201-203. 1940. (Mildred K. Nobles; conf. Alma M. Waterman).

ACER - Maple

Leaf Spot (Cylindrosporium pennsylvanicum) caused slight damage to A. pennsylvanicum at Cape Split, Kings Co., N.S. (J.F. Hockey). Present in the herbarium from Ont., Que., and N.B.

Die Back (?Nectria sp.) caused moderate injury to a group of trees in York Co., N.B. (J.L. Howatt).

Leaf Spot (Phleospora canadensis) slightly infected A. spicatum at Clearwater Bay, Ont. (W.L. Gordon).

Powdery Mildew (Phyllactinia dorylea) on A. rubrum was received from Mont Rolland, Que. (I.L. Conners).

Leaf Spot (Phyllosticta minutissima). A heavy general infection of A. spicatum occurred at Clearwater Bay, Ont. (W.L. Gordon).

Leaf Spot (Phyllosticta Negundinis and Septoria Negundinis). These two organisms were closely associated in a heavy infection of A. Negundo at Winnipeg, Man., in August (W.L. Gordon).

Wilt (Verticillium albo-atrum) affected a few trees of A. saccharum and A. pseudoplatanus at Ottawa, Ont., late in the season. Injury varied from killing of a single branch to death of the whole tree. Most cases were presumably long-standing infection with injury aggravated by severe drought (D.B.O. Savile).

AMELANCHIER

Black Leaf Curl (Apiosporina Collinsii) was heavy and general on A. alnifolia at Clearwater Bay, Ont. (W.L. Gordon).

Rust (Gymnosporangium clavipes) was sent in from near Vernon, B.C., on the fruit of A. sp. (I.L. Conners).

BETULA - Birch

Leaf Spot (Gloeosporium ?Betulae-papyriferae Sacc. & Dearn.). A moderate, widespread infection of B. papyrifera occurred at Clearwater Bay, Ont.; spores were 3-6 x 1.5 microns (W.L. Gordon). The relationships of the various species of Gloeosporium described on Betula require to be clarified by cultural studies.

Rust (?Melampsora sp.). On June 15 a pycnial infection was found at Fort Garry, Man., on a leaf of B. papyrifera; Betula has not been recorded as the aecial host of any rust (A.M. Brown). This material was finally collected by Mr. Brown, when it became apparent that no aecia were developing, and was sent to Ottawa; sections show that the pycnia tend to be flattened and that paraphyses, though present, are not strongly developed; the appearance of the pycnia, the abundant orange-yellow pigment, the mycelial habit, and the morphology of the haustoria leave no doubt that this is actually a rust; the form of the pycnia and the taxonomic position of the host suggest Melampsora or a related genus (I.L.C., D.B.O.S.).

Powdery Mildew (Phyllactinia corylea) slightly infected B. papyrifera at Clearwater Bay, Ont. (W.L. Gordon).

Leaf Spot (Phyllosticta Betulae). A moderate, general infection of B. papyrifera occurred at Clearwater Bay, Ont. (W.L. Gordon).

Die-Back (cause unknown). Most stands of yellow birch (B. lutea) of 60 years old or older are succumbing to die-back in N.B. As noted last year (P.D.S. 23:95), the bronze birch borer is often, but not always, associated with the trouble (J.L. Howatt). Die-back has been very destructive in P.E.I. and the fine birches seem to be headed for great reduction in population (R.R. Hurst).

CARAGANA

Leaf Spot (Septoria Caraganae) was light in hedges at Edmonton, Alta. (M.W.C.). It was moderate to severe at Brandon, extremely severe at Morden, and moderate at Winnipeg, Man., and was severe at Clearwater Bay, Ont., on C. arborescens (W.L. Gordon).

CORNUS - Dogwood

Powdery Mildew (Phyllactinia corylea) was general but caused slight damage to C. Nuttallii in N. Saanich Co., B.C. (W. Jones).

Mosaic (?virus). A few trees of C. Nuttallii in N. Saanich Co., B.C. showed chlorotic and somewhat distorted foliage, sometimes with splitting and necrotic spotting (W. Jones).

Blossom Blight (cause unknown). In a blossom blight of C. Nuttallii seen in Vancouver Island, B.C., the petals turned brown and were distorted. Where many blossoms were affected the ornamental value of the tree was greatly diminished. Phoma sp. was found in some blossoms (W. Jones).

CORYLUS - Filbert

Leaf Spot (Gloeosporium Coryli). A trace occurred on C. cornuta in the Arboretum, Ottawa, Ont., but none was seen on C. americana, C. Avellana or C. Avellana heterophylla (D.B.O. Savile).

Powdery Mildew (Phyllactinia corylea) was abundant on leaves of C. cornuta at Clearwater Bay, Ont. (W.L. Gordon).

COTONEASTER

Leaf Spot (Phyllosticta sanguinea Sacc.) moderately infected C. melanocarpa at Charleswood, Man.; spores 5-7.5 x 2.5 microns; first record in Canada (W.L. Gordon).

Dark Berry (Phytophthora Cactorum) was common on C. horizontalis in rock gardens in the Victoria and N. Saanich districts, B.C., causing moderate damage (W. Jones).

CRATAEGUS - Hawthorn

Rust (Gymnosporangium tubulatum Kern). A specimen was received from Grand Forks, B.C. (G.E. Woolliams, I.L. Conners).

DIERVILLA

Leaf Spot (Septoria Diervillae) was severe on D. Lonicera at Morden, Man., and was moderate but widespread at Clearwater Bay, Ont. (W.L. Gordon).

FRAXINUS - Ash

Powdery Mildew (Phyllactinia corylea) was very conspicuous on some trees of F. pennsylvanica at Ontario Agricultural College, Guelph, Ont. (J.E. Howitt).

Leaf Spot (Phyllosticta viridis) was heavy and widespread on F. pennsylvanica var. lanceolata at Winnipeg, Man.; the Piggotia stage was also present. Piggotia was also severe at Morden and moderate at Brandon (W.L. Gordon).

Rust (Puccinia sparganioides). Scattered infections were found on F. pennsylvanica var. lanceolata at Winnipeg, Man. (W.L. Gordon).

JUGLANS

Die-Back (Fusarium lateritium associated). This organism was isolated from beneath the bark of affected branches of J. regia on Vancouver Island, B.C. (Irene Mounce, W.L. Gordon).

LEDUM - Labrador Tea

Rust (Chrysomyxa ledicola). A light infection was present on a specimen of L. groenlandicum received from Gilbert Plains, Man.; see also Picea (W.L. Gordon).

LIRIODENDRON - Tulip Tree

Leaf Spot (Ecotstroma Liriodendri) greatly disfigured L. Tulipifera at Ontario Agricultural College, Guelph, Ont. (J.E. Howitt).

MALUS

Leaf Spot (Coniothyrium pirinum associated). A slight infection occurred on Malus baccata at Charleswood, Man. (W.L. Gordon).

Scab (Venturia inaequalis). A 10% infection on Betchel's Flowering Crab in Grantham Twp., Ont., caused spotting, yellowing and drop (G.C. Chamberlain).

PICEA - Spruce

Rust (Chrysomyxa ledicola). A moderate infection of P. glauca, with some defoliation occurred at Melfort, Sask. (P.M. Simmonds, W.L. Gordon). A specimen of P. glauca was received from Arborg, Man.; severe infection and damage were reported. This rust was common on P. pungens at Morden and Winnipeg, Man., and Dryden, Ont.; first record from Man. on this host (W.L. Gordon). It was abundant on P. glauca in Fenwick Co., N.S. (J.F. Hockey, I.L. Conners).

Needle Blight (Lophodermium Piceae (Fckl.) Hoehn.) was found on P. sitchensis in the Queen Charlotte Islands, B.C. Sterile material of ?L. filiforme Darker was also found on the same host (R.E. Foster, I.L. Conners; conf. E.K. Cash).

