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DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

DIVISION OF BOTANY AND PLANT PATHOLOGY

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TWENTY-FIRST ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1941

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FOREWORD

With the coming of the War much closer to this continent and the entry of the United States, it would seem appropriate to review the role that the Plant Disease Survey plays in preparing us for our duties in the protection of the food plants and other plant resources of the nation. It may be recalled that no organized plant disease survey existed before the last War. Many destructive diseases received little attention unless they were capable of causing repeatedly severe and widespread epidemics resulting in enormous economic losses. Most of the information even about these diseases had become historic fact and had ceased to have any news value by the time it was published. Most introduced diseases had already spread beyond the point they could be eradicated before they were noticed. Plant quarantines were helpful, but a central clearing-house for information was lacking.

Upon the entry of the United States into the last War, the plant pathologists in that country sought ways and means by which they might increase food production by protection of the crops from disease. One of the first things to be organized was the Plant Disease Survey as an office of the Bureau of Plant Industry. It came into being on July 1, 1917, with Dr. G.R. Lyman in charge. Publication began on Aug. 15 when the first number of the Plant Disease Bulletin, afterwards the Plant Disease Reporter, was issued. The response was appreciative and immediate. The Survey was latterly expanded by the publication of annual and special summaries. The value of the Plant Disease Survey was early realized by Canadian plant pathologists and the first annual summary covered the year 1920. Many other countries have since followed suit.

The immediate value of a Plant Disease Survey lies in the fact that each worker is rapidly informed of the troubles occurring in other parts of the country. It is a valuable aid especially to the isolated worker in the diagnosis of troubles new to him. This was particularly true 20 years ago when the corps of plant pathologists was rapidly expanding in the United States and Canada, and trained men were beginning to penetrate into all the more important crop districts of the two countries. In time, the reports have become a valuable source of information on the fluctuation in prevalence of many diseases as influenced by weather, variety, roguing, etc. Among minor diseases these reports are often the only permanent record made of their occurrence. They also provide new facts and figures for talks and articles in the fight against disease. Recently, the War Emergency Committees of both the Canadian and the American Phytopathological Societies have emphatically voiced the opinion that the plant disease survey is of the utmost importance and should be greatly extended. Several regional groups of our own Society have recommended that in the coming year special attention be given to the survey of those crops whose acreage has been increasing in recent years, such as sugar beets, soy beans, flax, grasses, and field peas, and root crops being grown for seed.

I would, therefore, ask all contributors to consider their survey programme this year most carefully, giving particular attention to the diseases listed above.

I have been unable recently to issue the reports as promptly as I would like, but some improvement is anticipated. Contributors would greatly assist, if their reports are all in my hands by Nov. 1st.

My thanks are again due to all who have contributed material for the report. Most of them are mentioned by name after one or more of their contributions in the main body of the report. I would particularly thank Dr. J. Emile Jacques, Plant Pathologist, Montreal Botanical Garden, a new contributor, who has supplied information on several diseases not previously reported in Canada; Mr. Omer Caron, and his assistant Mr. David Leblond, who have added to our knowledge of diseases, particularly about Quebec city; Dr. Rene Lachance, who has again kindly undertaken a French translation of "New and Noteworthy diseases", and Dr. J.E. Bier, who has reported in some detail on the tree diseases observed by him in B.C. in 1940 and 1941.

Readers will undoubtedly appreciate the special section, "Potato Aphid Vectors in New Brunswick", contributed by Mrs. Jean B. Adams.

Finally, thanks are due to the District Potato Inspectors, who have reported rather completely on the potato diseases in their respective provinces.

I.L. Conners,
Associate Plant Pathologist.

April 27, 1942
Division of Botany and Plant Pathology,
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New or Noteworthy Diseases

Stem rust of wheat did little damage in Western Canada. In the important "rust area" in Manitoba and eastern Saskatchewan, rust resistant varieties have virtually replaced susceptible bread wheats, and there was almost no rust on any wheat variety. In late fields, beyond the "rust area" stem rust damage was moderate to severe in Saskatchewan and slight to moderate in southern Alberta. Stem rust was more prevalent than usual about Lethbridge and in the Peace River district. In Eastern Canada, stem rust was moderate to severe in only an occasional field.

Little stem rust or crown rust was reported on oats. However, localized epidemics of crown rust traceable to plantings of buckthorn were more severe this year in New Brunswick than in 1940. Similarly, a few restricted epidemics of stem rust also traceable to plantings of the alternate host, the barberry, were recorded in that province.

The effect of common root rot (Helminthosporium sativum and Fusarium spp.) on the yield of wheat was studied for the third successive year in Man. The average loss was calculated to be 12.1%, compared with 16.6% in 1940 and 7.47% in 1939. Attacks of the disease did not reduce the yields of individual plants to the degree they did in the previous years. It is thought that the abundant precipitation during late summer prevented the premature ripening of the affected plants. Common root rot was reported to be less severe than usual in Alta. and more severe in Sask.

Kernel smudge was less prevalent in the Prairie Provinces in 1941 than in 1940. While Alternaria spp. and Helminthosporium sativum were, far, the commonest fungi associated with smudged wheat, H. sativum appeared to be responsible for the more severe forms of kernel smudge. Varietal differences in susceptibility were again noted.

Although Fusarium graminearum has long been recognized as an important pathogen in head blight (scab) of wheat in the United States and has been shown to be associated with the disease in Eastern Canada (P.D.S. 19:10), it is comparatively rare in Man. It was isolated for the first time from blighted wheat heads in 1941, and has been encountered previously but twice in seed wheat.

An extended discussion is given by Dr. T.C. Vanterpool on browning root rot of wheat as it occurs in Sask., Alta. and the Dakotas.

Other diseases of cereals deserving mention are: The epidemic of yellow leaf blotch (Pyrenophora Tritici-repentis) in wheat on stubble in west central Sask.; further evidence that the newer varieties of oats are less susceptible to Helminthosporium Avenae, but more susceptible to Septoria Avenae, than the old standard varieties; and the occurrence of grey speck (manganese deficiency) of oats in southwestern Ont.

Bacterial wilt (Phytomonas insidiosa) of alfalfa continues to be destructive in the irrigated districts in southern Alta. and was reported from several new points in the dry interior of B.C. A crown and root rot was particularly severe on alfalfa in the seed-growing areas of northern Alta.; the pathogen was a low-temperature basidiomycete first isolated in 1931 from turf grasses severely damaged by snow mould. Stalk and ear rots were much less destructive in the seed corn belt of southwestern Ont. than in 1940. Savoy (virus) of sugar beet transmitted by the pigweed bug, Piesma cinerea, was found in Ont. for the first time. Although the season was unusually favourable for sugar beet seedlings, black root (cause undetermined) resulted in the abandonment of some fields and reduced yields in others; the disease has been present for some time. Other new extensions or records on these crops are: Black stem (Ascochyta imperfecta) on alfalfa and Stagonospora leaf spot (S. recedens) on red clover in B.C.; stem canker (Ascochyta caulicola) on sweet clover in Man. and leaf spot (Pseudopeziza Meliloti) in Alta.; downy mildew (Peronospora manshurica) on soy bean in N.S.; leaf smut (Ustilago striaeformis) in B.C. on western rye grass.

A further increase of bacterial ring rot (Phytomonas sepedonica) of potato was noted in the irrigated districts of southern Alta. this year. It was found on 102 farms compared with 89 in 1940 and 40 in 1939. Ring rot was found in new centres in Sask., Man., Ont., and Que., more especially in table stock. More fields were rejected on account of the disease in Que. and N.B. in 1941 than in 1940. However, in P.E.I., where the production of certified seed is a very important industry, only one case was discovered in 1941 in contrast with 25 in 1940. It is too early to say whether or not the disease has been stamped out, but great pains were taken to see that diseased stocks were properly disposed of and premises, implements, etc., were disinfected under the personal direction of the inspection and pathology staffs. The satisfactory record for P.E.I. constitutes a most hopeful sign that efficiency and a systematic approach based on co-operation between pathologists and producers will result in the successful control of this exceedingly destructive and elusive disease.

Late blight (Phytophthora infestans) was prevalent on potatoes in the coastal sections in B.C. and was also reported for the first time in the dry interior. Late blight again appeared in Man. after a lapse of 13 years and caused considerable damage in the Red River Valley. The disease was also destructive in northern Ont. and northwestern Que., in N.B. and P.E.I. The epidemic in the latter province was said to be the heaviest ever experienced.

A case of wart (Synchytrium endobioticum) was found in a small garden in Halifax. Twenty-five years ago such a discovery would have caused apprehension, but in view of our present knowledge of wart, and the success in keeping it under control on this continent, the possibility of the disease ever becoming a problem in potato production seems remote.

Leaf mould (Cladosporium fulvum) caused moderate damage to Vetomold in the Victoria district, B.C., where the variety has now been grown commercially for two years. In Ont. this "loss" of resistance has been attributed to the appearance of a new strain of the fungus. In a single commercial test, in the Harrow district, Ont., with Improved Vetomold V 121, infection was negligible. It will be a matter of considerable practical importance if a fully resistant variety can be developed.

A bacterial disease of tomato, observed for the first time in 1940 in Man., has been determined as bacterial speck (Phytomonas tomato). It caused heavy losses in one instance. Bacterial spot (Phytomonas vesicatoria) previously known from Ont. and Que. was reported this year from Man. and N.S. New diseases of interest on vegetables were: Leaf spot (Cercospora Apii var. Carotae) on carrot and leaf spot (Septoria Lactucae) on lettuce in Que. and leaf spot (Heterosporium variabile) on spinach in B.C.

The aphids found on potatoes and their importance in the transmission of virus diseases of that crop have been discussed by Mrs. Jean B. Adams in a separate section.

Fire blight (Erwinia amylovora) was reported for the first time in Alberta; the disease is now known from every province of Canada, but it has never been of any importance in the Annapolis valley, N.S. It was troublesome at one time in the Okanagan Valley, B.C., and it continues to be a problem in Ont. and Que., where a moderate epidemic occurred in 1941.

Among the diseases of stone fruits, the virus diseases, several of which are reported for the first time, hold first place. The following may be mentioned: X disease of peach and chokecherry in Ont., western X disease on peach in B.C., prune mosaic on prune and peach in Ont. and B.C., line-pattern mosaic in Shiro plum in Ont., cherry mottle leaf and little cherry (?virus) in B.C.

Yellows (virus) is a widespread and destructive disease. Mr. D.J. MacLeod proved, experimentally, that yellows as it occurs in buckwheat, carrot, China aster, phlox, and the weed, Hieracium floribundum, in N.B. is caused by Callistephus virus 1. It was also noted this year on lettuce in Man. and Que.; on everlasting in N.B.; on snapdragon in P.E.I.; on calendula in N.B. and P.E.I., and possibly on gaillardia in P.E.I. Leaf blight or streak is a destructive disease of perennial phlox in eastern Canada. Mr. MacLeod carried out experiments, which indicate that the trouble is due to a virus. When the bulb inspection service was begun in B.C., certain diseases, notably break (virus) and fire (Botrytis Tulipae) in tulips and eelworms (Ditylenchus dipsaci) in narcissus and bulbous iris threatened the extinction of the industry. Today, thanks to the strict application of methods of control then known or since improved, the troubles are rapidly declining in importance or have ceased to be a factor in well-managed plantings.

Many new diseases of ornamentals and extensions of host and range were reported this year. Only a few are reported below: Leaf spot (Phyllosticta Pterdis) on greenhouse ferns; leaf spot (Ramularia macrospora) on canterbury bells; stunt (Cladosporium Cyclaminis) on cyclamen; leaf spot (Ascochyta Aquilegiae) on larkspur; powdery mildew (Sphaerotheca Humuli) on meadowsweet; bacterial leaf spot (Phytomonas hederae) on English ivy; and bacterial leaf spot (Phytomonas tardicresens) on iris.

The Weather and Its Influence on Plant Diseases

In the Coastal areas of British Columbia during 1941, the weather was characterized by a mild winter, a dry early spring and midsummer and a wet period in late summer and early fall.

The rainy weather in late summer and early fall, accompanied by relatively high temperatures, favoured the spread of some diseases of economic importance. This influence was particularly noticeable in late blight of potatoes, which became epidemic and caused heavy losses. In fact late blight appeared in areas where blight was previously unknown. Downy mildew of hops was similarly influenced. It was held in check by spraying during the dry mid-summer, but it became rampant on the cones at harvest during the rainy periods. Various vegetable-seed and fruit crops were also adversely affected by disease during the ripening period. In localized areas on Vancouver Island, Pythium ultimum did considerable damage to early harvested tubers in storage. As it is a high temperature organism, it developed rapidly during the prevailing hot weather.

In Alberta, the weather was not favourable for the development of most plant diseases until relatively late in the summer. It was a season of extremes and growing conditions were never uniformly satisfactory. The crops were sown late under rather dry conditions and their early growth was hastened by unusually warm weather. The general heavy rains which fell during the latter part of June temporarily checked crop deterioration, but came too late to save many of the early-sown stands. Under these conditions, browning root rot of cereals was prevalent, and often severe, in the brown soil areas centering on Drumheller. Primary stem and leaf rust infections appeared unusually early. Extremely hot, dry weather in late July, however, checked the development of rust and of other stem and foliage diseases. As a result, most of the crop was prematurely ripened and escaped damage from disease. Root rots, often masked by drought injury, were also apparently much less severe than usual. With the return of more normal temperature and moisture conditions in late August, the rusts and other diseases developed rapidly and severe infection occurred in late sown cereals, especially in the southern sections centering on Lethbridge. During September and October long periods of wet weather delayed harvesting operations and caused considerable deterioration and shattering.

The 1941 season in Saskatchewan was marked by extremes of temperature and moisture supply. May was cool and moisture fairly good, except in the south-west. Rains occurred in early June and were followed by frost which damaged wheat in some areas and its effects masked browning symptoms. Rising temperatures during June together with dry weather caused crop deterioration. Some stunting and weak growthwore evident in summerfallow crops of wheat, indicating injury by browning which was accentuated by continued drought and hot weather. Rains at the end of June relieved the situation, but these were followed by hot winds and steadily rising temperature which reached 103°F. on July 20. Common root rot increased rapidly during this latter period and became prevalent and

moderate to severe. Stem rust appeared in very small amounts about July 10 and it did not develop to any extent in central and northern Sask. where it remained dry. In south-central and south-eastern Sask. rains provided good conditions for spread of rust, but very little was found because most of the acreage was sown to resistant wheat. Rust developed on susceptible varieties, however. Crops were relatively free of leaf spots. In the dry areas, the leaves were burnt during July and early August. This checked the development of leaf spot fungi.

The weather conditions prevailing in Manitoba are briefly discussed under stem rust of wheat.

The effect of the wet season of 1940 in the Niagara Peninsula, Ont., and the early frost of October 23, 1940, was apparent in an unusual amount of dead wood in peaches and the loss of young trees in heavier and poorer drained soils in the early season of 1941. Winter injury also occurred in grapes and other orchard fruits showed an unevenness of development associated with winter injury.

The weather during the growing season of 1941 was distinctly unfavourable for fungus and bacterial diseases. The season was early in development, ten days to two weeks in advance of the average. It was an excellent spring, providing ample opportunity for efficient protective spray applications. Most stone fruits were in full bloom early in May, during which time fair, cool weather prevailed. There was almost no blossom blight infection.

The month of May continued dry, the rainfall being 0.76 in. and moderately warm with a low mean relative humidity. Rains were light and of short duration, the weather clearing quickly afterwards. Thus there were no prolonged wet spells or fogs, as in 1940, to initiate primary infection. Primary ascospore discharge of the apple scab fungus occurred on April 20, and was followed by seven discharge periods in May during light showers, none of which were followed by sufficiently wet conditions to be critical for infection except on May 31. This rain (0.29 in.) was followed by some fog and relatively high humidity for two days; these conditions favoured primary scab infection, which was evident on June 20. This proved the only critical time during the ascospore discharge period. The heavier ascospore discharges previous to this time were not critical because of clearing weather following immediately after rains. Primary infection was extremely light and little further spread occurred.

Leaf spot of sour cherries, a disease epidemic in 1940, was practically absent in 1941 and of very minor importance. Primary ascospore discharge of the causal fungus occurred on May 16, and reached a peak during the precipitation of May 31 which, because of subsequent damp and fog, was considered critical for infection. However, little disease developed and this was thought to be the result not only of the advanced development of the host owing to the early season, but also because good weather and spraying conditions had permitted growers to effectively protect the trees.

The month of June was also dry, warm and unfavourable for disease development. The effect of the dry weather was serious on the strawberry crop. Root rot was reported more prevalent and its effect along with the general drought, reduced the crop 60-75%. Dry weather affected orchard trees planted on shallow soils, especially apples which lacked growth and showed a marked paling and yellowing of the foliage. The dry weather was also considered a factor in the prevalence of "physiological" yellow leaf and drop in sour cherry trees, a suspected form of spray injury more pronounced where copper sprays, especially Bordeaux, were used or where sulphur and copper were used on the same trees. Dry weather apparently brought about a chlorosis of grape and accentuated the effect of soil deficiencies.

The prolonged dry spell was broken in early July by a severe storm accompanied by hail in a number of local districts, which caused severe damage to grapes, cherries, peaches and apples. Fortunately this rain was followed by fair, cool weather which prevented the splitting of maturing sweet cherries which are so subject to this injury, followed by brown rot and decay by other fungi. With no damp murky or foggy weather during harvest of the cherry crop, the fruit was handled free from brown rot.

Harvest periods for peaches and plums were free from wet weather and brown rot was a very minor factor. Light gales in early September caused loss to apple growers in heavy windfall and bruising. A heavy gale on September 25 caused damage to the grape, late apple and pear crops and many orchard trees suffered breakages.

Weather conditions during the growing season were in general favourable to the various crops in eastern Quebec. However there were two periods, one in May and the other covering the last week of July and the first half of August, during which various crops suffered from drought.

The excessively dry weather in May and early June delayed ascospore liberation and consequently early scab infection. The apple crop was almost free from scab. Unsprayed orchards did not suffer to any extent from this disease. However, late varieties showed some infection towards the end of September on account of the frequent rains during the first half of the month.

Late blight of potatoes was observed rather late in the province. In eastern Quebec it was not until Sept. 16 that the disease was noticed. At digging time the disease was occasionally observed on the foliage but it did not cause any damage. However, in unsprayed fields the crop suffered from tuber rot and the loss was heavier as digging was delayed.

Cereal rusts were much less severe than in 1940, owing to the dry spell in July and August. On certain dry soils the crop matured so rapidly that diseases were unable to cause any infection.

Bacterial blight of beans was favoured by hot moist weather conditions. The disease was severe in fields situated between hills and surrounded by trees while open fields sowed with seed obtained from the same source were practically free from blight.

In New Brunswick, the winter of 1941 was free from extremes of any kind. Sub-zero temperatures were registered for 20 days during the months of January, February, and March. A light to moderate blanket of snow covered the ground until the first week of April, after which it gradually melted away during a period of fine, sunny weather. The Saint John River cleared of ice on April 15, and the frost was out of the ground by the end of the month.

Clovers and grasses wintered well, as also orchard trees, strawberries, and perennial plants. There was, however, considerable tip killing in raspberries.

The first half of May was clear, but cool and dry, and many fields were worked and planted during this period. However, cold rainy weather predominated during the last few weeks of the month, delaying considerably seeding operations in many sections. During the month of June and the first two weeks of July, the weather remained cool and dry. These conditions adversely affected the growth of hoed and grain crops. The latter half of July was warm and crops made excellent growth.

Considerable rain fell during August and the first half of September. The average temperature during this period was 4°F. below the 28 year average. These conditions delayed the ripening and harvesting of grain, particularly in the eastern section of the province. This period was unfavourable for the ripening of squash, beans, tomatoes and soybeans. Late blight infection of potatoes became general, but it did not reach epidemic proportions due to the early maturation of the vines and sporadic, dry, cool weather periods, all of which tended to reduce sporulation to a minimum.

Cold rain fell almost every day in the first half of October, considerably delaying potato digging. However, the last two weeks of the month were clear and dry and most favourable for digging operations. The fall remained open until November 23, when ploughing ceased. A slight fall of snow covered the fields December 8. This was removed by rain on December 24 and 25. At the end of December, frost had penetrated the soil to a depth of 15 inches.

The season of 1941 in Nova Scotia may be known as a "wet year". There was no drought period. A heavy blanket of snow provided good ground coverage until the end of March. Perennials wintered well with few exceptions and winter injuries were of no consequence. An early fall freeze in 1940 caused more injury than any winter condition.

May was wet. From about May 8 to the end of the month the weather was wet or dull, making it very difficult to get the land seeded or orchards sprayed except in districts on well-drained light soils. These

conditions favoured damping-off, root rots, apple scab, and blossom blights. June was average in temperature and rainfall but was 25% below average in sunshine. These conditions favoured grass and hay growth as well as fungus leaf spots. July was the most favourable month of the season; the farmer was able to care for his crops and growth was good.

From the end of July through August and September, rainfall, humidity and temperature were most favourable for late blight (Phytophthora infestans). The disease soon reached epidemic proportions in the unsprayed and poorly sprayed potato fields as well as in tomatoes and an appreciable loss resulted. Late season infections of apple scab were also favoured by weather conditions in September and October, and resulted in a lower grade of pack in many of the winter varieties.

Total precipitation recorded at Kentville, N.S., for April to October inclusive was 23.54 inches compared with a 25 year average of 22.17 inches.

The growing season of 1941 in Prince Edward Island was featured by continuous wet, cool weather, which was favourable for the development of some highly destructive plant diseases. During a brief period of fine weather in late April, seeding operations were attempted on a few farms. However, the generally backward spring resulted in late seeding of all crops, including potatoes.

Apple scab spore discharge was recorded on May 15, two regular spray applications having been made by that date. Because of unusually difficult spraying conditions, however, it was impossible to make subsequent applications according to schedule. Thus, under the worst possible spraying conditions, together with ideal conditions for scab development, this disease was extremely troublesome, and caused very appreciable reductions in the marketable crop. Similarly, brown rot of stone fruits caused a total failure of plums in many localities.