Rust (Pucciniastrum americanum) was found on P. glauca adjacent to a commerical raspberry plantation at Memramcook, Westmorland Co., N.B., on July 5 (S.F. Clarkson).

PINUS - Pine

Blister Rust (Cronartium ribicola) severely attacked P. strobus in Kings Co., P.E.I. (R.R. Hurst).

Needle Blight (Hypodermella montivaga (Petrak) Dearn.). A specimen was received from near Field, B.C. This is the first Canadian collection of this fungus (J.E. Bier, I.L. Conners).

POPULUS - Poplar

Leaf Blight (Fusicladium radiosum) was found on P. tremuloides near Duncan, B.C. (R.E. Foster, I.L. Conners).

Leaf Blight (Linospora tetraspora) again severely infected P. tacamahaca in many sections of central Alta. (M.W.C.).

Leaf Spot (Marssonina Castagnei) was quite general in the region of Summerland, B.C., on P. tremuloides; it was severe on young trees, often causing premature death of the leaves (G.E. Woolliams). It was found on some leaves of the same host at Clearwater Bay, Ont., intermixed with Phyllosticta brunnea (W. L. Gordon).

Rust (Melampsora spp.). M. albertensis was quite general on P. tremuloides at Summerland, B.C. (G.E. Woolliams). M. medusae was severe on P. deltoides at Sanford and Winnipeg, Man. (W.L. Gordon). It should be emphasized that the report by Dr. J.E. Jacques in P.D.S. 23:98 refers to M. medusae rather than M. sp.

Leaf Spot (Phyllosticta brunnea). A moderate general infection occurred on P. tremuloides at Clearwater Bay, Ont. (W.L. Gordon).

Leaf Sport (Septoria populicola) slightly infected P. balsamifera at Gilbert Plains, Man. (W.L. Gordon).

Powdery Mildew (Uncinula Salicis) was general at Summerland, B.C., on P. tremuloides and P. trichocarpa, especially on young trees (G.E. Woolliams).

PRUNUS

Leaf Spot (Phyllosticta circumscissa). A slight general infection of Nanking cherry, P. tomentosa, was seen at Charleswood, Man. (W.L. Gordon).

Leaf Spot (Phyllosticta virginiana (Ell. & Hatsted) Tass) moderately infected dwarf Russion almond, P. nana, at Charleswood, Man. P. virginiana was slightly infected at Winnipeg and severely attacked at Clearwater Bay, Ont.; these are the first reports in the Survey; see also Plum and Sand Cherry (W.L. Gordon).

Leaf Curl (Taphrina Insititiae). At Ponemah, Man., one branch of a tree of P. pennsylvanica was attacked in 1943; in 1944 the disease spread to other branches and to nearby trees; leaves of infected branches were severely damaged (W.L. Gordon).

QUERCUS - Oak

Leaf Spot (Marssonina Martini). A trace occurred on Q. macrocarpa at Winnipeg, Man. (W.L. Gordon).

Leaf Spot (Phyllosticta livida) moderately affected Q. macrocarpa at Winnipeg, Man. (W.L. Gordon).

Leaf Blister (Taphrina caerulescens). A moderate infection occurred on Q. macrocarpa at Beaverlodge, Alta. (G.B. Sanford).

RHAMNUS - Buckthorn

Leaf Spot (Phyllosticta Rhamni). A trace occurred on R. Frangula at Winnipeg, Man. (W.L. Gordon).

Rust (Puccinia coronata). A scattered infection occurred in one planting of R. cathartica at Winnipeg, Man. (W.L. Gordon).

SALIX - Willow

Blight (Fusicladium saliciperdum). Severe twig blight was seen at Whycocomagh, N.S., but the disease was not generally prevalent in the western part of the province (J.F. Hockey).

Anthracnose (Gloeosporium Salicis) was severe on golden willow, S. alba var. vitellina, at Morden and Winnipeg, Man. It was also heavy on Salix sp. at the Forest Nursery Station, Shilo (W.L. Gordon).

Powdery Mildow (Uncinula Salicis) was general on Salix spp. throughout the Okanagan Valley, B.C. (G.E. Woolliams).

SORBUS - Mountain Ash

Leaf Spot (Coniothyrium ?pirinum). A slight, scattered infection occurred on S. Aucuparia at Winnipeg, Man.; spores were 5-7.5 x 2.5-3.5 microns (W.L. Gordon).

Rust (Gymnosporangium spp.). A trace of G. Juniperi was found at Brandon, Man., and a heavy infection at Clearwater Bay, Ont., on S. americana planted for ornament (W.L. Gordon). Fruit of Sorbus sp. was heavily infected by G. clavipes at Lunenberg, N.S.; pycnia of G. ?Juniperi were present on the leaves (J.F. Hockey, I.L. Conners).

TSUGA - Hemlock

Rust (Uredo Holwayi). A trace was found on Ts. heterophylla near Vernon, B.C. (I.L. Conners).

ULMUS - Elm

Dutch Elm Disease (Ceratostomella Ulmi (Schwarz) Buisman). The occurrence of Dutch elm disease in Canada was established late in 1944 when Dr. Rene Pomerleau, Quebec Dept. of Lands and Forests, received specimens from St. Ours, near Sorel, Richelieu Co., Que., that finally proved to be infected by the causal fungus. Subsequent scouting under the direction of Dr. Pomerleau indicated that the disease was present in nine localities in the region of Lake St. Peter, an expansion of the St. Lawrence about 50 miles below Montreal. The infected area was found to be about 40 miles long and, although only 28 diseased trees were actually located, it is believed that this number will be greatly increased when intensive scouting is carried out at a season more favourable than late autumn.

In the United States both the European elm bark beetle (Scolytus multistriatus Marsh.) and the native elm bark beetle (Hylurgopinus rufipes Eichh.) act as vectors, but the latter is a much less effective carrier of the fungus than the former. As fas as is known at present only the native bark beetle occurs in Que., which gives rise to the hope that it may be possible to eradicate the disease in that province. The history of attempts to eradicate exoctic tree diseases in North America is not encouraging, but it may at least be possible to confine it to a comparatively small area if future work does not prove it to be more widespread than it is now known to be. It is not known how long the disease has been present in this country, nor how it was introduced, although there are indications that it came directly from Europe rather than from the United States (A.W. McCallum).

Black Spot (Gnomonia ulmea) was heavy on some plants in a hedge of U. pumila at Winnipeg, Man., but absent from others. A slight infection occurred at Morden. Infection on U. americana was moderate and general at Winnipeg and Morden (W.L. Gordon).

Coral Spot (Nectria cinnabarina) continued to progress in hedges of U. pumila at the Botanical Garden, Montreal, Que., in spite of careful attention, and many trees were killed (J.E. Jacques).

VIBURNUM

Leaf Scorch (?high temperature and drought). In mid-August an unusual form of leaf injury occurred on Viburnum spp. in the Arboretum, Ottawa, Ont.; it was severe on V. Sargenti, moderate on V. Sargenti var. calvescens, and nil to a trace on others. For several days the injured leaves did not fall or curl although up to 3/4 of the blade area had been killed as though by steam. This is thought to have been direct heat injury during the first two weeks of August when shade temperatures up to 100° F. occurred at a time during which soil moisture may have been too low to allow adequate evaporative cooling of the leaves (D.B.O. Savile).

SHADE TREES

Drought Injury. By Aug. 20 at Ottawa, Ont., Juglans and Aesculus were 50 to 90% defoliated; Betula, trace to 75%; Ulmus, 10-25%. Acer was generally unaffected except for a few trees thought to have been infected by Verticillium. Almost all trees shed some leaves in Aug., but other genera were not seriously affected except in unfavourable situations (D.B. Savile).

INSECTS

Empusa sp. killed an estimated 20% of aphids throughout N.B. (J.L. Howatt). It killed great numbers of aphids in potato plots in P.E.I. (R.R. Hurst).

Bacterial disease of potato beetles. Potato beetles were scarce in many sections of N.B. In Albert Co. the beetles were uncommon and some of the first seen were lethargic; a bacterium isolated from these insects killed healthy beetles within 24 hrs. of inoculation (J.L. Howatt).

Virus wilt of tent caterpillars killed about 0.5% of these insects attacking poplar in Victoria Co., N.B. (J.L. Howatt).

VI. DISEASES OF ORNAMENTAL PLANTS

ALTHAEA ROSEA - Hollyhock

Leaf Spot (Cercospora althaeina) was severe on some plants at the Laboratory, Winnipeg, Man. (W.L. Gordon). This leaf spot was heavy on small plants and on the lower leaves of large ones, causing some defoliation, in one garden at Westboro, Ont.; previously reported from Man. and P.E.I. (D.B.O. Savile).

Rust (Puccinia Malvacearum) was common on hollyhocks at Summerland, B.C., and elsewhere in the district (G.E. Woolliams, H.R. McLarty). Rust was severe at Winnipeg, Man.; in one location some plants were killed (W.L.G.). At Ottawa and Westboro, Ont., rust was definitely heavier in some gardens than in 1943; pustules were sometimes confluent over the entire surface of a leaf. The relatively poor growth due to the drought made the injury conspicuous. Abundant inoculum from 1943 may have contributed to the epidemic but frequent gentle sprinklings of gardens during hot weather was the principal factor (D.B.O. Savile). A severe infection was seen on a private estate at Ste. Hyacinthe, Que. (J.E. Jacques). Rust was very heavy in many borders in Queens Co., P.E.I. (R.R. Hurst).

ANTIRRHINUM - Snapdragon

Basal Rot (Fusarium sp.). Damage in a planting at Edmonton, Alta., was apparently caused by Fusarium sp. (A.W. Henry). Isolations from wilting plants at Winnipeg, Man., yielded F. oxysporum, F. Equiseti and Cylindrocarpon radicicola (W.L. Gordon).

Rust (Puccinia Antirrhini) was moderately heavy at the Station, Summerland, B.C. (H.R. McLarty). Severe infection occurred in mixed "A. nanum compactum" (presumably a dwarf form of A. majus) in a garden at Edmonton, Alta.; in adjacent rows of the rust-resistnat Du Barry, infection was a trace to slight (M.W.C.).

Leaf Spot (Septoria Antirrhini) slightly affected volunteer plants in late April, in N. Saanich Co., B.C. (W. Jones).

AQUILEGIA - Columbine

Powdery Mildew (Erysiphe Polygoni) affected nearly all plants at the Station, Summerland, B.C., and was present but not serious at various locations in the Okanagan Valley (G.E. Woolliams, H.R. McLarty).

Root Rot (cause unknown) caused severe damage in the horticultural plots at Lethbridge, Alta. (G.B. Sanford).

Mosaic (Cucumis virus 1) affected one plant out of six of A. formosa in the Arboretum, Ottawa, Ont. (D.B.O. Savile).

ARTEMISIA

Powdery Mildew (Erysiphe Cichoracearum) was moderately heavy on some leaves of A. sp. at Morden, Man. (W.L. Gordon).

Leaf Spot (Phyllosticta sp. = ?Phoma ferruginea Sacc.) was moderately abundant on some leaves of A. sp. at Morden, Man.; spores 4-6 x 2-5 microns; first report to the Survey (W.L. Gordon).

ASTER

Rust (Coleosporium Solidaginis) was heavy on the leaves of some plants at Morden and Winnipeg, Man. (W.L. Gordon).

Dodder (Cuscuta Gronovii) killed several plants of michaelmas daisy (?A. novae-angliae) at Charleswood, Man. (W.L. Gordon).

Powdery Mildew (Erysiphe Cichoraceaarum) was moderately heavy on many plants of A. novae-angliae at the Station, Summerland, B.C. (H.R. McLarty). It was moderately heavy on some plants of Aster spp. at the University, Winnipeg, Man. (W.L. Gordon). A. novae-angliae vars. Red Cloud and Barr's Pink, and A. novi-belgii var. Beechwood Challenger were heavily infected late in the summer at the Botanical Garden, Montreal, Que.; the hybrid Glory of Colwall was lightly infected (J.E. Jacques).

Rust (Puccinia Asteris) slightly infected some plants of Aster sp. in a garden at Winnipeg, Man. (A.M. Brown).

Leaf and Stem Blight (Ramularia Asteris) was severe on Aster sp. at Morden and on A. ericoides at Winnipeg, Man.; first report in the Survey (W.L. Gordon).

Leaf Spot (Septoria atropurpurea) was moderate on Aster spp. at Winnipeg, Man. (spores 67.5-102.5 x 2.5-3 microns), and at Morden (spores 37.5-47.5 x 2 microns) (W.L. Gordon).

BELAMCANDA - Blackberry-Lily

Leaf Spot (Heterosporium Iridis). A light general infection occurred on B. chinensis at Brandon, Man. (W.L. Gordon).

BERBERIS - Barberry

Rust (Puccinia graminis). At the Botanical Garden, Montreal, Que., aecia were abundant on B. heteropoda, and present in small numbers on B. aggregata, B. brachypoda, B. Poireti var. weichangensis, B. sibirica, and B. Tischleri; rusted Agropyron repens was abundant nearby (J.E. Jacques). See also under stem rust of oats.

BERGENIA

Leaf Spot (Phyllosticta sp.) was extensive on B. cordifolia at Morden, Man.; spores 10.5-15 x 2.5-3 microns; first seen in 1934 (P.D.S. 14:91 under Saxifrage) and several times seen since but never in fruit. A number of doubtfully distinct species of Phyllosticta have been described from Saxifrage and related genera, but all seem to have much shorter and somewhat narrower spores (W.L. Gordon).

BOLTONIA

Streak (virus) was severe in the border at the Station, Fredericton, N.B. (D.J. MacLeod).

CALCEOLARIA

Spotted Wilt (Lycopersicum virus 3) caused moderate damage to plants at the Botanical Garden, Montreal, Que.; infection is thought to have originated from diseased salvias that were placed in the same house (J.E. Jacques).

CALENDULA

Yellows (Callistephus virus 1) attacked odd plants of C. officinalis at Winnipeg, Man.; first Man. record in this host (W.L. Gordon). See also under Callistephus.

CALLISTEPHUS CHINENSIS - China Aster

Rust (Coleosporium Solidaginis) was generally moderate but heavy on some leaves at Winnipeg, Man. (W.L. Gordon). Little or no rust occurred at Ottawa, Ont. (D.B.O. Savile).

Wilt (Fusarium oxysporum severely damaged half of a mixed planting in a garden at Agassiz, B.C. (W. Jones). Fusarium was isolated from severely damaged plants in Sandwich East Twp., Ont., where 60% were affected (J.J. Miller). Late in the season wilt was prevalent in the vicinity of Guelph, Ont. (J.E. Howitt).