The last spring frost (28°F.) was experienced May 2 and injured the tender growing shoots of many trees, leading later to leaf injury. The frost-free period covered 177 days, first killing frost being felt on October 26 (31°F.), the effect being noticed in many potato fields, and with considerable benefit to crops suffering from late blight.

The heavier-than-average seasonal rainfall, being highly favorable for the development of potato late blight, led to what was considered to be the worst outbreak of blight on record in this area.

Comparison of rainfall (1941) and 41 year average; also 1941 sunshine hours and 31 year average.

	Rainfall		Sunshine	
	1941	41 year average	1941	31 year average
April			171.3 hr.	159.0 hr.
May	5.81 in.	2.86 in.	185.7 "	213.2 "
June	4.31 "	2.77 "	208.3 "	225.7 "
July	5.35 "	2.97 "	236.3 "	244.5 "
August	4.84 "	3.26 "	183.7 "	234.7 "
Sept.	3.41 "	3.84 "	192.2 "	175.3 "

Common scab of potatoes, being a dry season disease, gave very little trouble. Powdery scab, however, showed a marked increase in the 1941 crop. Early season damping-off and seed-piece rot were widespread and very troublesome, brought on unquestionably by wet weather and extremely poor growing conditions.

Verticillium wilt of potato showed a marked decrease in 1941, and where it did occur, the yields were not noticeably affected. The growing season being generally unfavourable for potato growth, owing to wet, cool weather and reduced sunshine hours, wilting was less prominent in Verticillium affected plants, hence they did not succumb to the disease.

Because of the many periods when soil moisture was high and soil temperatures moderate (60-65°F.), club root infection was greater than in previous years, regardless of whether or not turnip seed was planted early or late. In areas of heavy soil inoculum, almost all plants succumbed to club root in their early stages of growth, while in fields where the contamination was less, infected roots were rendered unfit for use by club root.

Phenological Data

by
R.C. Russell

Phenological data have again been compiled from records collected by B. Peturson, R.C. Russell and M.W. Cormack at the Dominion Laboratories of Plant Pathology situated at Winnipeg, Man.; Saskatoon, Sask.; and Edmonton Alta., respectively. The data are presented in the accompanying table.

The 1941 season was a little in advance of other years throughout the whole period at Winnipeg and Edmonton. At Saskatoon, it was variable, but dry weather and heat hastened the ripening of early sown wheat.

For three plants in the list, Dr. W.H. Minshall supplies the dates on which they were first seen to flower at Ottawa, Canada.

Populus tremuloides	14/4
Acer negundo	19/4
Viola canadensis	29/4

Summary of Phenological Data taken at Winnipeg, Saskatoon, and Edmonton in 1941

Species	Winnipeg a	Winnipeg b	Saskatoon a	Saskatoon b	Edmonton a	Edmonton b
Pulsatilla Ludoviciana	-	-	22/4	4 L	17/4	9 E
Populus tremuloides	25/4	3 E	24/4	2 L	20/4	3 E
Phlox Hoodii	-	-	28/4	0	-	-
Acer Negundo	1/5	6 E	2/5	3 E	25/4	6 E
Betula papyrifera	-	-	4/5	4 E	1/5	7 E
Thermopsis rhombifolia	-	-	4/5	4 E	-	-
Amelanchier alnifolia	6/5	8 E	12/5	0	5/5	7 E
Hierochloe odorata	-	-	13/5	2 E	-	-
Prunus pennsylvanica	-	-	21/5	3 L	6/5	8 E
Prunus americana	5/5	7 E	-	-	-	-
Smilacina stellata	18/5	5 E	26/5	5 L	21/5	2 E
Viola canadensis	-	-	14/5	0	9/5	8 E
Prunus melanocarpa or P. nana	17/5	5 E	24/5	1 L	19/5	3 E
Svida sp. (Cornus sp.)	20/5	7 E	25/5	3 E	20/5	8 E
Crataegus sp.	17/5	4 E	21/5	-	-	-
Elaeagnus commutata	-	-	29/5	1 E	26/5	5 E
Diholcos bisulcatus	-	-	12/6	4 L	-	-
Lonicera glaucescens	-	-	9/6	-	31/5	6 E
Viburnum Lentago	26/5	7 E	-	-	-	-
Viburnum trilobum (V. Opulus)	29/5	9 E	-	-	2/6	4 E
Anemone canadensis	29/5	10 E	9/6	2 L	13/6	2 E
Achillea lanulosa	-	-	9/6	3 L	20/6	2 E
Galium boreale	-	-	12/6	2 L	9/6	5 E
Heuchera hispida	-	-	13/6	6 L	-	-
Rosa alcea	-	-	20/6	2 L	-	-
Gaillardia aristata	-	-	22/6	2 L	-	-
Agrimonia striata	-	-	-	-	24/6	3 E
Bromus inermis	14/6	5 E	21/6	1 E	22/6	2 E
Campanula petiolata	-	-	22/6	1 L	-	-
Symphoricarpos occidentalis	28/6	1 L	-	-	28/6	3 E
Phleum pratense	-	-	-	-	29/6	4 E
Psoralidium argophyllum	-	-	2/7	3 E	-	-
Zizia aurea	-	-	-	-	-	-
Chamaenerion spicatum	-	-	-	-	1/7	5 E
Agastache anethiodora	-	-	-	-	7/7	4 E
Lactuca pulchella	-	-	5/7	3 E	13/7	0
Solidago canadensis	-	-	-	-	11/7	?
Grindelia perennis	-	-	-	-	-	-
Oligoneuron canescens	-	-	-	-	-	-
Aster crassulus (white)	-	-	31/7	2 L	-	-
Aster laevis (purple)	-	-	-	-	24/7	6 E
Thatcher wheat						
Sown	17/4	2 E	30/4	8 L	18/4	8 E
Emerged	28/4	3 E	10/5	4 L	3/5	5 E
Headed	20/6	2 E	25/6	1 E	23/6	7 E
Harvested	28/7	2 E	27/7	3 E	4/8	7 E

Maladies nouvelles ou d'importance notable

René O. Lachance

La rouille de la tige du blé a causé peu de dommages dans l'Ouest canadien. Dans les régions du Manitoba et de l'est de la Saskatchewan, où la rouille est ordinairement importante, les variétés résistantes ont pratiquement remplacé les variétés à pain susceptibles à la rouille. Il y a eu presque pas de rouille sur aucune variété cette année. Dans les emblavures tardives en dehors de cette région, les dommages causés par la rouille ont varié de moyens à graves en Saskatchewan et de légers à moyens dans le sud de l'Alberta. La rouille de la tige fut plus abondante que d'habitude dans les environs de Lethbridge et dans le district de Rivière-à-la-Paix. Dans l'est du Canada, la rouille de la tige varia de moyen à grave dans quelques champs isolés seulement.

Sur l'avoine, on a rapporté très peu de rouille de la tige et de rouille couronnée. Cependant, les épidémies locales dont on a pu attribuer l'origine à des plantations de nerprun étaient plus graves cette année au Nouveau-Brunswick qu'elles ne l'étaient en 1940. On a également noté dans cette province quelques épidémies locales de rouille de la tige dont l'infection primaire était due à la présence de l'hôte complémentaire, l'épine-vinette.

Pour la troisième année consécutive, on a étudié au Manitoba l'influence de la pourriture commune des racines (Helminthosporium sativum et Fusarium spp.) sur les rendements du blé. On a estimé que la perte moyenne était de 12.1% tandis qu'elle était de 16.6% en 1940 et de 7.47% en 1939. Cette maladie n'a pas causé une diminution de rendement aussi forte que l'année précédente. On croit que la précipitation abondante vers la fin de l'été a empêché une maturité trop précoce. La pourriture commune des racines était moins grave en Alberta et plus grave en Saskatchewan qu'à l'ordinaire.

La noircissure des grains fut moins répandue en 1941 qu'en 1940 dans les provinces des prairies. Alternaria spp. et Helminthosporium sporium sativum furent les organismes dominants associés au blé noirci, mais H. sativum est apparemment l'organisme qui cause la forme la plus grave de noircissure. On a de nouveau observé des différences entre les variétés quant à leur résistance à cette maladie.

Aux Etats-Unis le Fusarium graminearum est depuis longtemps considéré comme un pathogène important responsable de la brûlure des épis (gale) du blé. De même, dans l'est du Canada, on l'a trouvé associé à cette maladie (P.D.S. 19:10). Au Manitoba, il est relativement rare et il fut isolé d'épis galeux pour la première fois en 1941. Cet organisme n'avait été observé sur les grains de blé qu'une couple de fois avant cette date.

Le Dr. T.C. Vanterpool présente une étude élaborée sur la pourriture brunissante des racines du blé en Saskatchewan, en Alberta et aux Etats-Unis, dans les états du Dakota-Nord et du Dakota-Sud.

Les autres maladies des céréales dignes de mention sont la tache jaune des feuilles (Pyrenophora Tritici-repentis) sur le chaume du blé dans l'ouest de la Saskatchewan centrale. On a observé une fois de plus que les nouvelles variétés d'avoine sont moins susceptibles à l'Helminthosporium Avenae mais plus susceptibles, par contre, au Septoria Avenae que les vieilles variétés. On a également noté, dans le sud-ouest de l'Ontario, la présence de la tache grise de l'avoine, maladie par carence de manganèse.

La flétrissure bactérienne de la luzerne (Phytomonas insidiosa) continue d'exercer des ravages dans les districts irrigués du sud de l'Alberta. Cette maladie a été observée à plusieurs endroits où elle était ignorée jusqu'ici dans les régions arides de l'intérieur de la Colombie Britannique. Une pourriture du collet et des racines de la luzerne s'est montrée particulièrement grave dans les régions de production de graine du nord de l'Alberta. Le pathogène responsable est un basidiomycète qui croît à basse température et qui fut isolé pour la première fois, en 1931, de plantes à gazon endommagées par les moisissures d'hiver. La pourriture des tiges et des épis fut moins destructive en 1941 qu'en 1940 dans la région à maïs de semence du sud-ouest de l'Ontario.

La Savoy (virus) de la betterave sucrière, maladie transmise par Piesma cinerea, a été observée pour la première fois en Ontario. En dépit de la saison particulièrement favorable au développement des plantules de betterave sucrière, la racine noire (cause inconnue) a causé des ravages considérables. Dans certains cas, des champs entiers ont été abandonnés tandis que dans plusieurs autres les rendements ont été grandement diminués; cette maladie sévit depuis quelques années. On a noté l'apparition ou l'expansion des maladies suivantes: l'ascochytose de la luzerne (Ascochyta imperfecta) et la tache stagnosporienne du trèfle (Stagnospora recedens) en Colombie Britannique, l'ascochytose du trèfle d'odeur (Ascochyta caulicola) au Manitoba, la tache des feuilles du trèfle d'odeur (Pseudopeziza Meliloti) en Alberta, le mildiou de la fève soya (Peronospora manshurica) en Nouvelle-Ecosse, le charbon de la feuille du ray-grass de l'ouest (Ustilago striaeformis) en Colombie Britannique.

Une recrudescence de la flétrissure bactérienne de la pomme de terre (Phytomonas sepedonica) a été observée cette année dans les districts irrigués du sud de l'Alberta; on l'a trouvé sur 102 fermes comparativement à 89 en 1940 et 40 en 1939. Cette maladie a été observée dans des centres nouveaux en Saskatchewan, au Manitoba, dans l'Ontario et le Québec, particulièrement dans les champs de pommes de terre cultivées pour la consommation. Dans le Québec et au Nouveau-Brunswick le nombre de champs refusés à la certification à cause de cette maladie fut plus considérable en 1941 qu'en 1940. Sur l'Ile-du-Prince-Edouard, où la production de la pomme de terre certifiée est une industrie importante, on n'en a observé qu'un seul cas en 1941 comparativement à 25 en 1940. Il est trop tôt pour dire si la maladie a été éliminée totalement, mais on a pris toutes les précautions pour éliminer les lots de semence malade et pour désinfecter les machines et les outils. Ce travail a été fait sous la surveillance immédiate du personnel du service de l'inspection et du laboratoire de pathologie. Le succès remporté sur l'Ile-du-Prince-Edouard nous donne la perspective encourageante

que la bonne volonté agissante et l'attaque méthodique, résultant de la coopération entre les producteurs et les phytopathologistes permettra de mater cette maladie très maligne et décevante.

Le mildiou (Phytophthora infestans) fut général dans la région côtière de la Colombie Britannique et on l'a observé pour la première fois dans les régions sèches de l'intérieur de cette province. Le mildiou s'est de nouveau montré au Manitoba après une absence de treize années et a causé des dommages considérables dans la vallée de la Rivière-rouge. Cette maladie a également causé des ravages dans le nord de l'Ontario et dans le nord-ouest du Québec, au Nouveau-Brunswick et dans l'Ile-du-Prince-Edouard. Dans cette dernière province l'épidémie, dit-on, n'a jamais été aussi forte.

Un cas isolé de gale noire (Synchytrium endobioticum) des pommes de terre a été trouvé dans un jardin à Halifax. Il y a 25 ans semblable découverte eut causé une commotion, mais présentement, considérant nos connaissances de cette maladie et la facilité avec laquelle on l'a tenue en échec sur ce continent, il ne semble pas probable qu'elle devienne un problème de la culture des pommes de terre.

La moisissure des feuilles des tomates (Cladosporium fulvum) a causé des pertes modérées à la variété Vetomold dans le district de Victoria, C.B., où l'on cultive cette variété sur une base commerciale depuis deux ans. En Ontario, la diminution de résistance à cette maladie est attribuée à l'apparition d'une nouvelle lignée du champignon. Un seul essai commercial fut fait avec la variété Improved Vetomold V 121 dans le district de Harrow en Ontario, et l'on a trouvé l'infection négligeable. La création d'une variété parfaitement résistante à cette maladie serait une contribution d'importance pratique considérable.

Une maladie bactérienne observée pour la première fois en 1940 au Manitoba a été identifiée comme étant la tacheture bactérienne (Phytomonas tomato). Les pertes ont été sérieuses dans un cas. La tache bactérienne (Phytomonas vesicatoria) que l'on connaissait dans le Québec et l'Ontario a été observée cette année au Manitoba et en Nouvelle-Ecosse. Les maladies nouvelles et importantes observées sur les légumes sont: la tache cercosporienne des feuilles des carottes (Cercospora Apii var Carotae), la tache septorienne des feuilles de la laitue (Septoria Lactucae) dans la province de Québec et la tache hétérosporienne des feuilles des épinards (Hétérosporium variabile) en Colombie Britannique.

Les pucerons récoltés sur les pommes de terre et leur importance dans la transmission des maladies à virus de cette plante sont un sujet traité dans une section à part par Mme Jean B. Adams.

La brûlure bactérienne du pommier (Erwinia amylovora) a été notée pour la première fois en Alberta. On sait maintenant que cette maladie se rencontre dans toutes les provinces du Canada. Cette maladie n'a jamais été un problème sérieux dans la vallée d'Annapolis en Nouvelle-Ecosse. Elle a déjà causé des ennuis sérieux dans la vallée d'Okanagan en Colombie Britannique, et elle continue d'avoir une importance considérable en Ontario et dans Québec. Dans ces deux provinces l'épidémie a été plutôt modérée en 1941.

Parmi les maladies des fruits à noyaux, les maladies à virus tiennent la première place. Plusieurs de celles-ci ont été observées pour la première fois cette année. Mentionnons les suivantes: la maladie X des pêchers et des cerisiers-à-grappes en Ontario, la maladie X de l'Ouest des pêchers en Colombie Britannique, la mosaïque du prunier sur les pruniers et les pêchers en Ontario et en Colombie Britannique, la mosaïque linéaire des pruniers Shiro en Ontario, la marbrure des feuilles et la petite cerise (virus?) du cerisier en Colombie Britannique.

La jaunisse (virus) est une maladie très répandue et destructive. M. D.J. MacLeod a donné la preuve expérimentale que la jaunisse telle qu'on la rencontre sur le sarrazin, les carottes, les reines-marguerites, les phlox, et la mauvaise herbe Hieracium floribundum au Nouveau-Brunswick est causée dans tous les cas par le virus Callistephus 1. La jaunisse fut également observée cette année sur la laitue au Manitoba et dans Québec, sur les immortelles au Nouveau-Brunswick, sur les muffliers dans l'Ile-du-Prince-Edouard, sur les soucis au Nouveau-Brunswick et dans l'Ile-du-Prince-Edouard, et, croit-on, sur les gaillardes dans l'Ile-du-Prince-Edouard. La brûlure ou rayure des feuilles des phlox vivaces est une maladie destructive dans l'est du Canada; M. MacLeod a fait des expériences qui indiquent que cette maladie est causée par un virus. Lorsque le service d'inspection des bulbes fut mis sur pied en Colombie Britannique, quelques maladies, notamment la mosaïque (Break) (virus) et la brûlure botrytienne des tulipes (Botrytis Tulipae), les nématodes (Ditylenchus dipsaci) des narcisses et de l'iris menaçaient l'industrie de la culture dus bulbes dans cette province. Aujourd'hui, grâce à l'application rigoureuse des moyens de lutte connus à l'époque ou améliorés depuis, ces maladies perdent rapidement de l'importance ou même n'existent plus dans les plantations bien exploitées.

Sur les plantes ornementales on a observé plusieurs nouvelles maladies, ou la présence, sur des hôtes nouveaux, de maladies connues, ou encore un agrandissement de l'aire géographique où on les rencontre. Telles sont: La tache des feuilles des fougères cultivées (Phyllosticta Pteridis), la tache des feuilles des campanules (Ramularia macrospora), le nanisme des cyclamens (Cladosporium Cyclaminis), la tache des feuilles des delphiniums (Ascochyta Aquilegiae), le blanc de la spirée (Sphaerotheca Humuli), la tache des feuilles du lierre anglais (Phytomonas heredae) et la tache bactérienne des feuilles de l'iris (Phytomonas tardicresens).

I. DISEASES OF CEREAL CROPS

WHEAT

HEAD DISCOLORATION (Alternaria, etc.) was common on Apex wheat in Sask. It was particularly severe at Swift Current and Saskatoon. Head discoloration was a trace to moderate on all heads at Giroux, Man., and on 75% at Niverville; the trouble was slight on some heads at Ste. Anne, and on 20% at Virden. About 5% of the heads of Dawsons Golden Chaff were overgrown with Cladosporium herbarum at Ailsa Craig, Ont.; the grain was badly shrunken in the affected heads (J.K. Richardson). Head discoloration was a trace to slight in the variety plots at Ste. Anne de la Pocatiere, Que. It also affected most heads in the plots at Lennoxville. The disease was usually only a trace in N.B., but the infection was 40% in a field at Waterville and 15-25% in some varieties in the plots at Black River Bridge and Fredericton. Head discoloration was generally absent in the plots in P.E.I., but a slight amount was present on one variety at Charlottetown.

ERGOT (Claviceps purpurea). A trace was present on both common and durum wheats at Winnipeg, Man. and on common wheat at Scarth. A trace was observed on Huron and Red Fife in Queens Co., P.E.I.

ROOT ROT (Cryptoascus sp.). A 25% infection occurred at Kensington, P.E.I., on Red Fife. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) infected wheat slightly in June at the Station, Sidney, B.C. It was also quite general on the leaves of 75% of the plants in the Lytton district. Infection was a trace to severe in the plots at Beaverlodge, Alta., and slight in 2 out of 30 fields examined in the Peace River district; it was severe on nearly all varieties in the plots at Lethbridge. Infection was severe on the lower portions of the stems and lower leaves of breeding material in the greenhouse in October at the University, Saskatoon, Sask. Powdery mildew was moderate on one variety, slight on a second, and a trace or absent on all others at Ste. Anne de la Pocatiere, Que.

HEAD BLIGHT (chiefly Fusarium spp.). Trace to slight damage was caused by Fusarium spp. in fields at Athabaska and Dewberry, Alta.; slight infection by Helminthosporium sativum was found in the plots at Edmonton (A.W. Henry). Blighted heads of wheat yielded the following fungi when isolations were made: Ste. Anne, Man.: Thatcher - F. graminearum; Winnipeg: Regent x Thatcher - F. graminearum and F. Scirpi var. acuminatum, Iumillo - F. Poae; Kemptville, Ont,: C.T. 129 - F. avenaceum; Lennoxville, Que.: Vernal Emmer - F. graminearum; Ste. Anne de la Pocatiere: Marquis x Kanred - F. avenaceum; Fredericton, N.B.: Coronation - F. Poae, Epicoccum purpurascens, Alternaria, etc. Only a trace of infection was recorded at all locations. This is the first time that F. gramineaum was isolated from head blight of wheat in Man., although it was isolated once from a sample of durum wheat seed of the 1939 crop obtained at Oak Bluff, and again once from a sample of common wheat seed of the 1940 crop obtained at Portage la Prairie (W.L. Gordon). In general only traces of head blight were recorded in Que., N.B., and P.E.I.; in some of the plots, however, particularly at Fredericton, N.B., up to 15% of heads were affected.

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) caused apparently less damage than usual in Alta., although its effect was frequently masked by drought injury. The damage was a trace in 22 fields and slight in 24 out of 81 examined.

Common root rot was widespread in Sask. and in general was more severe this year than in 1940. Examination of material from the dates of seeding test at Saskatoon showed that the usual rise in the disease rating came in the first half of July in 1941 as against the latter half of June in 1940. The increase followed rainy periods in each year. Soil temperatures were much higher during June and July in 1941 than in 1940. The disease was much more severe this year on wheat in the rotations on Illustration Stations than last. It was very prevalent as a prematurity blight. Plants ripened early and in many cases lodged. At Tisdale, 2% of the plants were affected in one field. Specimens of stunted plants from the south-eastern part of the province yielded H. sativum.

As in the previous 2 years, 10 fields of ripe wheat in each of the 6 principal soil zones in Man. were sampled to determine the effect of common root rot on the yield of wheat. On the basis of the data obtained, it was calculated that the disease reduced the yield of wheat by 12.1% in 1941. This was less than the figure (16.6%) obtained in 1940 but greater than that (7.47%) obtained in 1939. The average yield of healthy plants in 1941 was 1.01 gm., and was greater than the yield (0.85 gm.) in 1940 or the yield (0.72 gm.) in 1939. There were more culms per plant, but the weight of grain per head was no greater in 1941 than in 1940. Attacks by the disease did not reduce the yield of individual plants to the degree they did in 1940 or in 1939. It is thought that the abundant precipitation during late summer prevented the premature ripening of the affected plants.