Yellows (Callistephus virus 1) was severe at Lethbridge and Innisfail, Alta., and in several gardens at Edmonton (M.W.C.). Yellows appeared to cause considerable damage throughout Ont., as specimens were received from many widely separated localities (J.E. Howitt). Yellows was common on China aster in York, Sunbury, Queens and Westmorland Co., N.B. A florist at Sussex had only a minimum of yellows on Callistephus, Calendula and Phlox Drummondii within a cage covered with a special "tobacco cloth", whereas Callistephus and Calendula in the open near the cage were severely attacked. A number of weeds were commonly affected as follows: Chrysanthemum Leucanthemum, York and Sunbury Co.; Leontodon autumnalis and Plantago major, York, Sunbury, Queens, Westmorland, Albert and Carleton Co.; Erigeron annus, the above and Northumberland Co. C. Leucanthemum was first seen affected on June 6 when 18% of plants in a hay field at Fredericton were visibly diseased; at this date 19% of E. annuus in a pasture at Fredericton were infected; these two plants appear to be the principal overwintering hosts in N.B.; the virus was repeatedly transmitted from them to Callistephus in the spring. Four per cent of L. autumnalis in a lawn at Fredericton were infected (D.J. MacLeod). The following ornamentals were severely affected by yellows in P.E.I.: Calendula, Callistephus, Coreopsis, Cosmos, Dahlia, Gaillardia, Schizanthus, Tagetes. "By spraying these plants daily at dusk with strong Black Leaf 40 I am able to avoid most of this trouble in dahlias and to some extent in other plants" (R.R. Hurst).

CAMPANULA

Rust (Coleosporium Campanulae). Very little rust developed on C. rapunculoides at Ottawa, Ont., in contrast to the situation in 1943. Although the dry season unquestionably contributed to this meagre development, it is thought that inadequate snow cover, by hindering the overwintering of uredinia, also played an important part. A heavy infection was found on June 28 in a colony of escaped plants on a north-east slope in the Arboretum, where snow cover was probably abundant; this colony had not been observed previously, but it is almost certain that the rust had overwintered in it, since it was plentiful at this time although no rust occurred either in colonies between this one and the nearest pines or on the pines. A rusted specimen of C. rapunculoides was received from Bellechasse, Que. (D.B.O. Savile).

Leaf Spot (Phyllosticta ?carpathica Allesch.) was heavy on some leaves of C. sp. at Morden, Man.; spores 7.5-15 x 2.5-3 microns, rarely 1-septate. Grove (British Stem and Leaf Fungi 1:11, 297) suggests that Ph. carpathica is a phase of Ascochyta carpathica. This is the first report in the Survey of Phyllosticta on Campanula, but Ascochyta sp. was reported from Morden in 1942 (P.D.S. 22:98) (W.L. Gordon).

CANNA

Root Rot (bacteria associated). Of a shipment of canna roots from Toronto planted at Winnipeg, Man.; 80% failed to grow; bacteria were abundant in the roots (W.A.F. Hagborg).

CENTAUREA

Leaf Spot (Septoria centaureicola var. brevispora) was fully as heavy as in 1943 in a garden at Westboro, Ont., and was more widespread; sprinkling may have offset the effects of the dry season (D.B.O. Savile).

Yellows (Callistephus virus 1) was severe in Centaurea sp. in the border at the Station, Fredericton, N.B. (D.J. MacLeod).

CHRYSANTHEMUM

Spotted Wilt (Lycopersicum virus 3) infected a small percentage of plants at the Botanical Garden, Montreal, Que., but destruction of diseased plants soon checked its spread (J.E. Jacques).

Yellows (?Callistephus virus 1). Late in the fall a single clump of C. monspeliense in the Arboretum, Ottawa, Ont., produced pale, attenuated shoots from the base, suggestive of a recent infection (D.B.O. Savile).

CIMICIFUGA - Bugbane

Mosaic (virus) severely damaged about a dozen plants of C. japonica at the Botanical Garden, Montreal, Que. (J.E. Jacques).

CLEMATIS

Leaf Spot (Septoria Clematidis) was severe and destructive to C. ligusticifolia at Brandon and Morden, Man. (W.L. Gordon).

CLEOME

Crown Rot (Fusarium sp.). A giant spider plant (?C. spinosa) in the grounds at the Station, Summerland, B.C. was affected; Fusarium fruited abundantly on the surface of the rotted tissue (H.R. McLarty).

COREOPSIS

Yellows (Callistephus virus 1). See under Callistephus.

COSMOS

Yellows (Callistephus virus 1). See under Callistephus.

DAHLIA

Mosaic (virus) was seen at Winnipeg, Man., on a plant grown from a tuber purchased in B.C.; the disease spread to adjacent plants (T. Johnson).

Spotted Wilt (Lycopersicum virus 3) was severe on plants at the Botanical Garden, Montreal, Que.; infection is thought to have occurred in spring in the greenhouses where the disease was common (J.E. Jacques).

Stunt (virus) severely affected odd plants at Reston, Man. (W.L. Gordon). Seven cases of stunt were noted in P.E.I. (R.R. Hurst).

Yellows (Callistephus virus 1). See under Callistephus.

DAPHNE

Leaf Spot (Marssonina Daphnes) was received from Canard, Kings Co., N.S., where it was causing severe defoliation; previously reported from B.C. (J.F. Hockey, I.L. Conners).

DELPHINIUM

Powdery Mildew (Erysiphe Polygoni) was much less severe at Ottawa, Ont. than in 1943. Specimens were received from Lakefield, Que.; the grower stated that all twenty clumps in his garden were similarly affected; these plants (?D. cultorum) looked as though systemically infected by a downy mildew, the upper internodes being generally reduced to less than one quarter inch in length and blossoms being completely inhibited; a heavy infection evidently was initiated early in the season; the plants were almost completely covered with perithecia; the grower stated that the season was dry until late July (D.B.O. Savile). Powdery mildew was general but light at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Crown and Root Rot (Sclerotium Delphinii) killed several plants at Outremont, Que.; specimens showed brown, spherical sclerotia in and on the decayed tissue (J.E. Jacques, conf. F.L. Drayton).

DIANTHUS

Leaf Spot (Heterosporium echinulatum). At Brentwood, B.C., infection was heavy on foliage and moderate on stems of seed plants of sweet william (D. barbatus) var. Scarlet Beauty (W. Jones). Leaf spot was heavy on several plants of carnation (D. caryophyllus) received from a greenhouse at Vancouver, B.C. in December (D.B.O. Savile).

Rust (Uromyces caryophyllinus) was light to moderate on carnations in a greenhouse and in an outdoor planting at Edmonton, Alta. (M.W.C.). Rust was severe on all varieties of carnation in a commercial greenhouse at Montreal, Que., in November (J.E. Jacques).

DIMORPHOTHECA - Cape Marigold

Yellows (Callistephus virus 1) infected odd plants of D. aurantiaca at Brandon, Man.; first report on this host (W.L. Gordon).

ERYNGIUM - Sea Holly

Foot Rot (cause undetermined) attacked odd plants of E. alpinum at Brandon, Man. (W.L. Gordon).

ERYTHRONIUM

Rust (Uromyces heterodermus) was abundant locally on E. grandiflorum in E. and W. Saanich Co., B.C. (W. Jones).

ESCHSCHOLZIA

Yellows (Callistephus virus 1) attacked odd plants of E. californica at Brandon, Man.; first report to the Survey on this host (W.L. Gordon).

FILIPENDULA - Meadowsweet

Powdery Mildew (Sphaerotheca Humuli) was heavy on the leaves of nearly all plants of F. rubra at the Botanical Garden, Montreal, Que. (J.E. Jacques).

GAILLARDIA

Smut (Entyloma Compositarum) was severe and general on G. aristata at Morden, Man., but none was found at Winnipeg (W.L. Gordon). Supplementing the information given last year (P.D.S. 23:106), it may be stated that four Man. collections of gaillardia smut have now been examined and all prove to

be typical E. Compositarum. Smut was abundant in the gardens of the Division of Horticulture, C.E.F., Ottawa, Ont.; it also occurred in three gardens at Westboro, one at least being a new outbreak; falcate conidia were generally abundant when examinations were made, but acicular conidia were also found (D.B.O. Savile).

Yellows (Callistephus virus 1) was moderately abundant in the border at the Station, Fredericton, N.B. (D.J. MacLeod).