KERNEL SMUDGE (Helminthosporium sativum, etc.) was not as prevalent in the Prairie Provinces in 1941 as in 1940. The losses from this disease in Hard Red Spring wheat, owing to lowering of the commercial grade, were small. An examination of the car-inspection records of the Western Grain Division, Department of Trade and Commerce, Winnipeg, Man., for the period August 1 to October 31, in 1940 and 1941 respectively, gave the following results:-

Year	Cars inspected (Spring wheat)	Cars with kernel smudge	Percentage of cars with kernel smudge
1940	24,498	923	3.8%
1941	15,397	212	1.4

In 1941, the most severe infections of kernel smudge occurred in the crop districts of Russell in Man., and East Central (Yorkton) in Sask. There was only a very light infection of the disease in western Sask. with a bare trace appearing in most of the crop districts of Alta. Although Alternaria

spp. and Helminthosporium sativum were by far the most common fungi associated with smudged wheat kernels, H. sativum appeared to be responsible for the more severe forms of kernel smudge. An examination was made in 1940 and 1941 of the grain samples of several wheat varieties grown in co-operative wheat variety tests conducted at 16 different stations in the Prairie Provinces. The following results were obtained:-

Variety	Percentage of smudged kernels	
	1940	1941
Apex Selection	5.9%	7.2%
Thatcher Selection	2.4	3.0
Marquis	1.4	1.5
Red Bobs	0.8	0.7
Regent Selection	0.3	0.5
Renown Selection	0.6	0.4
Garnet	0.0	0.0

Kernel smudge was found to be more prevalent in the 1940 crop in Sask. judged from the laboratory examination of over 500 samples than it was in the 1939 crop (q.v. P.D.S. 19:11 and 20:4). Nevertheless the average infection was very slight. Apex and Thatcher showed more smudge than other varieties. Alternaria was commonly isolated from smudged kernels and fungi other than Helminthosporium predominated. According to Dr. R.C. Russell, several different types of dark discolorations appear on wheat in Sask., the area around the germ-end being particularly affected. Two types designated as "mild" and "severe" selected from the 1941 crop from the Laboratory's wheat plots at Indian Head, yielded 1% and 40% of H. sativum, respectively, when the kernels were placed on moist filter paper. Seed of the latter type germinated poorly in soil and considerable seedling blight developed, while the seed of the former type gave a stand which compared favourably with that obtained by using selected clean plump seed. Nigrospora sphaerica was also found on a high percentage of kernels showing certain types of discoloration selected from grain in the same plots.

TAKE ALL (Ophiobolus graminis) was found in 8 fields out of 81 examined in Alta.; the damage was a trace in 1 field, slight in 5 and moderate in 2. Its relatively rare occurrence this year was probably due to the dry conditions prevailing and to a large portion of the wheat being sown on summer fallow. No take all was found in Sask.; its absence was attributed to the extreme drought.

BASAL GLUME ROT (Phytomonas atrofaciens) was not recorded in Man. in 1941. (W.A.F. Hagborg)

BLACK CHAFF (Phytomonas translucens sensu lato). A field was slightly infected at Dewberry, Alta., and a trace was found on Apex and Reward selections at Beaverlodge.

Damage due to black chaff (Phytomonas translucens f. sp. undulosa) was apparently negligible in Man. The organism was isolated from two collections. (W.A.F. Hagborg)

STRIPE RUST (Puccinia glumarum) was general in a 10-acre field of fall wheat at Sumas, B.C. in June, and appeared to be causing moderate damage. A slight infection was observed on Regent at the Sidney Station.

STEM RUST (Puccinia graminis) was first found on winter wheat at Lethbridge, Alta., on July 18 and on spring wheat at Edmonton on July 23. Hot dry weather retarded its development until August. This is the first year on record that stem rust infection was more prevalent and also more abundant in southern Alta. than in the area north of Calgary. The infection centred at Lethbridge. In fields that matured relatively early, rust was absent or only a very slight infection developed. In late-maturing fields the infection was slight to moderate, but sometimes the rust was fairly heavy and caused some damage. Stem rust was unusually prevalent in the Peace River district, where a trace to a slight infection was found in most late stands.

Stem rust was found at Indian Head, Sask., on July 10. The infection remained very light until after the first week in August, when rust was present in epidemic formon susceptible varieties. Rain fell on 17 days between July 4 and August 4. A trace infection was observed at Saskatoon in July and rust became epidemic on late crops of susceptible varieties late in August. Rust was severe on Early Triumph at Unity on Aug. 7, and on Marquis at Shaunavon on the same date. Spread of rust was limited by hot dry weather and extensive sowing of resistant varieties.

Both temperature and moisture conditions were quite favourable for the germination of stem rust spores and the development of the fungus during most of the growing season throughout southern Man. in 1941. The only exceptions in the southern areas occurred in parts of the Red River Valley where rainfall was scanty during part of July. Temperatures ranged from 3° to 7° F. above normal throughout the agricultural area of Man. during May, June and July, except in the south east corner of the province where temperatures were 1° below normal for July. South of the Lakes region of Man., rainfall exceeded the normal amount by from 40 to 100% during May, and in the south west precipitation ranged from 20 to 40% in excess during June. However, along the Red River, the rainfall during June was from 10 to 20% below normal. Rainfall was very spotty in the southern part of the province during July, some areas receiving 40% less than normal and others as high as 70% above normal. Throughout the northern part of the agricultural area of the province, rainfall was considerably below normal during both June and July.

In spite of the favourable weather conditions which prevailed, particularly in southern Man. during the summer of 1941, stem rust of wheat made but little progress. There was practically no stem rust on susceptible bread wheats sown in Manitoba. However, most of the barley varieties grown are susceptible to stem rust and light infections of stem rust developed on these varieties throughout the whole of the province. Nowhere were the infections severe not even in the south where the weather was quite favourable for rust development. The infections generally ranged from 1-10% with infections exceeding 25% in only a few late fields. Similarly there was little more than a trace of stem rust on durum wheat in 1941.

The failure of stem rust to develop extensively was probably due to the fact that stem rust spores arrived from the south rather late, and suitable hosts for them to get established on to build up local inoculum were much more restricted than in former years owing to the replacement of the extensive acreage of susceptible wheats suitable for increasing rust inoculum by resistant wheat varieties. (B. Peturson)

A 25% infection was recorded on Garnet in the plots at Ste. Anne de la Pocatiere, Que., while stem rust was absent from most rust-resistant varieties. A 20% infection was observed on Huron in the plots at Lennoxville. Stem rust was recorded in 6 out of 19 fields examined in N.B. The heaviest field infection was 15% on Huron at Waterville; in addition, patches in a field at Canobie showed 25% with an average infection of 5% for the field. Garnet showed 65% of stem rust in the plots at Fredericton, but the rust-resistant varieties were virtually free from infection. Only a trace of rust was recorded even on susceptible varieties in the plots in P.E.I.

LEAF RUST (Puccinia triticina). A light infection was observed in the plots at the Sidney Station, B.C., and also in fields of spring and winter wheat at Lytton, Salmon Arm and Armstrong. Leaf rust first appeared in Alta. about July 15, and was unusually prevalent later in the season. Infection was moderate on late stands in southern Alta., slight to moderate in central Alta., and a trace to slight in the Peace River district. Leaf rust infection was very light in south and central Sask. in July and moderate in the north-east, south and south-west areas in late July and the first half of August. It was severe on Thatcher and other susceptible varieties at Indian Head on Aug. 12. Extreme drought during July undoubtedly limited infection. It was also severe on Sept. 4 on late blocks of Apex at Saskatoon. Leaf rust was first observed at Indian Head on July 7 and at Saskatoon on July 12.

Leaf rust (Puccinia triticina) was first observed in Man. during 1941, on June 3, fully two weeks earlier than normal. On that date, isolated primary infections were present throughout the south-eastern part of the Red River Valley. This rust spread rapidly and by the end of the second week in June it was present throughout the entire agricultural area of Man. and into eastern Sask. By mid-July, leaf rust infections had become quite heavy on Thatcher throughout the southern half of the province and when the leaf rust epidemic had reached its maximum, shortly before harvest, Thatcher wheat carried infections ranging from 60 to 90% in this area. The heaviest infections occurred in the south-eastern part of the province, but fairly heavy infections were quite general as far north as Dauphin. The varieties Regent and Renown were only lightly affected. Infections on these two varieties rarely exceeded 10% in intensity.

A comparison of the yield of sulphur-dusted and undusted plots of Thatcher and Renown located at Winnipeg, gave a rough measure of the damage caused to these varieties by leaf rust. In these plots, leaf rust reduced the yield of Thatcher by 20% and that of Renown by 4%. Only slight traces of leaf rust occurred on durum wheat. (B. Peturson)

A trace occured on winter wheat, then heading at Brucefield, Ont., on May 28. Leaf rust was heavy at Ste. Anne de la Pocatiere, Que., even on varieties usually but slightly affected elsewhere. Percentages as high as 65% were recorded on varieties generally showing not more than 5 to 10%. (C. Perrault). Leaf rust was observed in 8 out of 16 fields examined in N.B. with high infections at Buctouche (75%) and Jacksonville (45%); it was light in the plots (S.F. Clarkson). Leaf rust infection varying from 5 to 10% was recorded on August 7, on commercial Coronation in Queens Co., P.E.I. (R.B. McLaren). In the plots at Charlottetown no leaf rust was recorded on Coronation and but 5% was present on Garnet. (G.W. Ayers)

YELLOW LEAF BLOTCH (Pyrenophora Tritici-repentis (Helminthosporium Tritici-repentis) occured in epidemic form in many fields of wheat on stubble about Saskatoon, Sask., between Saskatoon and North Battleford, and between there and Lloydminster in June. None was encountered in Alta. In one field near Saskatoon, where the disease was closely observed, mature perithecia were abundant on the old stubble. Cultures obtained from the spots on the leaves of the wheat seedlings and from ascospores from the stubble were identical. Although the disease has been reported previously from Sask. (P.D.S. 19:12-14), it has never been quite so conspicuous. During the first few days of the browning root rot survey, fields affected with this trouble were occasionally mistaken for browning fields. An estimation of the effect that it might have on yield was interfered with by the extremely hot, dry weather which prevailed from mid-summer onwards (T.C. Vanterpool). Yellow leaf blotch infection was reported as slight at Virden, Man., moderate and general at Carman, Pipestone and Killarney and severe at Pierson.

BROWNING ROOT ROT (Pythium sp.). In a survey made in Alta. in late June, browning root rot was found in nearly all fields examined in the brown soil area between Trochu and Drumheller. The damage was estimated as follows: Trace in 6 fields, slight in 10, moderate in 7 and severe in 2. It also caused 25% damage in a field at Pine Lake. (G.B. Sanford)

A survey trip was made through Alta. from June 19 to 24. In general, browning infestation was light between Lloydminster and Edmonton, though field characters and root lesioning were fairly marked in fields near Kitscoty, Manville and Vegreville. Little was found near Edmonton where moisture conditions had been poor. Infestation was also generally light between Edmonton and Calgary, but increased somewhat north of Calgary. A severely attacked field was found near Didsbury. Both leaf and root symptoms indicated that much of the yellowing in barley and oat fields was due to Pythium. Root lesioning is not as conspicuous on these hosts as on wheat. There seemed to be relatively little wheat on this route and more oats and barley than one would have expected normally. This may partly account for the small amount of browning root rot on wheat observed between Edmonton and Calgary. The wheat was getting too far advanced to spot browning readily, while probably oats and barley were nearer the right stage.

Moderately attacked fields were found south from Calgary to Lethbridge, particularly at Midnapore, Black Diamond, Cayley and Claresholm. One gained the general impression that there was a moderately heavy infestation of browning root rot in the area from Calgary as far south as Granum. Disease symptoms were probably most conspicuous about 7 to 10 days earlier. Incidentally, there

was more wheat along the highway between Calgary and Granum than between Edmonton and Calgary.

Dr. G.B. Sanford made a survey of central and south central Alberta about June 24, and sent me some ten typical samples of wheat seedlings affected with browning root rot from Carbon, Ghost Pine, Grainger, Orkney, Trochu, Three Hills and Huxley.

In summarizing the Alberta situation, I would say that there was a moderately heavy infestation of browning in the crop area from Calgary south to Granum and north east to Drumheller. Elsewhere browning was light. (T.C. Vanterpool)

A limited survey was carried out by the Dominion Laboratory in southern Sask. A heavy frost on June 8 in the Indian Head-Regina area, caused the death of the leaves and thus masked the symptoms of browning root rot. Examination of roots from several areas showed the disease to be generally light. However, in the Regina district some fields were moderately to severely infected with the result that crop growth was retarded.

With the exception of some isolated areas in the black soil zone and a smaller number in the dark brown zone of Sask., above-ground symptoms of browning root rot on cereals were not conspicuous and infestation was slight. This is attributed to the good moisture conditions and the moderate temperatures which prevailed up to the middle of June. Under these conditions a damaged root system might still supply sufficient water for moderately good growth. With the onset of extremely high, intermittent temperatures and continued drought which began about June 22, browning symptoms soon merged into drought symptoms.

A visit at the end of June to districts which had been visited early in the month when moisture conditions were favourable, showed that the browning root rot areas were suffering more from the heat and drought than the normal areas, in spite of the better and often luxuriant growth in the normal areas. In this connection it should be mentioned that usually in early June, when browning root rot is most conspicuous in a wheat field on fallow, the soil in the diseased areas, at least to a depth of eight inches, is moister than that in normal areas; this difference is attributed to the more vigorous growth of the normal plants. These observations suggest that browning root rot increases the hazards from heat and drought, especially if these occur soon after the browning symptoms have appeared, which is usually around the second week of June.

Many wheat fields were again found to be affected with browning root rot in patches which were diseased in 1938, when these fields last carried a summerfallow crop. One of these fields was in barley this year and it also was affected with the disease.

Four samples of wheat seedlings with characteristic Pythium lesioning on the roots were received from Senate and Claydon, in the extreme south-west corner of Saskatchewan. Samples are rarely received from the drier areas of the light brown soil zone in the south-west, but the disease

is known to be present there when moisture conditions are suitable. (Cf. P.D.S. 20:7-8)

Strains of Pythium arrhenomanes Drechsl., P. aristosporum Vanterpool, and P. graminicola Subram. were isolated from young lesioned roots of field samples of brome grass, crested wheat grass and slender wheat grass collected in June in the western sections of zones 2 and 3. A single examination of the young roots which developed on these grasses at Saskatoon after the fall rains showed them to be free from Pythium.

In early August, Dr. Roderick Sprague of the Federal Station at Mandan, N.D., visited Saskatoon for a week, and together we made a laboratory survey study of some 160 isolates of Pythium obtained from cereals and grasses in the Dakotas and Montana. The large majority of the definitely pathogenic forms we considered as belonging to P. arrhenomanes. A large-spored pathogenic strain of P. aristosporum was encountered in two localities. Some slightly pathogenic forms we referred to P. deBaryanum, P. ultimum and close allies. The remainder were forms non-pathogenic to wheat seedlings in small flasks. We considered that the results showed that Pythium damage to cereals and grasses is just as common and serious in North Dakota as in Sask. (vide Sci. Agric. 20:735-749. 1940) and that, as has been previously pointed out (loc. cit.), the parasitic species concerned are indigenous on our native grasses. T.C. Vanterpool and R. Sprague, Phytopath. 32:327-328. 1942) (T.C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). A trace was present in 24 fields and slight in 2 out of 81 fields examined in Alta. The affected fields were located largely in the Peace River district and a trace was found on several varieties at Beaverlodge. A trace of glume blotch was found in a field at Nipawin, Sask. and on Huron in Queens Co., P.E.I.; slight to moderate infections were noted on several varieties in the plots at Palmer Road and Rose Valley.

SPECKLED LEAF BLOTCH (Septoria nodorum and S. Tritici). A trace was recorded in 19 fields, slight in 9, and moderate in 3 out of 81 fields examined in Alta.; a trace to slight infection occurred in the plots at Lacombe, Lethbridge and Beaverlodge. Septoria Tritici was present on leaves of winter wheat collected at Brucefield, Ont., May 28; a 20% infection was also recorded at Neguac, N.B.

BUNT (Tilletia caries and T. laevis). A summary of the bunt situation in Western Canada was prepared from the records of the Western Inspection Division and kindly supplied by Wm. Popp.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1, 1940 to July 31, 1941 and from August 1, 1941 to October 31, 1941.

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Smutty	Cars Inspected	Cars Graded Smutty	Percentage Smutty
	Aug. 1, 1940-July 31, 1941			Aug. 1, 1941-Oct. 31, 1941		
Hard Red Spring	166,040	443	0.3%	44,719	69	0.2%
Amber Durum	4,407	35	0.8	469	2	0.4
White Spring	1	0	0	-	-	-
Alberta Red Winter	278	16	5.8	233	4	1.7
Garnet	3,863	4	0.1	290	0	0
All Classes	174,589	498	0.3	45,711	75	0.2

About 1% of the plants were bunted in a field of Ridit at Armstrong, B.C.; the seed had been treated with Ceresan. In general, the disease was quite widespread and severe in the district this season; 75-80% of the plants were affected in some fields of Jones Fife, a very susceptible variety of fall wheat. The bunt was determined as T. caries (G.E. Woolliams). A trace of bunt was observed in 2 fields, and infection slight in 8 and moderate in 2 out of 81 examined in Alta. Out of 110 fields bunt infected 1% of the heads in a field at Sceptre, Sask., and a trace in two others. Out of 562 samples of foundation, elite, and registered seed wheat from the 1940 crop examined in the laboratory, 46 samples were found lightly infected with spores. Most of the affected samples were from zones 1 and 4. A trace of bunt was present on Huron wheat at the Charlottetown Station, P.E.I. (Bruce McLaren)

LOOSE SMUT (Ustilago Tritici) was recorded as follows: Trace on Red Bobs at Salmon Arm, B.C.; trace to slight in plots at Lacombe and Lethbridge, Alta., being severe on Dicklow at Lethbridge; present in 5 out of 110 fields in Sask. and in a guard strip of Garnet at Indian Head; 10% in several fields in Ont.; traces in the plots at Ste. Anne de la Pocatiere, Que., and 3% in 2 out of 19 fields in N.B.; 0.5% in Huron in Queens Co., P.E.I.

FALSE BLACK CHAFF (Non-parasitic). All plants of Reward were moderately to severely affected in the plots at Beaverlodge, Alta. (W.C. Broadfoot)

OATS

HEAD and STEM DISCOLORATION (Alternaria spp.) was severe on all the varieties except Victory in the plots at Currieburg, N.B., on Aug. 9; it was also noted in 3 fields during the Survey. (S.F. Clarkson and T. Johnson)

ANTHRACNOSE (Colletotrichum graminicola). A trace was found on wild oats at Bremner, Alta. (A.W. Henry)

POWDERY MILDEW (Erysiphe graminis) was reported as follows: Slight on all varieties at the Sidney Station, B.C.; slight on 10% of the plants at Lytton on Victory, etc; trace in 2 fields in N.B.

COMMON ROOT ROT (Fusarium spp. chiefly). A prematurity form of root rot was common in Sask. causing moderate damage particularly in zones 1 and 2. The plants became bleached early and were rotted at the base. Of 165 samples of foundation, elite, registered and certified seed from the 1940 crop, 35 yielded Helminthosporium sativum in culture.

LEAF BLOTCH (Helminthosporium Avenae). A trace was reported in one field out of 38 examined in Alta.; and a trace from Thornhill and Virden, Man. It was general and abundant everywhere in Que.; the average percentage of leaf area affected was found to be 3.51% in 1941 in comparison with 3.12% in 1940, an increase of 0.32%. It was again more prevalent than Speckled Leaf Blotch (q.v.) (I.H. Crowell and D. Leblond). In the plots at Ste. Anne de la Pocatiere, Que., leaf blotch infection differed widely according to the variety, but in general speckled leaf blotch was the more prevalent, as the tabulation below shows:-

Variety	H. Avenae	S. Avenae
Mabel	0	5.0
Erban	2.1	6.7
Lasalle	0.7	5.4
Banner	9.7	4.0
Gopher	1.0	23.6
Ajax	2.9	4.5
Ripon	1.1	11.2
Roxton	0	3.1

Leaf blotch was recorded in 114 out of 137 fields examined in N.B.; the average infection was 5%, reaching as high as 50%, and was recorded much more frequently than speckled leaf blotch. Very little leaf blotch was recorded in the plots (S.F. Clarkson). Leaf spot was generally slight to moderate on the varieties at Charlottetown, P.E.I. Elsewhere, slight infections were occasionally noted (G.W. Ayers). Examination of a sample of Victory from these plots showed both H. Avenae and S. Avenae equally prevalent.

NEMATODES (Heterodera schachtii). The nematode situation in Ont. appears to have changed little from that observed in former years. The area of infestation has neither increased nor diminished in Waterloo Co. Some farmers in the country are avoiding nematode injury by crop rotation. No new outbreaks have been reported from any part of the province in the past year. (J.E. Howitt)

HALO BLIGHT (Phytomonas coronafaciens). A trace was observed in 15 fields and a slight infection in 11 out of 38 examined in Alta.; infection ranged from a trace to slight in the plots at Edmonton and Lacombe and from a trace to severe at Beaverlodge. Halo blight was seldom encountered in north-central Sask. in June. Its absence was noteable considering its general prevalence in 1939. Although June was generally moist, the prevailing cool temperatures may have influenced infection (T.C. Vanterpool). Halo blight was

very prevalent in Man. in 1941. A few fields were severely retarded early in the season. All the plants were severely attacked in one field at Eden in June. Severe leaf reduction occurred at Winnipeg in July, on many varieties due to the disease. No halo blight was observed in the numerous leaf samples examined from fields and plots in N.B. (W.A.F. Hagborg)

CROWN RUST (Puccinia coronata). A very light infection was recorded in 3 fields in eastern Sask. and none was found in the west. Crown rust of oats was quite prevalent in Man. in 1941. The heaviest infections occurred in the south-eastern part of the province, where infections averaged 60% on late crops. Early sown oats carried infections averaging 5 to 15% (B. Peturson). The average percentage of leaf area affected by crown rust in the fields surveyed in Que. was 1.05% in 1941 compared to 1.96% in 1940, a decrease of 0.91% (I.H. Crowell and D. Leblond). Crown rust in general only slightly infected oats in Western Quebec, with somewhat higher infections at Lennoxville (F.S. Thatcher). Crown rust was more severe in N.B. in the areas where it was found than in 1940. Out of 137 fields examined, no rust was found in 60, traces in 24, but infection ranged from 45 to 90% in 12. Aecia were abundant towards the end of June in the Springhill area and a severe local epidemic developed. Crown rust was also epidemic in the Shediac area embracing Moncton Road, Gilbert's Corner, Shediac Corner, Scoudouc and Shediac, infection ranging from 65 to 90%. Heavy infections have been recorded in the area since 1937 (100% Shediac, 1937; 45% Gilbert's Corner, 1939). Mr. R.P. Gorham, Division of Entomology, found the common buckthorn this past summer at the Welling Farm, Gilbert's Corner. Rhamnus cathartica was also located at Dorchester, where a 90% infection was recorded at no great distance from the bushes (S.F. Clarkson). There was very little crown rust on oats in P.E.I., except on late fields, which were moderately infected (R.R. Hurst). It was first observed in the plots at Charlottetown on July 24 (Bruce McLaren). Infection ranged from 20 to 60% in the plots at Palmer Road, but elsewhere it was negligible. (G.W. Ayers)

STEM RUST (Puccinia graminis) was extremely scarce in Alta. A trace was found in the plots at Edmonton and Lacombe, and it was detected with difficulty in several late-maturing fields in southern Alta. A 5% infection was recorded in a field at Wawato, Sask. and a trace in 3 other fields out of 30 examined. Stem rust was present on susceptible varieties throughout Man. However, infection was generally light. In the early sown crop stem rust infection ranged from a trace to 10%, but in late fields it was much heavier, varying from 10 to 40% (B. Peturson). In Que., stem rust infected 0.51% of the stem area in the fields surveyed (I.H. Crowell and D. Leblond). Light infections were recorded in the plots and fields at Ste. Anne de la Pocatiere, Que. (R.O. Lachance). Only a slight infection of stem rust was observed in general in Western Que., although it was somewhat higher in the plots at Lennoxville (F.S. Thatcher). Stem rust was recorded in only 14 fields out of 142 examined in N.B., but in 6 fields infection ranged from 20 to 45%. Aecia were abundant on the barberry hosts at Hartland in the early summer, and 45% infection was present on oats in the milk and dough stage of maturity on Aug. 13. No aecia were present on the barberry at Rothesay, but no grain was grown near the bushes in 1940. The absence of grain growing near the alternate hosts, both barberry and

buckthorn, is quite commonly observed. In the few cases, where grain was sown near the alternate hosts and only a trace of rust developed on the grain, it was noted that only a trace of aecia had developed on the barberry or buckthorn, and the grain crop had been sown late and may have escaped aecial infection. The farmers of Pomeroy Ridge and Scotch Ridge, two places on parallel roads, about a mile apart, have experienced great difficulty in growing grain because of rust damage. Both barberry and buckthorn are suspected to be present from information in hand. New locations of barberry were found at Fredericton and at Lincoln in 1941. (S.F. Clarkson)

In the plots at Charlottetown, P.E.I. Erban showed a trace and Ripon a 2% infection on Aug. 30; no rust was in plots elsewhere. Some reports of stem rust damage on oats sown early were received in August, but in general, oats was unusually late this year and little stem rust developed. However, severe rust damage was found in several late fields on Oct. 12 and may have been quite widespread. (R.R. Hurst)

SPECKLED LEAF BLOTCH (Septoria Avenae) affected 0.37% of the leaf area in the fields surveyed in Que. this year as against 0.83% in 1940 (I.H Crowell and D. Leblond). It affected 3-40% of the leaf area at Lennoxville (F.S. Thatcher). The disease was recorded in 16 fields out of 142 examined in N.B., infection varying from a trace to 25%. It was heavy in the plots at Nashwaaksis, but only small amounts were recorded elsewhere. (S.F. Clarkson)

SMUT (Loose Smut, Ustilago Avenae and Covered Smut, U. Kolleri) affected a trace of the heads in 8 fields and 2-3% in 2 others out of 38 examined in Alta. Covered smut was recorded in 10 fields and louse smut in 3 out of 30 examined in Sask.; the average infection was less than 1%. Of 165 samples of foundation, elite, registered and certified seed samples grown in 1940, 111 carried smut spores and 12 were severely smutted. Smut was recorded in 13 fields out of 17 examined in Man., the average infection being 5% and the heaviest 25%. Smut was recorded in 37 out of 141 fields examined in N.B.; the average infection of covered smut was 0.5% and loose smut a trace, a decided reduction over last year. The highest infection was 10% of covered smut at Head of Millstream (S.F. Clarkson). Smut was recorded from 2 fields in N.S. - 10% of loose smut at Clifton and 10% of covered smut at Scott's Bay (W.K. McCulloch). Loose smut infection varied from a trace to 40% in P.E.I.; indeed in one field 75% was recorded. (R.R. Hurst)

BLAST (non-parasitic) was present in all fields examined in Alta. - 5% in 4 fields, 10% in 10, 15% in 9, 20% in 10 and 25% in 4, and from 10 to 25% in the plots at Lacombe and Lethbridge and from 10 to 35% at Beaverlodge; less severe in Sask. than in 1940; 0-14% in the plots at Ste. Anne de la Pocatiere, Que.; in all fields in N.B., averaging 15% and occasionally reaching 35%; 2-30% blast recorded in plots at Charlottetown and Rose Valley, P.E.I., with smaller amounts recorded elsewhere.

BLIGHTING. Following extreme heat on July 19 (over 100°F.) the upper two inches of the flag leaf sheath was whitened on that side facing the south-west on about 10% of the plants in a field at Dafoe, Sask.

GREY SPECK (manganese deficiency) was reported by J.D. MacLachlan

(Sci. Agric. 22:201-207. 1941) in a localized area in a field at the Ont. Agricultural College, Guelph. Grey speck has also been reported to occur on some of the plots at the Experimental Farm, Ottawa (P.D.S. 4:19), at Macdonald College, Que. (l.c. and P.D.S. 18:13), and the Lake St. John region (P.D.S. 20:14). What is apparently the same trouble has also been observed on other areas at the Farm according to R.Derick, and on some of the low areas in the Ottawa River Valley below the City. As MacLachlan points out, the trouble is probably more widespread than the present records indicate. (I.L. Conners)

BARLEY

SMUDGE (Helminthosporium sativum, Alternaria) affected a trace to 20% of the kernels in 40 samples out of 63 of foundation, elite, registered and certified seed examined from the 1940 crop in Sask.; 18 of these samples yielded H. sativum, although several clean looking samples did so also. All samples yielded Alternaria, and no apparent relation was discovered between presence of Alternaria and discoloration of the seed.

ERGOT (Claviceps purpurea) affected 1-2% of the plants in a field of Colsess barley at Armstrong, B.C.; 3-5% of the plants in a fallow field of Prospect barley and a lesser amount in an irrigated field at Swift Current, Sask.; a trace at Moose Jaw and in plots at Prud'homme; Sphacelia stage on Colsess barley received from Glen Bain; slight infection in plots at Winnipeg, Man.; one head in plots at Fredericton, N.B.; trace in 4 fields in Kings Co., P.E.I.

POWDERY MILDEW (Erysiphe graminis) was moderate on Colsess barley at Armstrong, B.C., and a trace on Olli at Vernon; 50-75% infection on lower leaves at Lorette, Man., with lesser amounts at Tyndall and Ste. Annes; general in Que. in August, 3.49% of leaf surface affected in the fields surveyed in 1941, compared to 5.28% in 1940; infection trace to moderate in plots at Ste. Anne de la Pocatiere; slight to moderate infection in 25 fields examined in P.E.I.

HEAD BLIGHT (chiefly Fusarium spp.). A trace was observed at Swift Current, Sask.; a few infected kernels in almost every head at McCreary, Man. (F. Poae and Alternaria sp.); out of 15 fields in N.B., traces were found in 3 located at Drummond (F. Poae), The Barony (F. Poae) and Lower Millstream (F. Poae, F. avenaceum and Epicoccum purpurascens). The fungi recorded were isolated and determined by Dr. W.L. Gordon.

STRIPE (Helminthosporium gramineum). A trace was found in 2 fields in Alta., and a slight infection in the plots at Edmonton; severe in a field at Oxbow, Sask.

SPOT BLOTCH (Helminthosporium sativum). A trace was recorded in 8 fields, slight infection in 4 and moderate in 1 out of 31 examined in Alta.; moderate infection at McCreary, Man.

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). A trace was reported in 6 fields and a slight infection in 13 out of 31

examined in Alta.; present in all 10 fields examined in Sask., causing moderate damage. Root rot (Fusarium spp.) was prevalent at Lennoxville, Que. About 50 to 60% of the area in small plots and 20% of a large field were rendered worthless. The disease was conspicuous because of the abrupt demarkation of the affected areas. Apparently local soil conditions exerted a predisposing influence. (F.S. Thatcher)

NET BLOTCH (Helminthosporium teres). A trace was present in 5 fields and slight infection in 4 out of 31 examined in Alta., with a trace also present in the plots at Edmonton; moderate infection in a field near Sutherland, Sask.; infection general in the Red River Valley, Man., the interlake area and the Portage plains, but elsewhere scattered, with severity usually slight, but occasionally severe; 1.62% of the leaf area affected in the fields examined in Que. in 1941 compared to 2.26% in 1940; trace to severe in the variety plots at Ste. Anne de la Pocatiere; 15-85% infection in the plots at Lennoxville, being most severe on Byng; infection usually slight in N.B.; apparently uncommon this year in P.E.I., traces being observed in 2 fields in Queens Co.

LEAF RUST (Puccinia anomala) was found in several fields in Man.- in most, infection was a trace, but in a few fields it averaged 5%. Leaf rust affected 0.07% of the leaf surface in fields examined in Que. in 1941 compared to 0.22% in 1940 (I.H. Crowell and D. Leblond); a trace recorded in one field in N.B.; 2% infection found in rod rows at Charlottetown, P.E.I.

STEM RUST (Puccinia graminis). A trace was found in 3 fields in Alta. and a slight to moderate infection in late-maturing plots at Edmonton. A trace was present in southern Sask. during July, and it was severe at Indian Head on late sown varieties on Aug. 12.

Experiments conducted in Man. in 1940 show that a stem rust infection of 25% severity reduced the yield by 15% and the amount of "heavy grade" barley, the type required for malting, by the same percentage and caused a reduction of quality of one grade. In past years, an infection of this severity has been frequently regarded as of little significance. (see also under Wheat Stem Rust)

The percentage of stem area affected by stem rust in the fields examined in Que. was 0.13%; a trace to a light infection occurred on most varieties at Ste. Anne de la Pocatiere. Traces of stem rust were present on all varieties except Olli, which was already ripe, at Fredericton, N.B. on Aug. 5. Stem rust was virtually absent in P.E.I., but traces to 10% were present in most fields still standing on Oct. 12. (R.R. Hurst)

SCALD (Rhynchosporium Secalis) was severe on Olli, and Olli hybrids at Sidney, B.C. in June (W. Jones). A trace was found in 4 fields, slight infection in 11 out of 31 examined in Alta.; it was slight in the plots at Edmonton and Lacombe and severe on several varieties at Warburg.

COVERED SMUT (Ustilago Hordei). About 5% developed in a field of Olli in the interior of B.C., although the seed had been treated with Ceresan; a trace was also noted in 2 other fields (G.E. Woolliams); present in 10 out of 31 fields examined in Alta., average infection 1.6%, highest, 25% in a field at Innisfail. Out of 63 samples of foundation, etc., seed from the 1940 crop in

Sask., 27 carried a light load of spores; present in 24 out of 53 fields examined in Man., with average infection 1.2%, highest 19%, at Franklin. Covered smut was present in all varieties at Lennoxville, Que.; the highest infections were 4% in O.A.C. 21, 12% in Charlottetown x Velvet 14-2-2, and 15% in Byng x Lennoxville Hulless 9-4 (F.S. Thatcher). A trace occurred in one field and 1% in another out of 15 examined in N.B.

LOOSE SMUT (Ustilago nuda). A 1% infection was noticed in Colsess at Armstrong, B.C. with lesser amounts in 2 other fields; loose smut was severe in a field at Wayne, Alta., while traces were present in 2 other fields; slight infection on Sanalta at Lethbridge, trace at Lacombe, slight infection at Edmonton; infection less than 1% in 2 fields out of 11 examined in Sask.; recorded in 8 fields in Man. - usual infection a trace, heaviest 10%; trace to 5% in 4 out of 14 fields in N.B.; 5% recorded at Great Village, N.S.; 2% infection noted in head rows at Charlottetown, P.E.I. on July 21. (B. McLaren)

FALSE STRIPE (non-parasitic) was general on Trebi in the plots at Agassiz and Sidney, B.C. (W. Jones)

TIP STERILITY (non-parasitic) affected 2% of the heads in a field near Montague, P.E.I. The trouble has not been noticed previously, and may have been due to the very wet and cool summer this year. (R.R. Hurst)

RYE

ERGOT (Claviceps purpurea). A trace of infection was found in one field in Alta. and in the plots at Lacombe; a trace was present at Battleford and Swift Current, Sask., and 0.5 to 1% infection on Prolific Spring at Indian Head; a trace to moderate infection was present in all 12 fields examined in Man.; less than 1% of the heads were affected in fields examined in Queens and Prince Counties, P.E.I.

BACTERIAL BLIGHT (Phytomonas translucens f. sp. undulosa) caused slight damage in one field out of 5 examined in Man. It should be noted that the pathogen was f. sp. undulosa, not f. sp. secalis. (W.A.F. Hagborg)

STEM RUST (Puccinia graminis) slightly infected rye at Winnipeg, Man.; traces were present on a few varieties at Fredericton, N.B.

LEAF RUST (Puccinia secalina). A trace was found in the plots at Edmonton and Lacombe, Alta.; slight infections were recorded at 4 points in Man.; traces were present on most varieties in the plots at Fredericton, N.B.; traces were also present in Queens Co., P.E.I.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta). Diseased specimens were collected at Edgewater, B.C. in July (W.R. Foster and I.L. Conners). Stem infection was slight to moderate in 9 out of 99 fields examined in southern Alta. in July. In 4 other fields, slight leaf infection was found. Slight to moderate leaf and stem infection was present in the plots at Edmonton, Lacombe, and Lethbridge, while a moderate infection only on Ladak occurred at Beaverlodge (M.W. Cormack). Black stem was common and doing some damage at Indian Head, Sask., on July 14.

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.) damage was found only in the Athabasca and Edmonton districts, where it occurred in 12 out of 27 fields examined. Severe damage by C. Ehrenbergi occurred in a field at Tawatinaw in early June. In the other fields damage was a trace in 4 fields and slight in 7. (M.W. Cormack)

DOWNY MILDEW (Peronospora aestivalis) was moderate on Lytton and slight on Baltic at Agassiz, B.C., while it was slight on Maesal at Sidney. Downy mildew was general on Grimm, Lytton and Ontario Variegated through the dry interior of B.C.; it was most prevalent in the north Okanagan and about Lytton, while it was found to a slight extent at Kelowna, Summerland and Grand Forks. The continuous wet weather during the spring months was probably responsible for its widespread occurrence. The infection was heaviest on the first crop, but the disease was observed on the young leaves of new growth following the first cutting (G.E. Woolliams). A trace to slight infection was general on young plants of all varieties at Edmonton in early September, and it was severe on a few scattered plants. (M.W. Cormack)

BACTERIAL WILT (Phytomonas insidiosa). Besides its occurrence in the fields of Grimm alfalfa at the Station, Summerland, B.C., bacterial wilt was found this year at Vernon and Grand Forks and diseased material was received from Trail. The organism was isolated, its identity and pathogenicity established. From these experiments it also appears that diseased plants are likely to succumb during the winter. Ladak appears to be more resistant than Grimm, Lytton (probably a strain of Grimm), or any other commercial variety available, and its cultivation is accordingly being recommended as a means of control of bacterial wilt. (G.E. Woolliams)

Bacterial wilt was found in 72 out of 74 stands of alfalfa, 3 years old or older, examined in the irrigated districts of southern Alta. The estimated mortality for 1941 was as follows: Trace in 23 fields, 1-2% in 32, 5% in 11 and 10% in 6. In the fields previously examined there was generally less damage than in 1940. Two 3-year-old fields, which were apparently free from damage had not been irrigated since the year of seeding and were very dry. No damage was found in 25 young stands, but the early stages of the disease were noted in several. Nearly all the old stands, which previously suffered severe damage, have been ploughed up. If increased damage in the younger stands is a reliable criterion, marked spread of infection was confined to the Lethbridge district. At the Lethbridge Station wilt was found in nearly all the plots and 5-10% of the plants were being killed in one old stand. (M.W. Cormack)

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii) was severe in an isolated field of Lytton at Half-Way House, Lytton, B.C.; not observed elsewhere (G.E. Woolliams). A slight to moderate infection was found in 3 fields in Alta., and in the plots at Edmonton.

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was general on Vancouver Island and the lower mainland, B.C. The disease was rather severe on the older foliage in crops of Grimm, uncut for hay in the Salmon Arm district. Infection was slight in 10 fields in Alta. and moderate in 3. In the plots, a trace was present at Beaverlodge, slight infection at Edmonton and Lacombe, slight to moderate at Lethbridge except on Orestan, which was severely infected. Common leaf spot was absent on the first crop at Ste. Anne de la Pocatiere, and Beaumont, Que., but it caused some defoliation of the lower leaves on the second (R.O. Lachance). Infection varied from a trace to severe in the 20 fields examined in P.E.I., with average infection slight (R.R. Hurst)

CROWN and ROOT ROT (A low-temperature Basidiomycete). Early spring killing of alfalfa caused by this pathogen (Phytopathology 31:1058-1059. 1941) was particularly severe in the seed growing areas of northern Alta. in 1941. The estimated damage by fields is given for the different districts in Table 2.

Table 2. Estimated damage caused by crown and root rot in alfalfa fields examined in central and northern Alta. in May, 1941.

District	Fields examined	Fields arranged according to estimated damage				
		None	Trace	Slight	Moderate	Severe
Cherhill-Sangudo	36	2	2	6	8	18
Barrhead-Westlock	14	2	4	5	3	
Edmonton-Lacombe	16	6	6	2	2	
Total fields	66	10	12	13	13	18

The damage was usually most severe in fairly young stands about 3 to 4 years old. In the Cherhill-Sangudo district, on grey wooded and transition soils, about 50% killing was found in 6 fields, and over 25% in 12 others. Much less damage occurred in the other districts on black soil. Severe killing was found previously, however, on black soil in the Lacombe district. (M.W. Cormack)

WITCHES' BROOM (virus?). A few plants were moderately affected in 3 fields at Cherhill, Alta. In a plot at Edmonton the disease had increased until about 5% of the plants were dead or severely damaged. (M.W. Comack)

POTASH DEFICIENCY was general in 2 fields in Queens Co., P.E.I. Small chlorotic islands were present in the leaves; these tended to coalesce along the leaf margin. (R.R. Hurst)

COMMON CLOVER

SOOTY BLOTCH (Cymadothea Trifolii) was general and moderately affected the lower leaves of red clover on the lower mainland and Vancouver Island, B.C. (W. Jones). Infection was a trace to moderate on red clover in P.E.I. (Bruce McLaren)

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.) caused slight damage to red clover and moderate damage to white clover in the plots at Lacombe, Alta. (M.W. Cornack)

POWDERY MILDEW (Erysiphe Polygoni). Infection was moderate on alsike clover at Brooks, Alta., and was a trace to severe on red clover in the plots at Edmonton. Powdery mildew was generally slight in P.E.I. on red clover. (R.R. Hurst)

COMMON LEAF SPOT (Pseudopeziza Trifolii) was collected on red clover at Agassiz, B.C. in June, 1940 (W. Jones and I.L. Conners). Infection was heavy in 15 fields under observation in Queens and Prince Counties, P.E.I. (Bruce McLaren)

STAGONOSPORA LEAF SPOT (S. recedens) was moderate to severe on red clover in the plots at Agassiz, B.C. on May 30, 1941. This is a new record for B.C. (W. Jones and I.L. Conners)

RUST (Uromyces Trifolii) was severe on leaves and stems on alsike clover in the plots at Sidney, B.C. (W. Jones). Aecia were abundant on white clover in the Winnipeg area, Man. by May 24 (A.M. Brown). Rust in varying amounts was widespread in P.E.I. (R.R. Hurst)

POTASH DEFICIENCY was heavy in patches covering 15% of the area of one field in Queens Co., P.E.I. (R.R. Hurst)

SWEET CLOVER

STEM CANKER (Ascochyta caulicola). A slight to moderate infection was found in 2 out of 15 fields in Alta. Scattered plants were killed at Brandon, Man. The organism was identified by W.J. Cherewick. This is the first time this organism was definitely identified with the disease in Man. (W.L. Gordon)

BLACK STEM (Ascochyta lethalis). A moderate infection was found in one field at Edmonton, Alta., out of 15 examined.

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.). Damage was slight in 1 field and moderate in 2 at Athabasca, Alta. It was a trace to slight on all varieties at Lacombe and Lethbridge. (M.W. Cormack)

ROOT ROT (Fusarium spp.) caused slight damage at Saskatoon, Sask. About 10% of the plants were affected in small second-year plots at Kentville, N.S.