GLADIOLUS

Yellows (Fusarium oxysporum). Specimens were received from Medicine Hat, Alta.; the grower stated that 0.5% of his plants were affected (D.B.O. Savile). Yellows was reported from North Battleford and elsewhere in Sask. (H.W.M.). It was more widespread and injurious in Man. than ever before, 25% of plants being not infrequently destroyed; it is causing alarm among large growers (W.L. Gordon). Specimens were received from Reston and Strathclair, Man., and Larder Lake, Sault Ste. Marie and Guelph, Ont., with losses up to 10% being reported. Yellows has unquestionably increased greatly in the last few years, partly due to the scarcity of high grade stock, which has resulted in diseased stock finding a ready market (D.B.O. Savile). Yellows was sent in from three localities in Ont. and was also quite prevalent in certain varieties at O.A.C., Guelph (J.E. Howitt).

Penicillium Rot (P. Gladioli) caused some damage to bulbs in storage at Winnipeg, Man.; the organism was readily isolated (W.J. Chorewick, W.L. Gordon). Several dozen corms, of many varieties, were attacked at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Scab (Pseudomonas marginata) caused slight damage in several gardens at Edmonton, Alta. (M.W.C.). It caused severe damage in stored corms of many varieties at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Dry Rot (Sclerotinia Gladioli). Diseased corms were received from Kelowna, B.C. (G.E. Woolliams, F.L. Drayton). Severe damage was seen in a garden in Calgary, Alta. (A.W. Henry). Specimens were received from Blackfalds and Calgary, Alta., and Summerberry, Sask. (D.B.O. Savile).

Flecking (?physiological). Affected plants of Picardy were received from a florist at Montreal, Que., in Sept.; according to Dr. F.L. Drayton this trouble has recently become common in Picardy at this time of year (D.B.O. Savile).

HELIANTHUS - Sunflower

Powdery Mildew (Erysiphe Cichoraceārum) was heavy on H. tuberosus at Morden, Man.; first Man. record on this host (W.L. Gordon). Sunflowers were moderately infected at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Rust (Puccinia Helianthi). Infection was light at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Wilt (Sclerotinia sclerotiorum) affected about 10% of the plants in the border at the Station, Summerland, B.C. (H.R. McLarty).

HELICHRYSUM - Everlasting

Yellows (Callistephus virus 1) was severe in the border at the Station, Fredericton, N.B. (D.J. Macleod).

HELIOPSIS

Yellows (Callistephus virus 1) severely damaged several plants of H. scabra gratissima at Morden, Man.; first record in the Survey on Heliopsis (W.L. Gordon).

HESPERIS - Rocket

Downy Mildew (Peronospora Hesperidis E. Gäum.) caused heavy leaf spotting and some killing of lower leaves of H. matronalis at Ottawa, Ont., in June in a bed that had been freely sprinkled; traces were seen elsewhere, but the disease soon disappeared with continued dry weather. The spring infection was presumably an aftermath of the wet season in 1943, but the plants were not under observation at that time. Conidia measured 21-30 x 18-27 microns, agreeing well with Gäumann's description; P. parasitica, to which this organism was formerly assigned, was collected locally at about the same time on Capsella Bursa-pastoris and yielded conidia 19.5-24 x 15.5-19.5 microns; first report to the Survey (D.B.O. Savile).

HYACINTHUS - Hyacinth

Bulb Eelworm (Ditylenchus dipsaci) was found in several plantings of common hyacinth (H. orientalis in coastal B.C., but caused no serious losses; hot water treatment was used in some cases (R.J. Hastings).

HYPERICUM - St. Johnswort

Blight (Gloeosporium cladosporioides Ellis & Halsted) was severe on leaves and flowers of a plant of H. Ascyron at Morden, Man.; first report to the Survey (W.L. Gordon); in the herbarium on H. virginicum from Ont.

IBERIS - Candytuft

Club Root (Plasmodiophora Brassicae). A trace was seen in a garden in Queens Co., P.E.I.; first report to the Survey on this host (R.R. Hurst).

IRIS

Eelworm (Ditylenchus dipsaci). The commercial iris stock in coastal B.C. is receiving regular hot water formalin treatments, which should reduce the small percentage of eelworm infection and also reduce fungous diseases (R.J. Hastings).

Soft Rot (Erwinia carotovora). Moderate to severe damage occurred at Lethbridge and in one garden at Edmonton, Alta. (M.W.G.). Odd plants were severely affected at Brandon, Man. (W.L. Gordon). One plant of Chalice and two of Mildred Presby were attacked at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Leaf Spot (Heterosporium Iridis). The fungus was found sporulating freely on leaves in a garden in N. Saanich Co., B.C. (W. Jones). There was little leaf spot in coastal B.C. this year in commercial plantings; greater attention to drainage is believed to be a factor, and the regular treatments for eelworms may help to reduce it (R.J. Hastings). Leaf spot was general in the Okanagan Valley, B.C., but did not cause serious injury (G.E. Woolliams). Slight to moderate damage was seen in several gardens at Edmonton, Alta. (M.W.G.). A heavily infected specimen was received from Moose Jaw, Sask. Leaf spot could hardly be found in most gardens at Ottawa, Ont., until Sept. when a scattering appeared (D.B.O. Savile). This disease was very prevalent in gardens in the neighbourhood of Guelph, Ont. In some instances the foliage was almost completely destroyed by it early in the fall (J.E. Howitt).

Bacterial Leaf Blight (Phytomonas tardirescens). Lady Foster was lightly attacked at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Mosaic (virus) varies greatly in the iris stocks in coastal B.C.; some have only about 1%, others up to 95% infection. Some virus-free stock is being developed (R.J. Hastings).

LATHYRUS

Streak (Erwinia lathyri) caused severe damage to sweet pea (L. odoratus) in several gardens at Edmonton, Alta. (M.W.C.). Infection ranging from a trace to 70% were seen in Queens Co., P.E.I., all varieties being affected; this disease is discouraging many sweet pea growers (R.R. Hurst).

Foot Rot (Fusarium oxysporum associated) killed 75% of a small planting of sweet pea at Winnipeg, Man., by Aug. 2; F. oxysporum was isolated (W.L. Gordon).

Powdery Mildew (Microsphaera diffusa) caused slight to heavy damage on all varieties of sweet pea in Queens Co., P.E.I. (R.R. Hurst).

Downy Mildew (Peronospora Lathyri-palustris) was general on L. Nuttallii in N. Saanich Co., B.C. (W. Jones).

Root Rot (?Rhizoctonia Solani) was reported on sweet pea from several localities in P.E.I.; 25% loss occurred in one garden (R.R. Hurst).

Bud Drop (excess nitrogen) caused slight to severe damage to sweet peas in Queens and Prince Co., P.E.I.; it is very troublesome (R.R. Hurst). Either excess nitrogen or a high ratio of nitrogen to phosphorus can cause this trouble. The practice of putting manure in the bottom of sweet pea trenches commonly causes bud drop; the roots often reach the manure just when the buds are forming, and the plants are thrown back into vegetative growth (F.L. Drayton).

Oedema (?unbalanced water relations). Most of the vines of L. latifolius in a garden near Ottawa, Ont., showed irregular white blisters on the laminae and long white streaks on the leaf veins; leaves tended to split along the affected veins (D.B.O. Savile).

LIGUSTRUM - Privet

Powdery Mildew (Microsphaera Alni) was common on privet at the Station, Fredericton, N.B. (D.J. MacLeod).

LILIUM - Lily

Mosaic (virus). Affected specimens of L. sp. were received from the Station, Lethbridge, Alta. (D.B.O. Savile).

LIMONIUM - Sea Lavender

Blight (Botrytis sp.). Considerable blossom blight and die-back occurred in a garden at Victoria, B.C. (W. Jones).