STAGONOSPORA LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). A trace of leaf infection was found in 4 fields in Alta. and in the plots at Edmonton and Lacombe. Mature perithecia of L. pratensis were found for the first time on overwintered material at Edmonton. (M.W. Cormack)

PHYTOPHTHORA ROOT ROT (P. Cactorum). The damage ranged from 1 to 5% in 5 fields examined in southern Alta. There was also, in general, a trace to slight mortality in roadside stands. (M.W. Cormack)

LEAF SPOT (Pseudopeziza Meliloti). A moderate infection was found on a few plants of Melilotus alba at Countess, Alta.; this disease has not been previously reported on sweet clover in Alta. (M.W. Cormack)

ROOT ROT (Rhizoctonia Solani) was recorded in Man. from 3 fields; infection was a trace at Neepewa and slight at Brandon and Pipestone. Rhizoctonia Solani was isolated from all collections and considered to be the causal organism. (W.J. Cherewick)

WITCHES' BROOM (virus). A trace to 0.5% of the plants were affected in foundation stock of Pioneer sweet clover at Wembley, Alta. (W.C. Broadfoot)

BUCKWHEAT

YELLOWS (Callistephus virus 1) causing a severe sterility in buckwheat was common in York, Queens, Sumbury and Westmorland Counties, N.B. In the experimental plots, infection ranged from 2 to 8% in the rough Fagopyron tataricum varieties and a trace to 1% in the smooth F. esculentum varieties. In the test plot at the Laboratory, the winged buckwheat, F. emarginatum, remained free from infection. The virus was transmitted to China aster by means of the leafhopper, Macrosteles divisus, and was identified as Callistephus Virus 1.

In N.B., Fagropyron tataricum is grown to the virtual exclusion of F. esculentum. Two small fields only of the latter were noticed in 1941. It is believed that F. esculentum is not popular because it fails to ripen satisfactorily under N.B. conditions. On the other hand, four fields of buckwheat examined near Napanee, Ont., were all F. esculentum and yellows was found in only one field, in reality only a small garden plot. (D.J. MacLeod)

CORN

EAR ROTS. In late September a survey was made of the incidence of disease in corn in the areas producing grain corn in southwestern Ont. Ear and cob rots, with which Diplodia Zeae, Fusarium moniliforme, Gibberella Saubinetii, Nigrospora sphaerica and Penicillium spp. were associated, were found occasionally, but were of negligible importance. A second survey, during the first week in November, was made of husked corn in the field and crib in Essex Co. The results were as follows: Nigrospora ear rot, trace

to 6%; Diplodia, trace to 2%; F. moniliforme, trace to 1%; and G. Saubinetii, trace. Ears of hybrid corn seemed as easily infected by Diplodia Zeae and Nigrospora sphaerica as those of open-pollinated varieties. There was some indication also that ear rots were more severe in plantings of corn on the lighter soils (A.A. Hildebrand). During seed inspection in September in the dry interior districts of B.C. some affected ears (F. moniliforme) were present in nearly every planting, but the extent of the disease on the individual ears differed widely. Rhizopus sp. also occurred, but much less frequently. (G.E. Woolliams)

STALK ROT. The September survey in western Ont. revealed a trace of infection in a few fields. However, in one of Late Golden Glow in Essex Co., 12% of the stalks were affected presumably by Nigrospora sphaerica. This was the only case, where the disease had any economic significance. (A.A. Hildebrand)

RUST (Puccinia Sorghi). A trace was observed in 2 fields at Estevan, Sask, and Balmoral, Man., while a trace to a moderate infection occurred at Winnipeg. It was less commonly observed in Man. than in former years. In south-western Ont., infection was general and varied from a trace to severe according to location and variety. In general, infection apparently took place so late in the season that little or no damage resulted. Traces were recorded in Queens Co., P.E.I.

ROOT ROT (Pythium ultimum) very lightly infected corn at Saskatoon, Sask. Although P. ultimum was isolated, it is probably only slightly pathogenic to corn. Under field conditions in Sask., corn does not appear to be as susceptible to Pythium root rots as it is in the United States. (T.C. Vanterpool).

SMUT (Ustilago Zeae) was recorded as follows: Trace at Swift Current and Estevan, Sask.; trace to moderate on various varieties at Winnipeg, Morden, Brandon and Rossendale, Man.; in general light in southwestern Ont., but in a few fields heavier infection of the lower stalk was clearly correlated with early injury due to careless cultivation; occurred everywhere in Quebec, but rate of infection low; a trace at Summerside, P.E.I.

Fusarium moniliforme Sheldon var. subglutinans Wr. & Rg. was isolated from dead larvae of the corn borer, Pyraustia nubilalis, received from Dr. G.M. Stirrett, Dominion Entomological Laboratory, Chatham, Ont. The fungus has been recorded in Germany on the larvae of the corn borer. Although it is commonly found on corn in various parts of the world (Wollenweber & Reinking, Die Fusarien p. 100, 1935), this constitutes the first record of its association with corn in Canada. (W.L. Gordon)

FLAX

WILT (Fusarium Lini). Fusarium and some Rhizoctonia developed on specimens received from Edgeworth, Sask.; about 10% of the plants were affected in a field at Viscount. A new flax-wilt nursery was started by the Field Husbandry Dept. at Saskatoon in 1940. Soil from the old nursery was scattered over the new one and worked in. No wilt developed in 1940. This

year, wilt was generally distributed and moderately severe throughout the nursery. (T.C. Vanterpool) Wilt was recorded in Man.: Neepewa, trace in patches; Scarth, 20% of plants in patches. The organism (F. oxysporum f. Lini) was isolated from The Scarth specimens by W.E. Sackston (W.L. Gordon). Wilt was fairly prevalent in the plots of the Fibre Flax Division at Ottawa. Results of isolations by W.L. Gordon were reported as follows: About 30% of the plants were affected with F. oxysporum probably f. Lini; besides there was a trace of Rhizoctonia and a good deal of Alternaria; the plants had all the earmarks of flax wilt. Some wilt was also present in fields of fibre flax in Quebec. (I.L. Conners)

RUST (Melampsora Lini). A slight infection was seen in a field at Ladner, B.C. (J.W. Butler). Infection was a trace in a field at Edberg, Alta., and moderate to severe in the plots at Lethbridge. Specimens received from Regina and places further south in Sask. indicate that rust was fairly prevalent. It was severe on some new crosses at Indian Head and slight to moderate on Redwing and Bison. Rust was found in 16 out of 19 fields examined in Man. and the average damage was slight; it was more commonly observed than in previous years.

BROWNING (Polyspora Lini). A trace was found in a field at Wembley, Alta., and in the plots at Beaverlodge. A trace of browning was found at Saskatoon, Sask.; in general, breaking over of flax above ground level was found only occasionally in Sask. in contrast to a breaking over at ground level, probably the result of late heat canker (q.v.) which was common, conspicuous and serious. (T.C. Vanterpool)

SEEDLING BLIGHT. A scattered infection of damping-off and early seedling blight was observed at Saskatoon, Sask. Isolations yielded fungi in the following proportions: Rhizoctonia, 15; Fusarium, 2; Alternaria, 1; no growth, 4. (T.C. Vanterpool)

HEAT CANKER (non-parasitic). A form heat or drought injury was very prevalent this year in all varieties of flax in Sask. Samples were received from many points in the province, including Rockglen in the extreme south. It was common at Saskatoon and was reported to have been severe in the Scott district, causing heavy losses in some fields, particularly of Bison.

The trouble, as it appears in Western Canada, occurs somewhat later than the canker described by C.S. Reddy and W.E. Brentzel (U.S.D.A. Bull. 1120. 1922. The stems are girdled at the soil line, but lack conspicuous cankers. As the injured plants are broken over by the first strong wind, the break is rather clean. (P.M. Simmonds and T.C. Vanterpool)

MANGEL

LEAF SPOT (Cercospora beticola) was general on the leaves with occasional spots on the stem and few on the inflorescence in a large acreage of Prince and Yellow Intermediate being grown for seed in Middlesex Co., Ont.; the damage was slight (J.K. Richardson). A slight infection was observed in 12 out of 21 fields of seed mangels in P.E.I. (R.R. Hurst)

LEAF SPOT (Phoma Betae) was prevalent on the leaves of seed mother plants in the northern Okanagan, B.C., affecting 90% of the leaves. The disease was not found on young steckling plants being grown for the 1942 seed crop. Its general prevalence was no doubt due to a continuous rainy period, which lasted 6 weeks or more (G.E. Woolliams). Infection was trace to moderate in one field in Queens Co., P.E.I.

CROWN GALL (Phytomonas tumefaciens). A few plants, severely affected, were found in one field in Queens Co., P.E.I. (R.R. Hurst)

LEAF SPOT (Ramularia beticola) was general and caused considerable damage in 2 seed crops of Long Red at Dewdney, B.C. (W. Jones)

CRINKLE (virus). A trace was found in 3 fields in York and Sunbury Counties, N.B. The affected plants were severely dwarfed. (D.J. MacLeod)

CURLY TOP (virus). Only a few affected plants were observed in seed crops in the northern and central Okanagan districts, B.C. (G.E. Woolliams)

MOSAIC (virus). A trace of mosaic (Beta Virus 1) was found in 2 fields in York Co., N.B. The mottle was very marked and the plants were dwarfed (D.J. MacLeod). Traces were observed in 5 fields of elite seed stock out of 21 examined in P.E.I. (R.R. Hurst)

YELLOWS (virus). Traces were present in 5 out of 21 fields examined in P.E.I. (R.R. Hurst)

FASCIATION (cause unknown) affected 2% of the plants in a seed plot near Maugerville, N.B. In some plants, the entire stem was flattened and was from 2 to 3½ in. in width, suggesting the fusion of several branches (D.J. MacLeod). Several plants were affected in 7 fields out of 21 examined in P.E.I. (R.R. Hurst)

HEART and CROWN ROT (boron deficiency) was found in 11 out of 21 fields of elite seed stock examined; percentage of infected plants ranged from a trace to 15%. (R.R. Hurst)

MILLET

SMUT (Sphacelotheca Panici-milacei). A slight infection was present in the plots of proso millet at Edmonton, Alta.

SOY BEAN

DOWNY MILDEW (Peronospora manshurica). Scattered infected plants were noted in the plots and general planting at the Station, Harrow, Ont.; damage was very slight (A.A. Hildebrand). A slight infection was found on Pagoda at the Farm, Nappan, N.S. (J.F. Hockey) Downy mildew has not been previously reported in Canada outside of Harrow.

BACTERIAL BLIGHT (Phytomonas glycinea). In the varietal and test plots and in the general plantings (at Harrow, Ont.), infection was general and ranged from slight to moderate. It was estimated that 95% of pods were affected in a field of Early Black Eye at St. Jean Chrysostome, Que. and 13.5% in another at the Station, L'Assomption; both were foundation stock grown from seed originating at Ottawa (R.O. Lachance). Three-quarters of the plants showed 50-100% foliage infection in a plot of Pagoda at the Farm, Nappan, N.S. on Aug. 23, and some pod infection later; Manitoba was less seriously affected. (J.F. Hockey)

MOSAIC (virus). Infection ranged from slight to moderate in the plots and general plantings at the Station, Harrow, Ont. (A.A. Hildebrand). An occasional plant of Pagoda was affected at Nappan, N.S.

SUGAR BEET

LEAF SPOT (Cercospora beticola) was present in 2 fields on Vancouver Island causing severe damage in one (W. Jones). As a result of periodic surveys of sugar beets in southwestern Ont. during the current season, it was established that, although leaf blight was general, it did not cause severe damage since infection of plants was delayed until relatively late in the season due to unfavourable environmental conditions. (A.A. Hildebrand)

LEAF SPOT (Phoma Betae) was found occasionally on the lower leaves on sugar beets on the lower mainland and on Vancouver Island, B.C. (W. Jones). A slight infection was recorded at Winnipeg, Man. In southwestern Ont., Phoma leaf spot was noted in the early part of the season on the foliage of beets being grown for seed in several different areas. Most of the infection was on the older leaves or on those of plants obviously lacking vigour. In a significant number of cases, however, young leaves near the tip of the seed plants were infected thereby affording a potential source of inoculum in close proximity to flower clusters in an early stage of their development. (A.A. Hildebrand)

CROWN GALL (Phytomonas tumefaciens). Only a few affected plants were seen in southwestern Ont. throughout the whole season; the disease was not of economic significance. (A.A. Hildebrand)

LEAF SPOT (Ramularia beticola). All 6 varieties (q.v. under rust) were moderately affected in the plots at Sidney, B.C., on April 4. It occurred generally on the lower mainland and on Vancouver Island on leaves and stems; it caused considerable damage to the foliage. (W. Jones)

RHIZOCTONIA ROT caused appreciable loss both in seed-producing plants and in commercial plantings in southwestern Ont. In seed plants, the injury usually appeared as a rotting of the base of the stem and crown of the steckling. In commercial plantings, the rot was first noted in early July on half-grown beets in several fields. When piles of harvested beets were examined in November, in those from one field, infection was exceptionally high, reaching 25%. (A.A. Hildebrand)

LEAF SPOT (Septoria Betae). All 6 varieties were slightly affected in the plots at Sidney, B.C., on April 4. (W. Jones)

RUST (Uromyces Betae) was found in January and throughout the season in the southern end of Vancouver Island. Although the disease was checked to some extent during the summer season, it caused considerable damage to the foliage. It was found for the first time on the lower mainland, where a slight infection was present in one field. Infection was slight on U.S. 33, U.S. 33 Special, and Danish on April 4 at Sidney, while it was moderate to severe on U.S. 12, Italian and Hungarian. The seed was sown the last week of June, 1940. (W. Jones)

CURLY TOP (virus). A slight infection was found in seed mother plants at Kelowna, B.C. (G.E. Woolliams)

SAVOY (virus), which is transmitted by the pigweed bug, Piesma cinerea, is reported for the first time in Ont. In most plantings examined this year in southwestern Ont., only a trace of the disease was found, but in fields in one particular district, infection ran as high as 6.5%. Circumstantial evidence suggests that weeds growing in close proximity to the fields were infected with the virus, which was transmitted to the beets following the invasion of the beet rows by viruliferous insects. (A.A. Hildebrand). See Hildebrand and L.W. Koch, Phytopath 32:328-331. 1942.

VIRUS-LIKE DISEASES. In the course of the surveys in southwestern Ont., some hundreds of plants exhibiting symptoms suggestive of diseases of the virus type were observed and have been marked for special observation. The affected plants were later harvested and "pitted" and after a period of dormancy are to be transferred to the greenhouse for further study. (A.A. Hildebrand)

BLACK ROOT (cause undetermined). Because of relatively dry weather in April and early May in southwestern Ont., it was possible to prepare the beet seed beds very thoroughly in 1941, and the crop was sown under more favourable soil conditions than for several years previously. With weather conditions continuing favourable, excellent early stands of seedlings were obtained. Commencing May 27, however, black root suddenly appeared over a great area and for a few days mortality of seedlings was extremely high. Although only a low percentage of the total acreage of some 30,000 acres sown to beets this year had to be abandoned, the effect of the disease was noted throughout the season in many fields, and was reflected in a marked reduction in yield.

It has been commonly held that incidence of black root is more severe in years of wet, cold springs. The fallacy of this belief was clearly indicated this year, since, as pointed out above, the beets were sown under more favorable conditions than have obtained for years. Obviously there is need for careful research to determine just what factors are associated with the incidence of the disease. (A.A. Hildebrand)

RAT TAIL (cause undetermined). A few affected plants were noted in southwestern Ont. (A.A. Hildebrand)

SUNFLOWER

RUST (Puccinia Helianthi). A moderate infection was recorded at Solsgirth, Man. Rust was very heavy in the plots at Ottawa, Ont., on a number of selfed lines of branched-type sunflower, which have been selfed for upwards of 20 years. Two lines died at flowering time and failed to set seed. Most of the earlier maturing lines matured seed, but the leaves died prematurely. (E.J. Doyle and I.L. Conners)

WILT (Sclerotinia sclerotiorum) was very prevalent in the rotations at the Station, Lacombe, Alta. It was most severe in the continuous sunflower plot (fertilized) where 75% of the plants were dying and nearly all the rest were infected. (G.B. Sanford)

CULTIVATED GRASSES

AWNLESS BROME GRASS (Bromus inermis)

Ergot (Claviceps purpurea). A trace was found in 2 fields near Edmonton, Alta. A trace was present in the experimental plots at Saskatoon, Sask. A trace was noted on cultivated awnless brome grass, on Agropyron repens, A. Smithii, Calamagrostis sp. and Elymus curvatus at Winnipeg, Man.

Leaf Blotch (Helminthosporium Bromi). A trace was found in 2 fields in Alta. A severe infection was general throughout the Arborg district, Man. in mid-June; some fields were ruined by the disease. (W.J. Cherewick and J.E. Machacek)

Bacterial Leaf Spot (Phytomonas coronafaciens var. atropurpurea). A slight infection was observed in the experimental plots at Saskatoon, Sask.; it is probably the same as the disease reported from Man. and Alta. (P.D.S. 20:26-27). It may have been present for some time. (T.C. Vanterpool)

Root Rot (Pythium arrhenomanes and P. graminicola) See under Browning Root Rot of Wheat. No way of estimating field damage of grasses by Pythium has been worked out. The reduction in dry weight of grasses grown in browning (Pythium-infested) soil as compared with normal soil, frequently amounts to 50% or more. This depression is easily overcome by applying ammonium phosphate to the browning soil. (T.C. Vanterpool)

Leaf Spot (Selenophoma bromigena) was reported as being severe at Winnipeg, Man.

CREEPING RED FESCUE (Festuca rubra)

Black Spot (Phyllachora graminis) was general in the plots at Sidney, B.C. (W. Jones)

CRESTED DOGTAIL (Cynosurus cristatus)

Brown Stripe (Scoletotrichum graminis) was general at the Station, Sidney, B.C.

CRESTED WHEAT GRASS (Agropyron cristatum)

Ergot (Claviceps purpurea). A trace was present on Fairway in the plots at Saskatoon, Sask. (T.C. Vanterpool)

Root Rot (Pythium arrhenomanes and P. aristosporum) See under Browning Root Rot of wheat.

KENTUCKY BLUE GRASS (Poa pratensis)

Rust (Puccinia Poae-sudeticae). A moderate infection was reported from Arborg and Winnipeg, Man.

MEADOW FESCUE (Festuca pratensis)

Rust (Puccinia ?Poae-sudeticae) was general on 3 strains of meadow fescue at Sidney and Agassiz, B.C.; the damage was slight.

ORCHARD GRASS (Dactylis glomerata)

Purple Leaf Spot (Mastigosporium rubricosum) was general on the lower mainland and on Vancouver Island, B.C., and caused slight to moderate damage. (W. Jones)

TIMOTHY (Phleum pratense)

Leaf Spot (Heterosporium Phlei) was reported as follows: General, causing slight damage on the lower mainland and on Vancouver Island, B.C.; slight to moderate infection in the plots at Edmonton, Alta.; slight to moderate damage on native and cultivated timothy in Queens Co., P.E.I.

Stem Rust (Puccinia graminis var. Phlei-pratensis). Infection was moderate in 2 fields and severe in one in Alta.; it ranged from a trace to severe in the plots at Edmonton. A 5% infection was reported from Grand Pre, N.S. Stem rust was general throughout P.E.I.; in the cultivated strains, susceptible lines were heavily attacked. (R.R. Hurst)

Brown Stripe (Scoletotrichum graminis) was general but caused slight damage on the lower mainland and on Vancouver Island, B.C.; a 5% infection was observed at Grand Pre, N.S. (G.W. Hope)

WESTERN RYE GRASS (Agropyron tenerum)

Ergot (Claviceps purpurea). A trace to slight infection was present in the plots at Saskatoon, Sask.; it was more prevalent on this grass than on awnless brome or crested wheat grass. (T.C. Vanterpool)

Leaf Smut (Ustilago striaeformis) was fairly general in the plots at Sidney, B.C. This is the first record of its occurrence in Canada on western rye grass. (W. Jones and I.L. Conners)

BOWLING GREENS

Brown Patch (Rhizoctonia type) was so severe this spring in a green about 8 years old in Saskatoon, Sask. that it was decided to re-seed rather than attempt to patch the green. The disease has been getting worse in the last few years. (T.C. Vanterpool)

LAWNS

Smothering (Physarum cinereum) caused some damage in a lawn about the Laboratory, Fredericton, N.B. Weeds were also attacked. (J.L. Howatt)

Brown Patch (Rhizoctonia Solani) killed the grass in a number of localized areas in a small lawn of Colonial Bent at St. Catharines, Ont. In a second lawn the disease was causing rather extensive dead areas (G.C. Chamberlain). Brown patch caused severe damage to 4 lawns at Charlottetown, P.E.I. It also affected small areas in 2 greens at the Stanhope Golf Course. (R.R. Hurst)

Snow Mould. Mycelial growth of a snow mould was conspicuous at the

edge of melting snow at many spots on the campus of the University of Saskatchewan, Saskatoon, Sask. It was seemingly most common on the north edge of snow banks or on the north side of a terrace. Killing of the grass appeared to be negligible, owing probably to the very rapid melting of the snow followed by a period of relatively warm and bright days. At Saskatoon, this trouble is noticed every spring, but it rarely causes any appreciable damage. A non-sporulating basidiomycete is most commonly isolated. (T.C. Vanterpool)

GOLF GREENS

Snow Mould (Fusarium spp., etc.) caused moderate to severe damage on untreated greens at Edmonton, Alta. (W.C. Broadfoot)

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia Asparagi) was general and severe in a large commercial planting of asparagus supposed to be Mary Washington at Grand Forks, B.C. This is the first time the disease was found in this field, which is several years old (H.R. McLarty). It was also quite general and severe on wild plants at Summerland; severe on a few plants at Indian Head, Sask., and very light at Saskatoon.

BEAN

ANTHRACNOSE (Colletotrichum Lindemuthianum) was general and caused moderate damage in the University plots, Vancouver, B.C. (W. Jones). Infection varied from a trace to severe on the different varieties at Winnipeg, Man.