LINARIA - Toadflax

Stem Blight (Colletotrichum vermicularioides Halsted). In a planting in the Arboretum, Ottawa, Ont., from mixed seed of L. purpurea and L. purpurea var. Canon Went, the former was severely blighted, whereas the latter remained uniformly healthy even when contiguous with diseased plants. L. vulgaris, planted for ornament at Westboro, Ont., was also seriously damaged. Both plantings had been liberally sprinkled during the dry weather. Once previously collected on wild L. vulgaris near Ottawa (D.B.O. Savile).

LINUM - Flax

Browning (Polyspora Lini) developed in early Oct. on L. grandiflorum at Saskatoon, Sask. No stem break developed. The plants were grown in the experimental plots and the pathogen was isolated. First report to the Survey on this host (T.C. Vanterpool).

LONICERA - Honeysuckle

Powdery Mildew (Microsphaera Alni) was fairly general in N. Saanich Co., B.C. (W. Jones). A heavily mildewed specimen was received from Dorval Is., Que., with the statement that almost every bush in the community was affected (D.B.O. Savile).

LOTUS

Leaf Spot (Septoria sp.) was heavy in a planting of L. corniculatus var. Double at Morden, Man.; spores were 15.0-27.5 x 1.5 microns, 1-3-septate (W.L. Gordon).

LUPINUS - Lupine

Leaf Spot (Ascochyta ?Pisi Lib. var. Lupini Sacc.) was heavy on some leaves of L. sp. at Morden, Man.; spores 10-20 x 3.7-5 microns, multiguttulate; first record in Man. (W.L. Gordon).

Streak (Pisum virus 2). Two plants of L. albus showing streak were found in a garden at the Station, Fredericton, N.B. The virus was transmitted by sap inoculation to L. albus, L. angustifolius, Pisum sativum, Trifolium pratense, and Vicia Faba. It failed to infect Capsicum annuum, Datura Stramonium, and Nicotiana Tabacum. The affected lupines were severely stunted and generally wilted and died (D.J. MacLeod).

Nitrogen Sickness. Excess nitrogen severely damaged an entire planting of Russell hybrids (L. polyphyllus) in Queens Co., P.E.I. (R.R. Hurst).

MALOPE

Foot Rot (cause undetermined) killed odd plants of M. trifida at Brandon, Man. (W.L. Gordon).

MENTHA

Rust (Puccinia Menthae) moderately affected some plants of M. piperita at the University, Winnipeg, Man.; first record on this host in Man. (W.L. Gordon).

Leaf Spot (Septoria menthicola Sacc. & Letend.) was moderately heavy on M. piperita at the University, Winnipeg, Man.; first record on this host in Man. (W.L. Gordon). Not previously reported to the Survey, but we have records from Alta., Sask., Man. and Que. on Mentha spp.

MONARDA

Rust (Puccinia Menthae) was moderately heavy on some clumps of M. fistulosa at Ottawa, Ont. (D.B.O. Savile).

NARCISSUS

Diseases in commercial plantings in coastal B.C. Botrytis narcissicola, Stagonospora Curtisii and Ramularia vallisumbrosae were of minor importance in field-grown stock due to regular use of the hot water formalin treatment. A one-hour treatment of imported forced stock has not, however, eliminated the bulb eelworm (Ditylenchus dipsaci) and the situation has somewhat deteriorated with respect to this pest. Growers will have to lift early, following one season's growth, and use a three-hour treatment to eliminate the eelworms. Plantings left down two years sustained serious losses.

There appears to have been more basal rot (Fusarium bulbigenum) and basal plate rot of mechanical or physiological origin in 1944. This may have been due to shallow planting and a late harvest, with consequent subjection of bulbs to high soil temperature. Storage in low, ill-ventilated sheds, with temperatures reaching 80° F., increased the incidence of basal rot. However, the 1944 harvest included bulbs from forced planting stock received in 1941 and 1942, and some basal rot may have originated in forcing houses with high temperatures (R.J. Hastings).

NEMESIA

Foot Rot (cause undetermined). Several severely affected plants of N. strumosa were received from Knowlton, Que.; bacteria and various fungi, including Fusarium, were abundant (D.B.O. Savile).

NEPETA

Leaf Spot (Phyllosticta decidua Ell. & Kellerm.) was moderately heavy on N. ucranica at Morden, Man.; spores 4-7 x 2 microns; first report to the Survey (W.L. Gordon).

Leaf Spot (Septoria Nepetae Ell. & Ev.) slightly affected a few leaves of N. ucranica at Morden, Man.; spores 12.5-30 x 1.5 microns; first report to the Survey (W.L. Gordon).

NICOTIANA - Tobacco

Leaf Spot (Ascochyta ?Nicotianae Pass.). A trace occurred on a few plants of N. sp. in a bed at the Laboratory, Winnipeg, Man.; spores 5-12 x 2.5-3 microns; first report to the Survey; Passerini gave no measurements for his fungus (W.L. Gordon).

NIGELLA

Foot Rot (cause undetermined) killed odd plants of love-in-a-mist, N. damascena, at Brandon, Man. (W.L. Gordon).

Yellows (Callistephus virus 1) severely injured odd plants of N. damascena at Brandon, Man. (W.L. Gordon). This appears to be the first record of yellows on this host.

PAEONIA - Peony

Blight (Botrytis Paeoniae). Bud, leaf and stem infection was common at Edmonton, Alta., and severely damaged several plantings (M.W.C.). A specimen was received from the Experimental Station, Lethbridge, Alta. Virtually no bud infection was found in the Ottawa, Ont., district, owing to the dry season, but stem rot was unusually serious; evidently many crowns became infected in the wet summer of 1943, and the dry weather of 1944 drew attention to such infection by inducing wilting (D.B.O. Savile). Blight was heavy in Queens Co., P.E.I. and caused severe damage. In one garden at Charlottetown it was particularly serious; injury was probably aggravated by rank growth of the plants and by their being tightly tied up (R.R. Hurst).

Leaf Blotch (Cladosporium Paeoniae) was moderate on some leaves, but not general, at Morden, Man. (W.L. Gordon). A light infection occurred on a few varieties at the Botanical Garden, Montreal, Que. (J.E. Jacques).

Leaf Spot (Septoria Paeoniae var. berolinensis) severely damaged a few leaves at Morden, Man. (W.L. Gordon).

Mosaic (virus). A few plants were moderately affected in two plantings at Edmonton, Alta. (W.C. Broadfoot).

Ring Spot (virus) slightly affected a few leaves at Winnipeg and moderately affected a few plants at Fort Garry, Man. (W.L. Gordon). Nine plants were affected in the border at the Station, Fredericton, N.B.; these plants have been under observation for over ten years; they seem to be degenerating as a result of the disease (D.J. MacLeod).

Blossom Failure (cause unknown) severely damaged several varieties at Lethbridge, Alta. (W.C. Broadfoot).

PAPAVER - Poppy

Dodder (Cuscuta Gronovii) attacked odd plants of Iceland poppy, P. nudicaule, at Charleswood, Man. (W.L. Gordon).

Smut (Entyloma fuscum Schroet.) was found at Westboro, near Ottawa, Ont., on corn poppy, P. Rhoeas, in three gardens. Heavy spotting killed many of the leaves and further damage was caused by extensive stem lesions that girdled a number of plants after only one or two flowers had been produced. A light infection was also found on P. orientale in one garden, adjacent to infected P. Rhoeas. On P. orientale, teliospores were sparse and conidia were lacking, and it is possible that the pathogen is not self-sustaining on this host. This European smut has been previously reported in North America from Maine, New Brunswick (Clinton, N. Am. Flora 7:66) Bermuda (Zundel, N. Am. Flora 7:1025) and Iowa (Gilman and Archer, The Fungi of Iowa Parasitic on Plants p. 339) but has never become well established. It is probably carried in seed lots on fragments of infected leaves or capsules (D.B.O. Savile).