The disease was less severe than usual in 1941 in the Montreal district and Western Quebec, probably because of the dry season. In 24 fields of Brittle Wax beans grown for seed, 7 were clean, 7 with a trace, 6 with less than 15% of the plants affected and 4 with 15-60% (E. Lavallee). It was also observed in Kamouraska Co. (D. Leblond)

Pencil Pod, the popular variety, was heavily infected in many gardens in P.E.I. In 6 gardens, to my knowledge, the crop was ruined. (R.R. Hurst)

ROOT ROT (Fusarium spp.) Scattered plants were stunted in a plot in the University garden, Winnipeg, Man.; isolations from the basal parts yielded F. Solani and F. oxysporum (W.L. Gordon). Root rot was very severe in beans sown in garden plots at Kentville, N.S.; it was also present in commercial fields, particularly in low or wet soils. (J.F. Hockey)

FOOT ROT. Fusarium oxysporum and Rhizoctonia Solani were readily isolated from a foot rot, which was attacking a single pole bean plant (Phaseolus multiflorus) at Morden, Man. (W.L. Gordon)

HALO BLIGHT (Phytomonas medicaginis var. phaseolicola was general on Black Pencil Pod in the University plots, Vancouver, B.C.; it caused considerable damage (W. Jones). Halo blight was found in several fields of beans being grown for seed located at Lavington, Kelowna, Kamloops and Vernon. Up to 50% of the plants were affected and in one field pod infection was present. (G.E. Woolliams)

BACTERIAL BLIGHTS (Phytomonas medicaginis var. phaseolicola and P. phaseoli) caused moderate to severe damage in several fields at Lethbridge, Alta., and in gardens at Calgary and Edmonton; infection in the varietal plots ranged from a trace to severe at Lethbridge, slight to moderate at Beaverlodge, and a trace at Lacombe. Bacterial blight was general throughout Man. Infections varied from slight to severe, depending upon location, variety, weather conditions, etc. This is the most destructive disease of beans in Man. (W.L. Gordon)

BACTERIAL BLIGHT (Phytomonas phaseoli). A slight infection was observed at Marguerite, B.C. (G.E. Woolliams). Bacterial blight was moderate to severe on Princess of Artois at Indian Head, Sask. All varieties were very free from the disease at the Station, Scott; beans were also very clean about Saskatoon. A trace of infection was present on some varieties of pole beans at Morden, Man. A slight infection only was present in localized areas in 2 five-acre fields of Robust in Ont. A thorough examination of variety plots in Lincoln Co. revealed a definite variation in the amount of disease present, but in no case was damage more than slight. (J.K. Richardson)

Bacterial blight like anthracnose (q.v.) was less prevalent than usual this year in Western Que., although it is the commonest bean disease. In 24 fields of Brittle Wax beans grown for seed, 5 were found free from disease, 6 had traces, 11 less than 10%, and 3 had over 50% of the plants infected (E. Lavallee). In 6 fields of Kidney Wax inspected, infection was 54% in one field, 2% in a second and absent in the other 4 fields; the first field was sown with registered seed, the rest with certified. Of the 20 fields of Michelite inspected, 9 were free; 3 showed trace; 3, 2-11% infection; and 5, 22-38%. In field beans at Ste. Anne de la Pocatiere, blight infection was a trace in Hunter, slight in Michelite and Burbank, moderate in Gohris and severe in Navy. Also, the only disease in the green bean plots was bacterial blight; infection ranged from a trace to 100% (Pencil Pod Black Wax) (R.O. Lachance). A trace to slight infection was found at Cape Bald, Shemogue and Port Elgin, N.B.; plants in this area suffer wind damage. In protected areas both wind damage and disease are less (S.F. Clarkson). Bacterial blight was destructive in one planting in Queens Co., P.E.I.

DAMPING-OFF (Rhizoctonia Solani chiefly) was present on varieties of string beans in gardens at Charlottetown, P.E.I. It was very destructive in one garden at Freetown. (R.R. Hurst)

RUST (Uromyces appendiculatus). A very heavy infection was observed in a commercial planting of Michelite near Chatham, Ont., but rust had developed so late that it had not seriously affected production. The pods were remarkably free from infection of any sort (A.A. Hildebrand). A few specimens of Navy bean with conspicuous pustules on the pods were received from the Farm, Nappan, N.S. (J.F. Hockey). A trace was seen on Pencil Pod in one garden in Queens Co., P.E.I.

MOSAIC (virus) was absent in most fields examined during seed inspection in B.C., and caused little damage; in one field 30% of the plants were infected (G.E. Woolliams). About 10 plants were infected in a home garden in Chambly Co., Que.; the disease was successfully transmitted (E. Lavallee). Mosaic was common in York, Sunbury, Westmorland and Kent Counties, N.B., the damage was slight (D.J. MacLeod). Traces were present in some gardens in Queens Co., P.E.I., but in one all the plants were affected. (R.R. Hurst)

BEET

SCAB (Actinomyces scabies) was common in Rimouski and about Quebec City, Que. (D. Leblond). It affected 10% of the beets in a garden in Queens Co., P.E.I.

LEAF SPOT (Cercospora beticola). Infection was general, but the damage was slight on the lower mainland and on Vancouver Island, B.C. (W. Jones). Infection was very severe on the leaves of seed beets at Rossendale, Man.; elsewhere infection was a trace to slight. In a plot at Vineland Station, Ont., infection was general, but not severe (J.K. Richardson). Leaf spot was very common in virtually every garden in P.E.I. (R.R. Hurst)

DOWNY MILDEW (Peronospora Schachtii) was found on a few plants in 2 seed crops at Milner and Agassiz, B.C. These plants were apparently infected the previous year in the steckling stage. No current season infection was noted on the neighbouring plants. (W. Jones)

LEAF SPOT (Phoma Betae) was fairly general on the lower mainland and Vancouver Island, B.C., but infection was confined to a few of the lower leaves (W. Jones). Infection was general, but not severe on lower leaves of seed plants in the northern Okanagan; a trace on the plots at Lacombe, Alta.; a trace to slight in 6 fields examined in Man.

RUST (Uromyces Betae) was found on 2 crops grown for seed and in gardens in the Sidney area, B.C. (W. Jones)

BROWN HEART (boron deficiency) was found affecting 12% of the beets in a field in Kings Co., P.E.I.; it may be more general than this one record would indicate (R.R. Hurst)

INTERNAL BLACK SPECK (boron deficiency?). A disease corresponding to the description of internal black speck given by J.C. Walker (Phytopathology 29:120-128. 1939) slightly affected garden beets at St. Roch des Aulnaies, Que. Attempts to isolate an organism were unsuccessful. Microscopic examination failed to reveal the presence of mycelium. Anatomical changes were present in the tissues which resemble those observed commonly in boron-deficient plants. (R.O. Lachance)

ROOT ROT (cause unknown) was very severe in 3 seed crops on the lower mainland, B.C., and slight in one on Vancouver Island. (W. Jones)

BROAD BEAN

POD BLIGHT (Alternaria sp.). A trace to a slight infection occurred in Windsor beans at Ile aux Coudres, Que. A species of Alternaria was constantly isolated from the blighted pods. Infection apparently takes place shortly after petal fall, while the pod is still small. (R.O. Lachance)

FOOT ROT. A single plant was affected at Brandon, Man.; isolations yielded Fusarium oxysporum, F. Solani, and F. Scirpi var. acuminatum. (W.L. Gordon)

MOSAIC (virus). A slight infection was observed in a seed crop at Keating and another at Sidney, B.C. (W. Jones). Mosaic was found in nearly all fields being grown for seed in northern Okanagan and Kamloops. Infection ranged from 2 to 40% of the plants; the yield of affected plants was reduced 50%. (G.E. Woolliams)

BROCCOLI

BLACK LEAF SPOT (Alternaria circinans) was general in a row of broccoli being grown for seed at Agassiz, B.C.; the damage was moderate. (W. Jones)

CABBAGE

BLACK LEAF SPOT (Alternaria circinans) occurred mostly on the lower leaves of plants being grown for seed in 5 fields on Vancouver Island, B.C.; the damage was slight. Pod infection has been found occasionally. A stem rot of seedlings caused by A. circinans was present in many flats belonging to Chinese growers about Vancouver. (W. Jones). It was also found on leaves of seed plants at Armstrong, B.C. (G.E. Woolliams)

HEAD ROT (Botrytis cinerea). About 1% of the heads were partially rotted by B. cinerea in one test plot in the University garden, Winnipeg, Man. This is the first record of its occurrence on cabbage in Man. (J.E. Machacek)

SOFT ROT (?Erwinia carotovora) affected the main stem of mother plants of Penn State at Marguerite, B.C., and destroyed 80% of the plants. (G.E. Woolliams)

RING SPOT (Mycosphaerella Brassicae (Fr.) Lindau) caused considerable damage to the foliage of one seed crop at Dewdney, B.C. Plenty of inoculum was present to infect the pods, which had not yet formed. Although the disease has not been previously reported to the survey, it has been noticed on cabbage at the Station, Sidney, B.C., but the fungus was immature. For an account of the disease see J.L. Weimer (J. Agr. Res. 32:97-132. 1926). (W. Jones)

BLACK ROT (Phytomonas campestris) was recorded as causing severe loss to cabbage and cauliflower in many parts of Ont. this year. It was observed also to some extent on turnips (J.E. Howitt). The disease was present to some extent in all plantings of early cabbage and cauliflower observed in Essex Co. (L.W. Koch). Black rot was a conspicuous disease in western Quebec in early September (F.S. Thatcher). The disease affected all 4 cabbages in storage in a home at Charlottetown, P.E.I.

CLUB ROOT (Plasmodiophora Brassicae) was general in truck gardens of Chinese growers in Vancouver and New Westminster districts, B.C. and caused severe damage in some. It is the most serious disease of cabbage in the coastal areas of B.C. (W. Jones). About a dozen fields were found heavily infected in Laval Co., Que., and many more were doubtlessly affected. It is the most serious disease of cabbage in the Montreal district (E. Lavallee). Malformation of the roots was apparently much less than usual, possibly due to the low seasonal moisture (F.S. Thatcher). It was also reported from Montmorency, Quebec and Sherbrooke Counties (D. Leblond). Club root severely affected 2% of the cabbage in a garden at Charlottetown, P.E.I.

DAMPING-OFF and WIRE STEM (Rhizoctonia sp.) was found causing moderate damage at Edmonton, Alta. (A.W. Henry)

MOSAIC (virus). Several plants showing typical mosaic were found in varietal plots in Lincoln Co., Ont. (J.K. Richardson).

BORON DEFICIENCY was common in a market garden at Hulton, Man. This is the first record on cabbage in Man.

CARROT

LEAF SPOT (Cercospora Apii Fres. var. Carotae Pass.). Two fields were heavily infected at Cote St. Michel, Montreal Island, Que. The carrots from one field were harvested, but all rotted in about 10 days. Those from the other were sold in bunches as harvested and no loss was suffered (E. Lavallee and F.S. Thatcher). This disease has not been previously reported in Canada, but a specimen collected Aug. 12, 1935 by Bro. Marie-Anselme at Beauceville, Que. is in the herbarium. (I.L. Conners)

ROOT ROT (Erwinia carotovora) affected 10% of the roots in one seed crop on Vancouver Island, B.C. (W. Jones). It caused losses of roots in nearly every field planted with stecklings for seed in the dry interior. Infection ranged from 10 to over 50%, but usually it was 15-20%. (G.E. Woolliams)

LEAF BLIGHT (Macrosporium Carotae) was general in one seed crop on Vancouver Island, B.C., and in some gardens on the lower mainland. (W. Jones)

BACTERIAL BLIGHT (Phytomonas carotae) was present in 83% of the fields grown for seed in the Okanagan Valley, and in the Grand Forks district, B.C. Infection on the leaves and floral parts affected 10-40% of the plants (G.E. Woolliams). Infection was generally slight, but widespread throughout Man. The causal organism was isolated and its pathogenicity proved. (W.A.F. Hagborg)

ROT (Sclerotinia sclerotiorum) caused a trace of damage in the plots at Lacombe, Alta.

YELLOWS (virus) was widely distributed in Man.; infection was generally slight, but in a plot of seed carrots at least 10% of the plants were severely affected. It affected 5% of the plants in a seed plot at Ste. Clothilde, Que. (F.S. Thatcher). Yellows was widespread in carrots in N.B. Infection ranged from 2 to 25% in 17 fields examined. Tho virus was transmitted using virus-free leafhoppers to healthy China aster and carrots, but it failed to affect Zinnia elegans. It was, therefore, identified as the type strain of Callistephus Virus 1. Carrot is probably not as recent a host in N.B. as might be supposed. Mr. W.W. Hubbard, one time Superintendent of the Station at Fredericton, as well as others, claims to have seen the disease 25 years ago (D.J. MacLeod). A survey in Annapolis and Kings Counties, N.S., showed that yellows affected 3-22% of the plants. The average infection in commercial plantings was less than 5%. It began to show up first in late July. Plantain and fall dandelion were conspicuous hosts during the season (J.F. Hockey). Infection ranged from a trace to 4% in plantings examined in P.E.I. (R.R. Hurst)

CAULIFLOWER

BLACK LEAF SPOT (Alternaria circinans) was found on the curd and leaves of 4 seed crops on the lower mainland and Vancouver Island, B.C. Inoculum was abundant for the infection of the inflorescence. Some 20% of the seedlings were infected in cold frames of one grower in October (W. Jones). Black leaf spot was severe on the flower heads of 30% of the Early Snowball plants in the University gardens, Winnipeg, Man.; a trace occurred on some other varieties. (J.E. Machacek)

SOFT ROT (Erwinia carotovora) was present in 15 seed crops on Vancouver Island and on the lower mainland, B.C.; damage was severe in some. It is the most serious disease occurring in crops grown for seed (W. Jones). A slight infection, evidently following insect injury occurred at Lilooet, B.C. (G.E. Woolliams)

DOWNY MILDEW (Peronospora Brassicae) was general on seedlings in a cold frame at Keatings, B.C., and caused much damage. (W.R. Foster and W. Newton)

BLACK ROT (Phytomonas campestris). A moderate infection was general in a garden at Parkdale, Man., and another at Hulton. This is the first record of its occurrence on cauliflower in Man. (W.L. Gordon). Two fields were found heavily infected in Laval Co., Que. (E. Lavallee)

CLUB ROOT (Plasmodiophora Brassicae) severely affected 1% of the plants in a garden in Queens Co., P.E.I.

WIRE STEM (Rhizoctonia Solani) is a serious disease in hotbeds in Laval Co., Que. Soil disinfection (1 qt. of formalin to 3 gal. water per each 6' x 12' bed) has proved effective where it has been tried in the past two years. (E. Lavallee)

WILT (Sclerotinia sclerotiorum) affected a few plants grown for seed on Lulu Island, B.C. (W. Jones)

BORON DEFICIENCY severely affected all the plants in one garden in Queens Co., P.E.I.; traces and 10% were recorded at two other locations. (R.R. Hurst)

WHIP TAIL (non-parasitic) was reported as causing severe damage on one farm at Todmorden, Ont. (J.E. Howitt)

CELERY

ROOT ROT (Botrytis cinerea) was found on Jan. 14, 1942, affecting half the plants in a case of celery grown in the Holland Marsh, Bradford, Ont. B. cinerea was isolated in every instance. (H.N. Racicot)

EARLY BLIGHT (Cercospora Apii). Slight to severe infections were recorded in the University garden, Winnipeg, Man. The disease was quite general in the Niagara Peninsula, Ont., but it was less destructive than usual. (J.K. Richardson)

SOFT ROT (Erwinia carotovora). Injury from tarnished plant bug was ocmmon in the Montreal district, Que.; soft rot bacteria had added to the loss.

ROOT ROT (Pythium spp.). Many flats of seedlings and transplants were stunted and chlorotic due to a severe necrosis of the roots in a greenhouse in Lincoln Co., Ont. All soil had been thoroughly steamed, but it was proved that infection came through the water supply.

LATE BLIGHT (Septoria Apii-graveolentis) was general on the foliage of celery on the market in Victoria and Vancouver, B.C. (W. Jones). A patchy development of late blight was observed on Utah and less often on Giant Pascal; some plants were severely affected. While the disease was only noted at Kelowna in 1940 (P.D.S. 20:33) and at Armstrong and Penticton in 1941, its general prevalence in 1941 was probably the result of the unusually prolonged rains from late August onward. (G.E. Woolliams). Infection was moderate in a garden at Edmonton, Alta., and in the plots at Beaverlodge. Late blight was reported as severe in 2 gardens in the Winnipeg area, Man. The disease was general but very severe only in unsprayed fields in Laval Co., Que. (E. Lavallee). Late blight rendered several fields unfit for storage. (F.S. Thatcher)

BORON DEFICIENCY. The fields visited in the Montreal district, Que. were largely free from symptoms. Growers seem to be rapidly becoming familiar with the use of boron.

HEART ROT (non-parasitic) was very destructive about Trois Pistoles, Que. (D. Leblond)

CUCUMBER

LEAF SPOT (Alternaria cucumerina) caused moderate damage to the foliage in a field grown for seed at Duncan, B.C. The organism was determined by J.W. Groves (W. Jones)

SCAB (Cladosporium cucumerinum) was reported from Sherbrooke and Montreal, Que.

ANTHRACNOSE (Colletotrichum lagenarium) caused slight damage to several crops under glass in the Olinda area, Ont., in May. (L.W. Koch)

BACTERIAL WILT (Erwinia tracheiphila) was noted twice in Laval Co., Que., but it was not severe (E. Lavallee). Wilt occurred at L'Assomption, Joliette, Soulanges and St. Hyacinthe.

WILT. About 50% of the cucumber plants wilted in a test plot in the University gardens, Winnipeg, Man.; isolations yielded Fusarium oxysporum, F. Solani, F. Scirpi var. acuminatum and F. Equiseti. Wilt was also recorded at Parkdale, but the cause was undetermined. (W.L. Gordon)

ROT KNOT (Heterodera marioni) caused moderate damage in some greenhouses in Essex Co., Ont. Damage occurred only where the soil had not been steamed for one year or more. It resulted in a shortening of the picking period. (L.W. Koch)

MYCOSPHAERELLA WILT (M. citrullina). Several plants were severely affected in a garden at Calgary, Alta. (M.W. Cormack)

STEM and FRUIT ROT (Sclerotinia sclerotiorum) caused severe damage in a greenhouse at Medicine Hat, Alta.

MOSAIC (virus) affected up to 20% of the plants in some plantings at Summerland, B.C.; a slight infection also occurred at Kelowna (G.E. Woolliams). Mosaic caused considerable loss to greenhouse cucumbers at Aldershot, Ont. (J.E. Howitt). It affected about 40% of the plants causing severe dwarfing in a small patch planted also to cucumbers in 1940 in Lincoln Co. (J.K. Richardson). Mosaic was observed in nearly all plantations in the Leamington area. Usually only scattered plants were affected and little of the fruit was distorted. In the spring greenhouse crop, an outbreak occurred in the same area after greenhouse vents were kept open. The damage was severe, as in many houses the picking period was shortened (L.W. Koch). A few diseased plants were seen in a home garden at Longueuil, Que. (E. Lavallee). Two plants were found in a field in Sunbury Co., N.B. The virus was identified as Cucumus Virus 1. (D.J. MacLeod)

EGG PLANT

Wilt (Verticillium Dahliae) was present as usual in Lincoln Co., Ont.; every planting was diseased to some extent and the majority suffered severely. The disease has become so general and losses so severe, that the growth of this crop has been reduced to small isolated plantings. (J.K. Richardson)

HOPS

DOWNY MILDEW (Pseudoperonospora Humuli) was very prevalent on susceptible varieties in early spring in the Fraser Valley, B.C. It was checked somewhat during the dry summer, but infection became fairly general on the cones during the harvesting period as the weather was rainy. In one yard at Sumas, the loss was heavy. The disease was heavy on the recently introduced varieties, Early Primrose, Gold Mine and Non-Such, the latter being fairly resistant. Some infection was also noticed on the resistant Fuggles variety. Spraying with copper fungicides is practised by all growers (W. Jones). On May 19, many basal spikes were found infected in the hop fields at Cazaville and St. Polycarpe, Que. As all the hills were kept scrupulously clean of shoots and runners throughout the season and a copper-lime dust was applied once or twice, the disease caused little damage. The dry season may have also helped in keeping the disease in check. (E. Lavallee)

POWDERY MILDEW (Sphaerotheca Humuli) was likewise prevalent in all the hop fields at Cazaville and St. Polycarpe, Que. from the middle of June onwards. The disease was completely checked where a thorough sulphuring programme of one treatment each week with a power duster was followed. (E. Lavallee)

CHLOROSIS (virus). A slight infection was noted in the Golding and Fuggles varieties in the Fraser Valley, B.C. (W. Jones)

HORSE RADISH

LEAF SPOT (Ramularia Armoraciae) was observed at Rimouski, Que. (D. Leblond)

LETTUCE

DOWNY MILDEW (Bremia Lactucae) was general on plants being grown for seed in the north and central parts of the Okanagan Valley, B.C.; the damage was little more than the destruction of some of the lower leaves (G.E. Woolliams). Downy mildew severely damaged 15% of plants in a greenhouse at Leamington, Ont. (L.W. Koch)

WET ROT (?Erwinia carotovora) affected up to 20% of the plants in the North and Central Okanagan, B.C., especially at Armstrong. Affected plants rot and die before sending out flower shoots. (G.E. Woolliams)

ANTHRACNOSE (Marssonina Panattoniana) was general but caused slight damage in the University garden, Winnipeg, Man. (J. E. Machacek)

DROP (Sclerotinia sclerotiorum) affected 2% of the plants in 3 Chinese truck gardens at North Westminster, B.C. (W. Jones). A number of varieties were moderately affected in the University gardens, Winnipeg, Man. (J.E. Machacek). A trace to slight infection was present at the Station, Ste. Anne de la Pocatiere, Que. (R.O. Lachance)

LEAF SPOT (Septoria Lactucae Pass.) was noted in one field at St. Michel, Island of Montreal. The crop had already been harvested (E. Lavallee and F.S. Thatcher). This disease has not been previously reported to the Survey.