Bacterial Blight (Xanthomonas papavericola (Bryan & McWhorter) Starr & Burkh.). A light infection was found on the lower leaves of specimens of P. Rhoeas in the phanerogamic herbarium; the plants were grown in the Arboretum, Ottawa, Ont., in 1940 from seed received from Holland, but the disease was not observed at that time. This is the first report to the Survey on Papaver, but the disease is recorded from B.C. on Meconopsis (P.D.S. 18:105) (D.B.O. Savile).

PARTHENOCISSUS

Powdery Mildew (Uncinula necator) was heavy on some plantings of P. quinquefolia at Morden, Man. (W.L. Gordon).

PELARGONIUM - Geranium

Spotted Wilt (Lycopersicum virus 3) was moderately heavy at the Botanical Garden, Montreal, Que.; about a dozen varieties had to be discarded (J.E. Jacques).

PENSTEMON

Leaf Spot (Ramularia sp.) was severe on many leaves of P. sp. at Morden, Man. (W.L. Gordon).

PETUNIA

Virescence (virus). Greening of the flower parts was seen in seven plants in the border at the Station, Fredericton, N.B. (D.J. MacLeod).

Yellows (Callistephus virus 1). Some of the plants being grown for seed in the district of Grand Forks, B.C., became infected (G.E. Woolliams). Many plants were severely affected at Winnipeg, Man., odd plants were attacked at Brandon, it was severe on both single and double varieties in some plantings

at Morden, and at Clearwater Bay, Ont., infection was 100% with severe injury by the end of the season (W.L. Gordon). Yellows has been reported previously on petunia from Alta., Sask. and N.B.

PHLOX

Powdery Mildew (Erysiphe Cichoracearum) was general on P. paniculata at the Station, Summerland, B.C. (H.R. McLarty). Mildew did not develop fast at Ottawa, Ont., on P. paniculata, probably because of lack of overwintering inoculum. A few clumps became badly disfigured in July, and by the end of the month development was about as severe as in late Sept., 1943. The severe drought in August severely affected perennial phlox, and most plants shed all their lower leaves comprising most of the infected tissue; there was little further development of the disease. P. maculata in the Arboretum at Ottawa showed large patches of mildew on the stems but little on the leaves; bloom is past in this species before mildew can become very conspicuous. Specimens of mildew were received from Levis, Que., on P. paniculata and from Knowlton, Que., on P. Drummondii (D.B.O. Savile).

Blight (?virus) affected 10% of plants in the border at the Station, Fredericton, N.B.; severe defoliation occurred in some clumps (D.J. MacLeod). In one garden at Charlottetown, P.E.I., all plants were affected, there being no bloom and severe defoliation. It is very troublesome and all varieties seem to be susceptible (R.R. Hurst).

Virescence (?virus). A greening of the floral parts of P. Drummondii was common in the border at the Station, Fredericton, N.B. (D.J. MacLeod). A greening similar to that described from N.B. has been seen for a number of years in P.E.I. (R.R. Hurst).

Yellows (Callistephus virus 1) attacked odd plants of P. Drummondii at Brandon, Man. (W.L. Gordon).

POTENTILLA - Cinquefoil

Leaf Spot (Marssonina Potentillae (Desm.) Magn.) was heavy on some leaves of P. fruticosa at Morden, Man.; spores 12.5-17.5 x 5.0-7.5 microns; first report to the Survey (W.L. Gordon).

RIBES

Leaf Spot (Septoria aurea). A light general infection of R. odoratum occurred at Winnipeg, Man. At Morden it was light to heavy on various currants (W.L. Gordon).

ROSA - Rose

Crown Gall (Agrobacterium tumefaciens). A moderate infection was found on roots of a shipment of rose bushes grown at Montreal, Que. (D.B.O. Savile).

Black Spot (Diplocarpon Rosae) was present at Salmon Arm, B.C. (G.E. Woolliams). One bush was severely damaged in a garden at Edmonton, Alta. (A.W. Henry). Black spot was prevalent on hybrid teas and hybrid polyanthas in the the Niagara Peninsula, Ont.; some bushes were completely defoliated by mid-Sept. (G.C. Chamberlain). Else Poulsen (multiflora) was severely attacked at the Botanical Garden, Montreal, Que. Many reports and specimens indicated that the disease was severe in the Montreal district (J.E. Jacques).

Stem Canker (Leptosphaeria Coniothyrium). Several well-marked cankers killing the terminal growth, were seen on Clovelly (hybrid tea) at St. Catharines, Ont. (G.C. Chamberlain).

Leaf Spot (Mycosphaerella rosicola (Cercospora r.) became moderately heavy late in the season on R. ?xanthina at Ottawa, Ont.; the bushes had been allowed to spread and the dense growth probably aided infection (D.B.O. Savile).

Rust (Phragmidium spp.). P. disciflorum was common but not severe on hybrid teas at the Station, Summerland, B.C. (H.R. McLarty). P. speciosum caused large cankers on stems of R. sp. received from the Forest Nursery Station, Indian Head, Sask.; it was stated that a single group of plants was involved and that growth was so poor that they were removed (D.B.O. Savile). P. montivagum lightly infected R. blanda at Charleswood, Man. (W.L. Gordon).

Leaf Spot (Phyllosticta ?rosicola Massal.). A slight infection occurred on R. blanda at Charleswood, Man.; spores were 4-6 x 1 micron, compared with 2.5-4 x 1 micron given for P. rosicola; first report to the Survey of Phyllosticta on rose (W.L. Gordon).

Speck (Pilobolus crystallinus). Rose leaves submitted from a greenhouse at Glen Falls, N.B., had many sporangia adhering to both surfaces; woodwork and a thermometer were also heavily spotted (J.L. Howatt).

Powdery Mildew (Sphaerotheca spp.). Sphaerotheca sp. was quite severe on ramblers and slight on hybrid teas at the Station, Summerland, B.C. (H.R. McLarty). A specimen of F.J. Grootendorst (hybrid rugosa) heavily infected with S. pannosa was received from north of Montreal, Que. (D.B.O. Savile).

Mosaic (virus) caused considerable damage to some plants at Morden and severely injured a bush at Stonewell, Man. (W.L. Gordon). A single plant of Kirsten Poulsen (hybrid polyantha) in Lincoln Co., Ont., showed foliage mottling and a distinct breaking of the flower colour (G.C. Chamberlain).

SALVIA

Spotted Wilt (Lycopersicum virus 3). A whole collection at the Botanical Garden, Montreal, Que., comprising many varieties, had to be discarded because of this disease (J.E. Jacques).

SCHIZANTHUS - Butterfly Flower

Yellows (Callistephus virus 1). See under Callistephus.

SEDUM - Stonecrop

Leaf Spot (Septoria ?Sedi Westd.). Infection of Sedum spp. at the University, Winnipeg, Man. was heavy on many leaves; spores 25-47.5 x 1.5 microns. Infection was also severe in a planting at Morden; spores 25-42.5 x 1.5 microns (W.L. Gordon). Diedicke (Kryptogamenflora der Mark Brandenburg 9:508) on the basis of Sydow, Myc. march. 3992, describes the spores as being 20-32 x 1-1.2 microns, but no spore measurements were given in the original description. Fungi Columb. 3081 on S. Telephium, Five Islands, N.S., has spores 19.5-32.5 x 1.0-1.5 microns. Our only other exsiccati material so labelled is Roum. F. Sel. Gall. 29 which is in poor fruit but yielded a Phyllosticta with spores 4-7 x 2-2.8 microns; this is considerably larger than the dimensions of 3 x 1.5 given for P. Aizoi. S. Telephii, described from Finland, has much larger spores, 50-75 x 1.5-2.5 microns (D.B.O. Savile).