YELLOWS (virus). About 10-15% of the plants were infected in the University garden, Winnipeg, Man. This is the first record on lettuce in Man. (J.E. Machacek). About 4% of the crop was affected at L'Assomption, Que. (F.S. Thatcher)

MELON

LEAF SPOT (Cladosporium cucumerinum) caused moderate damage in the Leamington district, Ont., but less than for several years past, due to its appearance rather late in the season. Soon after harvesting began, however, the disease was present in every plantation. (L.W. Koch)

BACTERIAL WILT (Erwinia tracheiphila). There was considerable wilt throughout Lincoln Co., Ont., particularly in plots which were infected with beetles (J.K. Richardson). Wilt caused slight damage in some plantations in the Leamington area. (L.W. Koch)

WILT (Fusarium sp.). A 3-acre field at Fonthill, Ont., was found severely infected on July 19; it was estimated that the crop will be reduced a third. (J.K. Richardson)

WET ROT (Pythium ?ultimum) was general on Zucca melon in the southern

Okanagan Valley, B.C. and caused a rapid, soft rot of the fruit in all stages of development. (G.E. Woolliams)

CURLY TOP (virus) affected 10% of the plants of Zucca melon growing at the Experimental Station, Summerland, B.C. It caused little injury to the plants. (G.E. Woolliams)

ONION

NECK ROT (Botrytis Allii) was general in the bulb crop in the Okanagan and at Grand Forks, B.C., and caused a heavy loss due to the continuous rain this fall. Some bulbs rotted while still in the field. It was also found to a small extent in mother bulbs being grown for seed (G.E. Woolliams). About 2% of the onions were found affected in a 5-acre planting in Essex Co., Ont., at harvest time (L.W. Koch). Neck rot caused heavy loss in storage in 1940-41 in onions of the Spanish type in Ont. One grower's loss was 80% of his crop from 4 acres or $1300.; bacterial soft rot may also have been a factor in some lots (G.H. Berkeley). There was only a slight infection in the crop in the Niagara Peninsula at harvest time; ideal curing weather prevailed during late September and October (J.K. Richardson). Onions markedly injured by this disease were received this year from Brantford, Markdale and Thedford. (J.E. Howitt)

FUSARIUM BULB ROT (F. oxysporum) was general in the Okanagan Valley, B.C.; it has also recently appeared at Grand Forks. The disease caused losses up to 20% and an average of 2.5%. It is most destructive to the bulb crop, but it also affects the seed mother bulbs (G.E. Woolliams). A patch of infected plants was observed in an acre field at St. Michel, Que. (E. Lavallee)

DOWNY MILDEW (Peronospora Schleideniana) was general and caused slight damage about Sidney, B.C. (W. Jones). Some infection was observed in all plantations of Sweet Spanish in Essex Co., Ont.; the disease appeared a few weeks before harvest, being later than usual, and caused slight damage (L.W. Koch). Downy mildew was severe in a $\frac{1}{4}$-acre field grown for seed in St. John Co., Que.; at least half the crop was destroyed. (E. Lavallee)

SMUT (Urocystis Cepulae) was found in the Winnipeg area, Man., in onions grown for sets, but not in other types. It appeared to be chiefly confined to the East Kildonan district, where onions have been grown on the same land for some time. Greatest infection observed was 1% of the sets. (W.L. Gordon)

OKRA

WILT (Verticillium sp.). In one plantation of okra, a new crop in Norfolk Co., Ont., 75% of the plants were affected by wilt. Plants affected by the same trouble were received from Chatham. (G.H. Berkeley and J.K Richardson)

PARSNIP

LEAF SPOT (Cercosporella Pastinacae) was found in 3 seed crops located at Langley and Duncan, B.C.; it caused moderate damage to the foliage. (W. Jones)

LEAF SPOT (Ramularia Pastinacae) was general in 12 seed crops on the lower mainland and Vancouver Island, B.C. It caused slight to moderate damage affecting both leaves, stems and to some extent the inflorescence. (W. Jones)

ROOT ROT (Sclerotinia sclerotiorum). Damage was severe in a seed crop at Dewdney, B.C., and slight in a second at Langley; some of the roots had apparently been infected in storage (W. Jones). The disease affected 2 or 3 plants of a seed crop at Vernon. (G.E. Woolliams)

PEAS

LEAF and POD SPOT (Ascochyta Pisi). Infection was a trace to slight on most varieties in the plots at Beaverlodge and Lacombe, Alta., and Ste. Anne de la Pocatiere, Que. a little of the disease was present on leaves collected by J.P. Perron from the plots at Cap d'Espoir, in the Gaspe (G.A. Scott). Small amount of this leaf spot was seen in Western Que. (F.S. Thatcher). Infection was heavy on the pods in a planting of Ryders Universal in Queens Co., P.E.I. (R.R. Hurst)

GREY MOULD (Botrytis cinerea) has affected up to 15% of the pods in some fields in Kings Co., N.S. Infection appears to be through the sepals and has penetrated affecting the green seeds. (J.F. Hockey)

POWDERY MILDEW (Erysiphe Polygoni). A severe infection was found at Edmonton, Alta. (A.W. Henry). Infection was general and severe in a field of Tall Telephone in Missisquoi Co., Que. (E. Lavallee). Powdery mildew was fairly heavy in the untreated plots at Cap d'Espoir, while it was somewhat less in the plots sprayed with Bordeaux (J.P. Perron). Diseased specimens were received from Ragueneau (D. Leblond). Infection was generally heavy in Queens Co., P.E.I. and damage severe. In one garden at Cornwall, the entire planting was destroyed. (R.R. Hurst)

ROOT ROT and WILT (Fusarium sp.) was found for the first time in the north Okanagan Valley. At present, it is restricted to a few fields and the damage is slight. The species of Fusarium has not been determined (G.E. Woolliams). A trace was present in the plots at Lacombe, Alta. Root rot was prevalent in field peas in the Nipawin area, Sask.; damage was less than 1% in any field. Scattered plants were affected by a foot rot in a plot in the University gardens, Winnipeg, Man. Isolations from the diseased basal parts yielded F. Solani and F. oxysporum (W.L. Gordon). Root rot affected numerous plantations of a canning company in Essex Co.; localized areas suffered severely in fields not too well drained (L.W. Koch). A slight amount of root rot was observed in Western Que. (F.S. Thatcher). Root rot was generally a trace to light, but occasionally moderate to severe in the plots at Ste. Anne de la Pocatiere. Root rot wiped out a planting of American Wonder in Queens Co., P.E.I. (R.R. Hurst)

DOWNY MILDEW (Peronospora Pisi) was present in all fields examined on the lower mainland and Vancouver Island, B.C. The damage was slight, being usually on the lower leaves, but occasionally on the pods (W. Jones). It was quite general and prevalent in the northern Okanagan district. The disease was

most prevalent on Tall Alderman and Dwarf Telephone (90% of the plants affected) with less on Blue Bantam and Lincoln (60%). (G.E. Woolliams)

LEAF BLOTCH (Septoria Pisi). Infection was severe in Fort Garry, Winnipeg, Man.; a trace to moderate on several varieties in the University garden, and a trace at Brandon. A trace to slight infection was noted in the plots at Ste. Anne de la Pocatiere, Que. Leaf blotch affected 10% of the lower leaves in a planting at Kentville, N.S.

RUST (Uromyces Fabae). A slight infection was present in the University plots, Vancouver, B.C. (W. Jones). It was also observed in Western Que. and Ste. Anne de la Pocatiere, and in Queens Co., P.E.I.

MOSAIC (virus). A small amount was found in some fields of peas grown for seed at Salmon Arm and Lavington, B.C. (G.E. Woolliams). A trace was seen in 2 fields near Nipawin, Sask. Mosaic was present in numerous plantations of a canning company in Essex Co., Ont.; affected plants developed very few mature peas (L.W. Koch). A slight infection was present on most varieties in test plots in Lincoln Co. (J.K. Richardson)

PEPPER

BLACK SPOT (Alternaria sp.). A sample of peppers showing black spots caused by an Alternaria were received from an Ontario point. (J.E. Howitt)

MOSAIC (virus). Infection was general in the Univeristy garden, Winnipeg, Man.; it was severe on some varieties. This is the first record from Man. (J.E. Machacek). In a planting of 1500 plants in Lincoln Co., Ont., one-third were infected with cucumber mosaic. The crop from the diseased plants was almost a total loss (J.K. Richardson). Five plants in a $\frac{1}{4}$-acre field in Sunbury Co., N.B. were affected by mosaic and streak. The virus was identified as Solanum Virus 1, strain L. on standard differentials. (D.J. MacLeod)

POTATO

The Plant Protection Division, Science Service, has supplied tabulations on the extent of the seed potato industry, the acreages of the leading varieties passing inspection, the extent that fields 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 certified seed.

Table 3 - Seed Potato Certification : Number of Fields and Acres Inspected, 1941.

Province	Number of Fields Entered	Number of Fields Passed	Fields Passed %	Number of Acres Entered	Number of Acres Passed	Acres Passed %
P.E.I.	3,812	2,532	66.4	16,912	11,185	66.1
N.S.	501	433	86.4	1,104	960	86.9
N.B.	2,535	1,561	61.6	13,366	8,697	65.1
Que.	1,400	721	51.5	2,787	1,201	43.1
Ont.	688	499	72.5	1,665	1,176	70.6
Man.	126	98	77.8	305	255	83.6
Sask.	115	89	77.4	212	132	62.3
Alta.	117	95	81.2	190	115	60.5
B.C.	519	376	72.4	1,127	684	60.7
TOTAL	9,813	6,404	65.3	37,668	24,405	64.8

Acres Entered		Acres Passed	
1940	48,111	1940	34,094
1941	37,668	1941	24,405
Decrease of 10,443 acres or 21.7%		Decrease of 9,689 acres or 28.4%	

There was a sharp contraction of the acreage of potatoes planted for certification in 1941; in addition, the percentage passing inspection was also reduced. Quite a considerable part of the acreage expansion in the previous four years was wiped out. Mosaic was, as usual, the chief cause of rejection, but leaf roll was a close second, and bacterial ring rot was also an important factor. This was largely due to the large number of rejections for leaf roll in N.B. and for bacterial ring rot in N.B. and Que.

Table 4 - Seed Potato Certification: Acreages Passed by Varieties, 1941.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Green Mountain	3,652	74	3,746	1,090	68	20	62	8,712
Irish Cobbler	6,720	195	281	84	201	182	7	7,670
Katahdin	581	336	3,357	15	538	11	47	4,885
Bliss Triumph	102	242	1,280			6	2	1,632
Netted Gem					2	139	435	576
Chippewa	43	6	8	6	274	9	8	354
Rural New Yorker					72			72
Up-to-Date	5	55					9	69
Houma	64					1		65
Warba		2			15	20	22	59
Early Ohio						55		55
Other Varieties	18	50	25	6	6	59	92	256
TOTAL	11,185	960	8,697	1,201	1,176	502	684	24,405

Table 5 - Seed Potato Certification: Fields Rejected, 1941.

Province	Mosaic	Leaf Roll	Bacterial Ring Rot	Adjacent Diseased Fields	Black Leg	Foreign Varieties	Misc.	Total
P.E.I.	652	263	1	110	107	28	119	1,280
N.S.	22	20		13	2	4	7	68
N.B.	120	469	205	77	7	89	9	974
Que.	123	35	272	121	70	8	50	679
Ont.	11	36	26	31	9	35	41	189
Man.	3	1	3	6	3	4	8	28
Sask.	5		2	3	2		14	26
Alta.	2	9		1	3		7	22
B.C.	31	32		32	1	4	43	143
TOTAL	969	863	509	394	204	172	298	3,409
Rejections as a percentage of fields:								
Entered	9.9	8.8	5.2	4.0	2.1	1.7	3.0	34.7%
Rejected	28.4	25.3	14.9	11.6	6.0	5.1	8.7	100.0%

Table 6 - Seed Potato Certification: Average Percentage of Disease Found in Fields, 1941.

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	.23	.04	.08	.23	.06	.27	.16	.18	.08
Leaf Roll	.84	.62	1.87	.25	.33	.04	.02	.49	.58
Mosaic	1.09	.69	.63	.50	.09	.12	.26	.14	.64
Fields passed (final inspection)									
Black Leg	.07	.01	.05	.06	.03	.09	.01	.01	.01
Leaf Roll	.32	.21	.36	.33	.11	.02	.02	.05	.14
Mosaic	.11	.11	.16	.29	.03	.02	.03	.01	.13

COMMON SCAB (Actinomyces scabies). High percentages of scab were present on smooth-skinned varieties in Alta. on bin inspection. Scab was also prevalent in Sask.; 5 lots could not be graded for certified seed and scab infection average 10% in the other lots inspected so far (J.W. Marritt*). One field near Winnipeg, Man. yielded a crop ungradable for certified seed (J.W. Scannell*). Common scab caused the rejection of 10,000 bushels at bin inspection in southern Ont. (O.W. Lachaine*). In general, scab infection was slight in Que. Deep scab was quite noticeable in Kamouraska Co., where fresh manure was used. The hot dry growing season probably favoured this severe infection. The average tuber infection was 2.5% in 448 bins inspected (B. Baribeau*). In trials at Montreal, Katahdin showed 1-2% scab, Irish Cobbler 10-15%, and Green Mountain all tubers severely attacked (J.E. Jacques). A slight infection was general in N.B. The severity of infection is greater on old ground. In one bin in Carleton Co., a 16% infection was found (C.H. Godwin*). In N.S., 80% of the crops were virtually free from scab; the average tuber infection was 0.5% (W.K. McCulloch*). Common scab was unimportant in in P.E.I., and was far less prevalent than in 1940 (S.G. Peppin*). It was abundant only in a few badly infested areas. (R.R. Hurst).

EARLY BLIGHT (Alternaria Solani) was fairly general and caused some damage in the coastal region of B.C. (W. Jones). It was quite general in the Armstrong district (G.E. Woolliams). A slight infection of early blight was observed in the Quebec district and a moderate infection was reported in the Chicoutimi and Lower St. Lawrence districts on account of the dry season. Early blight was present in the Saint John Valley, N.B. Weather conditions favoured its development. It increased as the season advanced, and hastened the early ripening of late varieties. Early blight was reported in Colchester Co. on July 29 and in Kings Co., N.S., on July 31. Perhaps on account of frequent rains and a cooler growing season, it did not spread rapidly. Irish Cobbler, whose yield is usually reduced by early blight, produced heavy crops. Only 2 cases of Alternaria rot were seen; it averaged 1.5% in 3,000 bushels of Irish Cobbler (W.K. McCulloch). A slight infection was noted on July 19 at Kentville. Except in certain districts such as Scott's Bay, the yield was not affected in Kings Co. (G.W. Hope). A late outbreak caused moderate injury to the plots at Charlottetown, P.E.I. Alternaria rot severely affected 10% of the tubers of Irish Cobbler on Nov. 27, 1940 in a lot in Prince Co. It was later observed in tubers from Queens and Kings Counties, and the first case this year was brought in on Nov. 23. (R.R. Hurst)

ARMILLARIA ROT (A. mellea). A few affected tubers were found in a bin of Green Mountain at Milner, B.C. by H.S. MacLeod*. (W. Jones)

GREY MOULD (Botrytis cinerea). A slight infection was observed on Irish Cobbler in Prince Co., P.E.I. (R.R. Hurst)

RHIZOCTONIA (Corticium Solani (Rhizoctonia Solani). This common disease was widely distributed as usual in Alta.; it evidently caused much loss in yield, both directly and indirectly (G.B. Sanford). Slight injury was observed in the field in Alta., and only traces of the sclerotia were found at tuber inspection, as the crops were dug before they were completely mature. In general, injury was slight in the growing crop in Sask.; but two fields were severely affected. A moderate development of sclerotia was found on bin inspection.

*District Potato Inspectors in their respective provinces.

One lot was too severely affected to be graded for certification. Sclerotial development was very heavy in Man.; wet weather delayed digging 3-4 weeks. Rhizoctonia was less prevalent than usual in Que.; it caused slight damage in the field and average tuber infection was 2.4% in 448 bins inspected. Rhizoctonia was present to some extent in every field in N.B. It was more prevalent in Bliss Triumph than in other varieties, and a few rough, knobby tubers were formed instead of a large number of small ones. This behaviour is more noticeable in fields planted on old potato ground or where potatoes are being grown a second year in succession. Rhizoctonia was reported in N.S. in 40% of the fields of Irish Cobbler, 25% of Bliss Triumph, and 30% of Katahdin, but infection was usually slight. It was first seen on July 16, and was not common until August 8. Maximum tuber infection was 50%, the average, 4%. Crops following winter rye were remarkably clean. Rhizoctonia was less prevalent than usuall in P.E.I. The sclerotia were seen much less frequently that a few years ago (S.G. Peppin). Rhizoctonia was rather severe in 2 fields in Prince Co. (R.R. Hurst)

BLACK LEG (Erwinia phytophthora) was found in 68 out of 519 fields inspected in B.C. and one field was rejected (H.S. MacLeod). No large amounts of black leg were found in Alta. in 1941, especially in the northern part of the province. Out of 117 fields, a trace occurred in 15, larger amounts in 5, 3 of which were rejected. The dry spring and early summer in many parts of Sask. were unfavourable for the development of black leg; out of 115 fields, it was present in 8, 2 of which were rejected. Out of 126 fields in Man., 3 were rejected (J.W. Scannell). In a field at Portage la Prairie, 5% of the plants were affected. (W.L. Gordon). About 50% of the plants were reported affected in a field at Shellington, Ont. (H.N. Racicot). Only 8 fields were rejected for black leg in Ont. (O.W. Lachaine). Black leg was slightly more prevalent in Que., than in 1940. Out of 1400 fields inspected, 70 were rejected. It was of little importance in the Montreal, Quebec, or Lower St. Lawrence districts, but about Chicoutimi and Lake St. John it was more prevalent than in 1940, 42 of the rejected fields being located in these districts. Seven fields were rejected in N.B. for black leg; for the past 5 years there has been no severe outbreak. Black leg was present in 36 out of 501 fields inspected in N.S. and 2 were rejected. Most of the disease was found in Irish Cobbler, while Bliss Triumph was free. Seed treatment has been neglected in recent years, except in the Bliss Triumph, which is grown for a special market. Black leg was more prevalent than usual in P.E.I.; 107 fields were rejected in 1941 compared to 20 in 1940 (S.G. Peppin). Traces were present in 17 fields of table stock; in a low area in one field 4% of the plants were affected. (R.R. Hurst)

STEM-END ROT (Fusarium Solani var. eumartii) was of little importance in Ont. this year. The disease was probably present in the fields rejected for wilt (q.v.), but it was not recorded (O.W. Lachaine). Stem-end rot was reported from Terrebonne Co., Que. on Green Mountain; it affected 15-20% of the crop. The seed used was certified seed from P.E.I. The disease was also reported affecting 20% of the tubers in a lot from Temiscouata Co. (B. Baribeau)

TUBER ROTS (Fusarium, etc.). The following fungi were isolated from rotted tubers received from points in Alta.: Fusarium caeruleum, common; F. sambucinum f. 6, very common; F. Solani, occasionally; F. avenaceum, rare;

Pythium spp., fairly common, if temperature high during October (G.B. Sanford and M.W. Cormack). The destructive rot of potatoes in storage in P.E.I. (P.D.S. 20:44) during the winter 1939-40 was due to F. oxysporum. Twelve cases of storage rot due to Fusarium were brought to the laboratory from March to May, 1941. (R.R. Hurst)

WILT (Fusarium sp.) was found in 69 out of 519 fields inspected in B.C. and caused the rejection of 5, a considerable reduction over 1940. In that year, wilt was found late in the season and was the result of infection from the soil. It was present to some extent in Man. One field was rejected in Man.; 2 in the Kenora-Dryden district in north-western Ont.; and 5 in other parts of Ontario. Wilt was present in some fields in Temiscouata and Kamouraska Counties, Que., but no fields were rejected. The disease was seen in 42 fields in N.B., but the highest infection recorded was 0.3%. Wilt was reported from 3 fields in Kings Co., N.S. Fusarium wilt was not common this year in P.E.I. (R.R. Hurst)

WILT (Fusarium and Verticillium) was present in 45% of the fields on second inspection in Alta. Only 13%, however, showed more than a trace and but 2 fields were rejected. In Sask. wilt was present in 36% of the fields and 3 fields were rejected. Fields showing the highest percentage of wilt were in the south-central part of the province.

SEED-PIECE ROT (Fusarium, Phytophthora, Alternaria) caused many misses in potato fields in P.E.I.; occasionally up to 75% of the sets were decayed and the field had to be replanted. (R.R. Hurst)

PSYLLID YELLOWS (Paratrioza cockerelli). Neither yellows nor psyllids were seen in fields inspected for certification in Alta. and certified seed stocks were very free from necrosis this year (J.W. Marritt). "Phloem necrosis" was observed only in the experimental plots in the immediate proximity of an infested greenhouse at the Station, Lethbridge, Alta. (G.B. Sanford)

BACTERIAL RING ROT (Phytomonas sepedonica). A survey for bacterial ring rot was made in September in southern Alta. by the Alberta Department of Agriculture. Almost every farm under irrigation about Lethbridge was visited with a less detailed survey at Medicine Hat and the irrigated area embracing Barnwell-Taber, Raymond and Welling. Lack of sunshine, rain, frost and hail made the detection of the disease difficult. Its presence was verified in every case by a microscopic examination by L.E. Tyner, Dominion Laboratory of Plant Pathology, Edmonton. Bacterial ring rot was found in 693 acres of potatoes in 102 farms out of 430 inspected. The affected farms were in 16 townships. The disease is evidently still on the increase. Not only the number of farms has increased, but it is spread over a greater area. The persistence and spread of ring rot appears to be due largely to the continued use of infected seed. Some growers planted again their own diseased stock, contrary to advice, while some affected stock found its way into seed channels and thus spread the disease to additional farms. On the other hand, most growers now understand what is required to obtain control. Of the 73 growers, on whose farms bacterial ring rot was found in 1940, 31 apparently got rid of the disease. Many of them obtained new seed for their entire farms and most of them disinfected their planters, storage houses, and equipment. The value of certified seed was amply shown. On 62 farms, growers were using certified seed for at least part of their crop. Bacterial ring rot was found in only 2 lots of

certified seed and these were on farms where the disease was even worse in potatoes grown from the farmer's own stock. Fourteen lots of certified seed were clean, although crops from the farmer's own seed were diseased (J.L. Eaglesham). No bacterial ring rot was found in fields entered for certification in Alta. It was present, however, in fields at Medicine Hat, planted with certified seed of Irish Cobbler and Early Ohio from a carload imported from Fargo, N.D. In the fields inspected, the two varieties were being grown side by side. A high percentage of the Early Ohio plants was infected, while little disease was present in the Irish Cobbler. It is likely that the infection was carried over from the Early Ohio to the Irish Cobbler in planting operations. The seed was inspected in the spring, but no ring rot was detected at that time. (J.W. Marritt)

Bacterial ring rot was found in 2 fields inspected for certification in Sask., one located at Yorkton and the other at Norquay; it appears to have been introduced from table stock. The disease was found in table stock during spring inspection on two farms on the Pike Lake Road west of Saskatoon. A survey made in the fall by A. Blackstock, Agricultural Representative, Saskatoon, revealed the disease on 8 farms. While the potatoes showed little decay in storage, in some cases the farmers reported 10-20% of the crop left in the field. Bacterial ring rot was found on 2 fields of table stock in the Estevan district, in addition to the farm on which it was discoverd in 1940.