SENECIO - Groundsel

Leaf Spot (Septoria Senecionis Westd.) slightly affected S. Jacobea at Glenkeen, N.S. (J.F. Hockey, D.B.O. Savile).

SOLIDAGO - Goldenrod

Powdery Mildew (Erysiphe Cichoracearum) lightly infected goldenrod late in the season at the Botanical Garden, Montreal, Que. (J.E. Jacques).

SYMPHORICARPOS - Snowberry

Rust (Puccinia Symphoricarpi) was common on S. racemosa in N. Saanich Co., B.C. (W. Jones).

SYRINGA - Lilac

?Graft Blight (lilac-privet incompatibility). Three bushes at the Station, Fredericton, N.B., showed chlorosis and wilting, followed by death of the lilac but not of the privet. See P.D.S. 22:106 (D.J. MacLeod).

TAGETES - Marigold

Foot Rot (cause undetermined) killed several plants of French marigold, T. patula, at Brandon, Man. (W.L. Gordon).

Yellows (Callistephus virus 1) ruined several plants of T. patula at Clearwater Bay, Ont.; first report on this host from northwestern Ont. (W.L. Gordon). Yellows was severe on Tagetes in gardens at Fredericton, N.B., and vicinity; at the Station symptoms were striking; a yellowing of the youngest leaves was followed by the development of a number of pale spindling shoots at the tops of the plants; in Sept. the chlorotic parts became a vivid purple and remained so until killed by frost (D.J. MacLeod). See also under Callistephus.

TANACETUM - Tansy

Leaf Spot (Ramularia Tanaceti J. Lind) was moderate to severe on T. vulgare at the University, Winnipeg, Man.; recorded by Bisby et al., but this is the first report to the Survey (W.L. Gordon).

TULIPA - Tulip

Fire (Botrytis Tulipae). In coastal B.C. 80 plantings inspected showed less than 0.1% and 19 showed over 0.1% infection. This figure is the maximum infection considered satisfactory. Forced tulip planting stocks were found to carry many times more primary lesions than the field-grown stocks; probably the bulbs were not matured under shelter and became infected under damp conditions; they will have to be dipped or given the hot water formalin treatment (R.J. Hastings). In the Okanagan Valley, tulips at Salmon Arm were almost free from fire, and none was seen in the Vernon area; the disease has never been found south of Vernon (G.E. Woolliams). Moderate damage was caused in one garden at Edmonton (M.W.C.).

Fire infected almost 100% of a mixed planting in Lincoln Co., Ont., both blossoms and leaves being severely spotted (G.C. Chamberlain). As many as 5% of the plants in some gardens near Ottawa bore primary lesions, but little or no blossom injury occurred owing to the dry weather (D.B.O. Savile). At the Botanical Garden, Montreal, Que., Von Bade, Fantasy, Mon Tresor and Gris de Lin were very severely affected and nearly all bulbs had to be discarded (J.E. Jacques).

Storage Rot (Penicillium sp.). There was comparatively little storage rot in coastal B.C., owing to improved storage and protection of bulbs by a liberal scattering of peat-sulphur mixture (R.J. Hastings).

Break (virus). Of 26 plantings inspected in coastal B.C., 14 were free of break and the others showed from a trace to 20% (R.J. Hastings). In the Okanagan Valley the situation has changed little, infection being only a fraction of 1% (G.E. Woolliams). Traces were seen in various gardens in the Ottawa district, Ont. (D.B.O. Savile).

VERONICA - Speedwell

Leaf Spot (Ramularia Veronicae Fckl.) was light in one clump and heavy, with considerable damage, in another of V. Teucrium at the Central Experimental Farm, Ottawa, Ont. If, as is probable, the 8 or more species of Ovularia and Ramularia named on Veronica, are all one, R. Veronicae Fckl. Symb. p. 361, 1869, is the valid name. The present collection perhaps best fits R. coccineum (Fckl.) Vestergren (Fusidium c. Fckl. Symb. p. 370, 1869), but adequate examination shows that its range covers those of most of the described species. Spots were purplish, then necrotic, fruiting below; conidiophores 35-115 x 2.2-3.5 microns, 0-6-septate, sometimes branched, with few to many spore scars often in groups of 2 or 3, commonly many in a compact column, ranging from hyaline to deep red, basal knots of mycelium commonly deep red; conidia 5-32.5 x 2-4 microns, with 0-1, rarely 2-3 septa; in branching chains. First report to the Survey (D.B.O. Savile).

Leaf Spot (Septoria Veronicae) was heavy on most plants of V. sp. at Morden, Man.; spores 35-45.5 x 1.5-2 microns (W.L. Gordon).

VINCA - Periwinkle

Rust (Puccinia Vincae) was moderately heavy on some plants of V. major in the greenhouses of the Division of Horticulture, Central Experimental Farm, Ottawa, Ont., in Feb. 1945; several varieties with plain and variegated foliage, were affected (D.B.O. Savile).

VIOLA

Leaf Spot (Cercospora Violae). A large bed of pansies, V. tricolor var. hortensis and horned violet, V. cornuta, was heavily infected at Westboro, Ont.; at least 50% of the leaves showed large lesions and considerable areas were killed; powdery mildew was also present and the total damage was severe; a light infection was found in a second garden. Chupp, in litt., confirms the identity of C. Violae-tricoloris with C. Violae, suggested in P.D.S. 23:117, and gives C. Violae var. minor Rota-Rossi and C. trinotatis Pass. in litt. as additional synonyms. Of the species on Viola recognized by Chupp, C. murina is rare and confined to the U.S.A., C. granuliformis is common in the U.S.A. and is known from Southern Ont. on V. sororia, and C. Violae is common and worldwide (D.B.O. Savile).

Powdery Mildew (Sphaerotheca Humuli). Almost all the pansies at the Station, Summerland, B.C., were completely covered (H.R. McLarty). Infection was light to moderate on several varieties of pansies and violas in a garden at Edmonton, Alta. (M.W.C.). Mildew was heavy on pansies at Kindersley, Sask., and some was seen in gardens at Saskatoon (H.W.M.). It was heavy in a large bed of horned violet and pansy at Westboro, Ont.; in combination with Cercospora Violae the damage was heavy (D.B.O. Savile).

Crown and Root Rot (Sclerotium Delphinii). Pansies growing near diseased Delphinium (q.v.) at Outremont, near Montreal, Que., suffered badly from this disease (J.E. Jacques).

Chlorosis (excess lime) was severe on pansies at West Kildonan, Man. (J.E. Machacek).

VITIS - Grape

Water Scald. On Aug. 19 a large clump of V. labrusca in the Arboretum, Ottawa, Ont., showed a striking necrosis of all horizontal or cupped leaf surfaces that might be expected to retain water. The vine is

spreading on the ground and accordingly many leaves are approximately horizontal. On some leaves the margin of the necrotic area plainly indicated the "high-water mark". The injury is believed to have occurred on Aug. 16, the last day of an exceptionally severe heat wave. At noon, with the thermometer at about 92° F., rain fell briefly from a small, isolated cumulonimbus cloud; the fall was measured as a trace by the Experimental Farm rain gauge about half a mile away, but may have been somewhat more in the Arboretum; the temperature then climbed to a max. of 94° F. (D.B.O. Savile).

ZINNIA

Alternaria Blight (A. Zinniae Pape) was severe and general at the Station, Agassiz, B.C.; first Canadian record (W. Jones).

Stem Rot (Sclerotinia sclerotiorum) was a trace in one planting and moderate in another at East Kildonan, Man.; more than half the plants were killed in a bed at Fort Garry (W.A.F. Hagborg).

Yellows (Callistephus virus 1) was found in 3 plants in the border at the Station, Fredericton, N.B., and in 5 plants in a garden in Sunbury Co. This is apparently the western or California strain of the virus, because Zinnia is stated to be immune to the eastern strain (D.J. MacLeod).

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