Bacterial ring rot was found at 5 new points in Man., viz. Rosser, Beausejour, Altona, Balmoral and Tuelon. Besides, the disease was located at 2 places, close to where it was previously noted. It was present in 3 fields entered for certification. Bacterial ring rot was found on 35 farms in Ont. where certified locally-grown seed was used; 26 cases were in fields entered for certification and 2 in bins, while the other 7 were on farms of table stock growers. Infection ranged from 0.1% to 5%. These farms were located as follows: 14 in Dufferin Co., 12 in Cochrane District, 3 each in Peel and Simcoe Counties, and one each in Carleton, Middlesex and Norfolk. The disease was also found on 6 farms of table-stock growers, who were not using certified seed; the farms were located: 3 in Dufferin Co., one in Carleton and 2 in the Nipissing District. In one field of Katahdin table stock, 50% of the crop was left in the field at digging time (O.W. Lachaine). Bacterial ring rot appears to be established in widely different parts of Ontario. Samples showing typical symptoms of the disease were received from 3 of the chief potato-growing centres in western Ontario. (J.E. Howitt)

Bacterial ring rot was found in Que. in 272 fields out of 1400 inspected and in 57 bins in 1941, as compared to 111 fields out of 1161 in 1940. Only a trace was present in most fields or a few affected tubers in the bins. The disease was exceptionally prevalent in the Lake St. John and Chicoutimi districts, where 42 fields were rejected for ring rot out of 86 inspected. The high percentage of fields infected in these areas was mostly due to the use of contaminated implements. In general, where disease-free seed was used and the premises were disinfected, the disease was found in only the odd field. Bacterial ring rot was unusually prevalent in fields planted with table stock; 5 to 35% of the plants were affected (B. Baribeau). The disease was noted in 4 farms in Western Que.; in one planted in Pontiac

Co., with certified Green Mountain seed from P.E.I., and in 4 planted in the Temiskaming District with N.B. Canada #1 potatoes. At the time of inspection, infection in the first field was 0.6% of the plants, while it was 10-35% in the 4 fields of table stock. (O.W. Lachaine)

Bacterial ring rot was found in 205 fields out of 2535 inspected for certification in N.B. The seed apparently became contaminated in most cases when it was grown for a generation or two on a farm where the disease subsequently developed. The level of infection in these stocks has remained, in the meantime, so low as not to be detected. It may be noted that growers who have taken particular pains in cleaning up their equipment and premises have apparently eliminated the disease and that many of the foundation stock growers have never had the disease on their farms (C.H. Godwin). No exact figures are available, but considerable bacterial ring rot is known to occur in table stock. (I.L. Conners)

Only one case of bacterial ring rot was found in P.E.I. in the 1941 growing season, compared to 25 cases in 1940. This case was in a field of Irish Cobbler entered for certification at Monticello. The disease was detected, however, on 2 occasions in a few tubers of the 1940 crop. In one case at Souris East, bacterial ring rot was brought in from Maine in a sample of "eyes" of Katahdin for planting about 3 years ago. (S.G. Peppin and R.R. Hurst)

LATE BLIGHT (Phytophthora infestans) was prevalent in B.C. in 1941, especially in the Fraser Valley, the lower mainland, some sections of Vancouver Island, and the Pemberton district. It was found for the first time in the Salmon Arm and Princeton districts in the interior. Late blight was first reported on June 16, in the Fraser Valley. It caused considerable damage to the foliage early in the season, thereby decreasing the yield. Rain fell frequently in September and much of the crop was dug when the soil was wet. As a result late blight rot and adverse weather conditions resulted in a loss of 25-30% of the crop in the coastal sections. Spraying is not a general practice, but its use is increasing (H.S. MacLeod). In two fields of Sebago, tuber infection was negligible, although foliage infection was considerable. Late blight was found for the first time in the southern sections of Vancouver Island (W. Jones). Late blight was found for the first time at Summerland on Oct. 7, in a single field; infection was general. (Unusually prolonged rains fell in the last week of August.) (H.R. McLarty and G.E. Woolliams).

Late blight appeared in Man. for the first time since 1928. G.R. Bisby (Fungus Flora of Man. & Sask., p. 30. 1938) reported it in Man. in both 1927 and 1928, but since then it has not been observed. Rainfall was extremely heavy from Aug. 15 to Sept. 30 with very little sunshine. Many potato fields were covered with water for a few days to a few weeks. The greatest losses occurred north of Winnipeg on the west side of the Red River and the average loss from late blight rot alone or combined with drowning was 20-25% in the Red River and Springfield districts, the largest potato-producing areas in Man. Rot affected 60-75% of the tubers in a field of Irish Cobbler, while only a trace occurred in a nearby field of Warba. An affected tuber was received from Katrine, 25 miles northwest of Portage la Prairie and the disease was reported from Rossendale, similarly situated to the southwest. Tubers inspected at Cypress River and Melbourne, still further west were free from infection (J.W. Scannell). A diseased tuber was received from Mather, southwest of Portage, but near the U.S. boundary, where considerable rot was reported. (H.N. Racicot)

Late blight was epidemic in northern Ont. and north-western Que.; the average loss was 50% of the crop and in some cases no crop was harvested. Late blight appeared late in September in Que., and infection was very slight on the foliage in most districts. In short, 1941 was not a "blight year". A few severe outbreaks of tuber rot were recorded along the lower St. Lawrence, and the losses amounted to 20% of the crop on some farms in Kamouraska and Temiscouata Counties. Bin inspection disclosed 0.75% of the tubers affected.

In N.B. the greater part of the growing season was cool and late blight appeared earlier than usual. In the latter part of August, the disease was prevalent in all parts of the province. Tuber rot was present in almost every crop and was heavy in the northern part of Victoria Co.

Late blight was widespread in N.S. in 1941. It was first reported in Kings Co. on Aug. 4, and in Colchester on Aug. 19, and it had reached epidemic proportions by Aug. 24. Thorough spraying, however, was very effective and large crops were harvested virtually free from rot. Nevertheless some heavy losses were sustained. One lot of 1,300 barrels from a field sprayed only twice was harvested, while still partly green, and packed for shipment to Cuba. Later the fungus was found fruiting vigorously in the barrels and after several attempts at regrading, the lot had to be abandoned. The average loss from rot throughout N.S. was about 4%.

The outbreak of late blight in 1941 was the worst which we have ever experienced in P.E.I. The disease was widespread, destructive and difficult to control, on account of the unusually wet and broken weather. Many fields were destroyed by late September. It was demonstrated that the best control followed the earlier applications, provided a regular schedule was maintained throughout the season. Some farmers were able to reduce blight rot appreciably by destroying the tops, while others avoided heavy losses by spraying late into the growing season. The blight resistant variety, Sebago, was outstanding. Unsprayed fields of this variety showed very little blight, and the crop was entirely free from rot. (R.R. Hurst)

SOFT ROT (Pythium ultimum) caused severe damage in tubers harvested for the early market at Nanimo and Ladysmith, B.C. Field infection was initiated through pecking by pheasants, and skinning of the tubers, and was favoured by high temperature in transit and storage. The parasite seems to be quite prevalent in the soils containing muck pockets, which soils are found in certain areas on Vancouver Island. (W. Jones)

VIOLET ROOT ROT (Rhizoctonia Crocorum) was found affecting a few tubers in a bin of Green Mountain potatoes at Milner, B.C. (W. Jones). A slight infection was found at Camrose, Alta. (A.W. Henry)

SILVER SCURF (Spondylocladium atrovirens) slightly infected a few lots in one district on the lower St. Lawrence, Que. It was observed a few times in Carleton Co., N.B., particularly in Irish Cobbler. Silver scurf was common and widespread on Irish Cobbler in storage in P.E.I. during 1940-41. About 2% of the tubers of Irish Cobbler were affected in one field in Oct. (R.R. Hurst). Very little silver scurf was found by Dec. 20 (S.G. Peppin). In a carload of certified Irish Cobblers from Morell, P.E.I., examined at Chatham, Ont., almost every tuber was affected on Jan. 2, 1942. (H.N. Racicot)

POWDERY SCAB (Spongospora subterranea) was found on one farm in Temiscouata Co., Que.; the percentage of tubers affected was small. A few affected tubers were recorded on bin inspection in Carleton Co., N.B. Powdery scab was found in 7 out of 200 lots of potatoes inspected this fall in N.S.; 0.25 to 5% of the tubers were affected. On one farm, the disease appeared in the crop on land newly broken from blueberry pasture, while the crop was clean on an adjoining piece, which had been under cultivation for many years. Several cases of powdery scab were reported in P.E.I. in 1941; in one or two instances infection was quite severe (S.G. Peppin). For the first time in several years, powdery scab has been of some importance; there would appear to be a close correlation between the weather and the disease. (R.R. Hurst)

A trace of powdery scab appeared in the laboratory greenhouse, Fredericton, N.B. The disease was very severe on U.S.D.A. seedling 41956, Kerr's Pink, and Bliss Triumph, while it was slight on Green Mountain and Irish Cobbler. (D.J. MacLeod)

WART (Synchytrium endobioticum). A few tubers affected by wart were received on Oct. 1, from a correspondent in Halifax, N.S., by Mr. J.F. Hockey, Officer-in-Charge, Dominion Laboratory of Plant Pathology, Kentville, N.S., who immediately suspected the cause of the disease and sent the material on to the Dominion Botanist for verification. These tubers were from a small garden patch of about 20 hills, some of which yielded good-sized clumps of affected tubers. The garden has been under cultivation for 60 years. The necessary clean-up and destruction of affected material was carried out at once. It is thought possible that the disease may have been there for some and was unnoticed because resistant varieties, such as Irish Cobbler, have been cultivated in recent years. Investigation of all clues as to the possible source of infection has yielded no additional information. Further search will be made next summer. The owner has guaranteed to refrain from growing potatoes on the plot, until permission to do so is again given by the Department. The garden, in the meantime, will be visited regularly to ensure that this promise is carried out. Naturally, everything is being done to prevent any spread and to uncover any other centres.

The finding of wart has long been expected, particularly at sea-port towns, where ships' stores may be unloaded from a boat and left for disposal in one way or another, without the careful inspection that a cargo would receive. Nevertheless, there is no cause for alarm, but for continued vigilance. The immediate recognition of the disease by the first officer to whom the affected material was sent is a matter of which we may well be proud and emphasizes the importance of alertness on the part of every officer. (I.L. Conners)

POUTS (Thrips sp.). An injury corresponding to that described on peanut seedlings and called "pouts" (Shear and Miller. Thrips injury of peanut seedlings, Pl. Dis. Reporter 25:19. 1941) was observed on potato seedlings at Fredericton, N.B., in Sept. The damage was severe on seedlings, but negligible on mature plants. (Jean B. Adams)

WILT (Verticillium sp.) was widely distributed in Alta., and was particularly prevalent in gardens or on land intensively cultivated. The disease appears to be definitely on the increase and probably is perpetuated mainly by infected seed stock. In one large field at Lethbridge, almost every hill was affected, and in another, 60% of the hills showed wilt. The aggregate loss must

be considerable (G.B. Sanford). Verticillium wilt was not serious in P.E.I. in 1941 for, due to the wet weather, wilted plants did not die rapidly and thus the yields were not greatly reduced as has been the case in years when the weather was warmer. In one field of Irish Cobbler near Charlottetown, 50% of the plants were affected, but with no appreciable reduction in yield. Experiments conducted in 1940 again revealed that seed treatment offers a fair measure of control. Of the commoner varieties in cultivation, Houma was resistant. (G.W. Ayers and R.R. Hurst)

LEAF ROLL (virus) was found in 43% of the fields entered for certification in B.C. and resulted in the rejection of 6%. It may be noted that the percentage of crop rejected, of which the presence of leaf roll and mosaic is the chief cause, was considerably higher on Vancouver Island and in the Fraser Valley than in other districts in B.C. This difference is apparently due to less isolation, greater aphid population, and the use of certified seed, the disease content of which approaches the limits allowable. A trace or more leaf roll occurred in 34% of the fields inspected and caused the rejection of 9 fields in Alta. Most of the affected fields were in the Edmonton, Lacombe and Brooks districts. At Brooks, the disease was in Netted Gem stock, brought into the province this spring. Its prevalence at Lacombe and Edmonton is attributed to late-season spread in 1940. For instance, in Carter's Early Favorite planted at the University, Edmonton, in 1940, over 50% of the plants were affected with leaf roll in 1941; in the same stock grown in other districts for these two years no leaf roll was found (J.W. Marritt). Leaf roll was very common and probably more severe than usual. In severe cases noted at Edmonton, Olds, Calgary and intermediate points, the foliage had a purplish colour (G.B. Sanford). Small amounts of leaf roll were found in 13% of the fields inspected in Sask.; no fields were rejected. Leaf roll was not common in Man. or in the Kenora and Rainy River districts of Ont.; however, 4 out of 64 fields inspected in the Thunder Bay area were rejected (J.W. Scannell). There was a marked decrease in the number of fields rejected for leaf roll in Ont.; in the 36 rejected fields, infection ranged from 3-7% in most fields, up to 10% in a few and 15% in one of Chippewa (O.W. Lachaine). Leaf roll appears to be increasing in Que.; a slight increase was noted in all districts. Of 1,400 fields inspected, 35 were rejected. Necrosis associated with leaf roll, according to H.N. Racicot, affected 2, 5 and 10% of the tubers received from separate parishes (B. Baribeau). Symptoms resembling leaf roll were found on all the plants in a plot of Netted Gem grown from Ont. certified seed at Ste. Clothilde, while plants of the same variety from an Idaho source appeared normal (F.S. Thatcher). The disease was more prevalent in N.B. this year than in 1940; out of 2,535 fields inspected, 467 were rejected. Many of the rejected fields had been planted with marginal material. Leaf roll was reported in 70% of the fields inspected in N.S. and 3.9% were rejected. Leaf roll is still increasing in all varieties in P.E.I.; 90% of the fields showed at least a trace and 263 fields were rejected, being 3 times the number rejected in 1940.

MOSAIC (virus) was found in 54% of the fields in B.C., and resulted in the rejection of 6%. Only 7% of the fields inspected in Alta. were affected by mosaic. The 2 rejected fields were planted with seed brought to the province this spring. Mosaic was present in 13% of the fields inspected in Sask.; they were mostly located in the Saskatoon area. In all, 5 fields were rejected. In Man. 3 fields out of 126 and in western Ont. one field out

of 119 were rejected. Only 10 fields were rejected in southern Ont. Mosaic was slightly less prevalent than usual in Que.; 123 fields were rejected. The symptoms tended to be masked. Mosaic was present in almost every field inspected in N.B. and 120 fields were rejected. Only 6 fields showed over 1% of the plants affected and the highest infection was 19%. The disease was reported in 46.7% of the fields inspected in N.S. and caused the rejection of 4.2%, a slight reduction from 1940. Mosaic was much less prevalent than in previous years in P.E.I.; rejections this year were but 60% of those in 1940.

PURPLE DWARF was observed only occasionally in Alta., compared to its relatively common occurrence in 1940 (G.B. Sanford). This trouble was observed in only 6% of the fields inspected in Alta.; high percentages were seen in only one field located at the School of Agriculture, Olds. A trace of purple dwarf was found in all fields inspected in Sask. (J.W. Marritt)

PURPLE TOP was seen chiefly in Katahdin potatoes in N.B. (C.H. Godwin).

SPINDLE TUBER (virus) was recorded as follows: Present in 4% of the fields inspected in B.C.; 6 fields rejected in Man.; 4 rejected in Ont., where the disease is on the increase, especially in Katahdin and many fields were slightly infected; slight infection in some fields in Que.; most prevalent in Irish Cobbler and Katahdin in N.B., being present in 84 fields and causing rejection of 2; not observed in the field in N.S., but many pear-shaped tubers in Katahdin, which have invariably produced plants with the symptoms of spindle tuber. No increase in spindle tuber was observed in P.E.I. (S.G. Peppin). In 12 fields of table stock, spindle tuber varied from a trace to 28%. (R.R. Hurst)

WITCHES' BROOM (virus) was present in 16% of the fields inspected in B.C. and caused the rejection of 2 fields. It is becoming quite common in Alta. and is associated with what appears to be leaf roll. A severe outbreak of this complex occurred at Olds, causing the loss of increase plots of foundation stock (G.B. Sanford). A trace was present in 8% of the fields inspected in Alta. A few affected plants were found in the North Cochrane District, Ont.

YELLOW DWARF (virus) was reported in a mild form in 2 fields inspected in B.C. (H.S. MacLeod). Six fields were rejected for yellow dwarf in Ont., 3 located in Leeds Co., and one each in Dufferin, Norfolk and Simcoe Counties (O.W. Lachaine). During the harvesting of the plots of the Division of Botany at Black Rapids, near Ottawa, Ont., 66 potato plants or over 1% were found affected by yellow dwarf. Evidence pointed to current season infection, which apparently originated from the adjacent red clover. This assumption was supported by the finding the vector, the clover leafhopper, Acertagallia sanguinolenta, on the clover by Mr. Matthewman, Division of Entomology, in considerable numbers for the time of year. The striking feature of this outbreak was the lack of distinctive vine symptoms. Affected plants appeared to die down somewhat earlier than healthy plants. When a hill was found to contain healthy and diseased tubers, examination showed one stem almost completely dead, while the others were still fairly green. To determine the situation in the Ottawa district, a rapid survey was made in the area between Sept. 29 and Oct. 4. Examination was confined to fields being dug, culls left in the field, or an occasional bin. Yellow dwarf was found in one field at Bowesville, in another on Allumette Island, Que., and in one field and one bin on separate farms at Riceville, Ont.

No field appeared to have been severely damaged. These findings indicate that the disease is more widely scattered than has been realized, but no other conclusion can be drawn at the present time. (D.B.O. Savile and F.S. Thatcher)

FERTILIZER INJURY. About 0.5% of the potatoes, which were placed in sacks previously used for potash, were injured in a warehouse at Summerside, P.E.I.

FROST. A heavy frost damaged half the potato fields in the Lake St. John district, Que., on Aug. 23. Injury and net necrosis due to frost were also reported from many other districts. In a carload of table stock from N.B., frost affected 18 out of 23 tubers examined at Ottawa. (H.N. Racicot)

GIANT HILL was found in 29% of the fields inspected in B.C. and caused the rejection of one. Many plants suspected to be affected by giant hill were seen in fields of Green Mountain in Kings Co., N.S.

MAGNESIUM DEFICIENCY. About 1% of the plants were affected in 10 fields examined in P.E.I. (R.R. Hurst)

NET NECROSIS. Of the 70 cases of net necrosis studied in 1940-41, the cause was determined as follows: Leaf roll 19, Verticillium 8, Fusarium Solani var. eumartii 3, F. Solani var. Martii 2, F. oxysporum 7, F. Scirpi 1, F. sambucinum f. 6 4, F. caeruleum 3, F. bulbigenum 2, F. angustum 1, F. trichothecioides 2, F. sp. 2, Rhizoctonia Solani 2, psyllid necrosis 6, purple dwarf 2, frost 4, frost injury to green plants 2, unknown 2 (F.S. Thatcher). Net necrosis was rather common in N.B. in Green Mountain tubers which were affected in varying degrees. In previous years it was confined to York and Carleton Counties, but it now seems to be spreading to other areas (C.H. Godwin). Net necrosis was reported several times in table stock in P.E.I. Deep stem-end browning was more prevalent than usual, an occasional lot showing 5% of the tubers affected (S.G. Peppin)

POTASH DEFICIENCY. Typical symptoms of potash deficiency were observed in a field in Queens Co., P.E.I. (R.R. Hurst)

SPINDLING SPROUT (cause unknown) was noted in many fields of Irish Cobbler and Green Mountain in P.E.I. Several samples of affected tubers were also brought to the Laboratory. (R.R. Hurst)

PUMPKIN

POWDERY MILDEW (Erysiphe Cichoracearum) slightly infected some small pie pumpkins at the Station, Summerland, B.C. (G.E. Woolliams)

RADISH

CLUB ROOT (Plasmodiophora Brassicae). About 1% of the plants were affected in a garden at Charlottetown, P.E.I.

BROWNING (boron deficiency) affected 15% of the radishes in a second planting in Queens Co., P.E.I.

PROLIFERATION (cause unknown) was general in the plantings at the Station, Summerland, B.C.; 9% of the plants were affected. (G.E. Woolliams)

RHUBARB

LEAF SPOT (Ascochyta Rhei). A slight scattered infection was present at Brandon, Man.

ANTHRACNOSE (Colletotrichum erumpens) caused moderate damage in a planting at Kentville, N.S.

LEAF SPOT (Phyllosticta Rhei) moderately infected a planting at Kentville, N.S.

RUST (Puccinia Phragmites). A heavy infection was recorded on Macdonald's Ruby in Fort Garry, Man. An unnamed variety in the same patch was not infected. (A.M. Brown)

STREAK (virus) caused slight damage at Indian Head, Sask.

CROWN ROT (cause unknown) caused moderate damage in plantings at Millet and Edmonton, Alta. The trouble was prevalent in the Saskatoon district, Sask., but the damage was slight. A slight amount of crown rot occurred at Indian Head.

SALSIFY

WHITE RUST (Cystopus cubicus). All the plants were attacked in a small plot on the Island of Montreal, Que., and many of the leaves dried up and died. Nevertheless, the yield was reduced only by about 5% when compared to last year's crop, when no rust appeared. (J. Emile Jacques)

SPINACH

Ascochyta Chenopodii Rostr. was found on a few seeds of King of Denmark growing at Keating, B.C. (W. Jones and Irene Mounce)

LEAF SPOT (Heterosporium variabile Cooke) was found in 19 crops grown for seed on the lower mainland and Vancouver Island, B.C.; the disease was widely distributed and caused slight to moderate damage (W. Jones). This is the first report of this disease in Canada, although it has been known in the United States since 1905.

DOWNY MILDEW (Peronospora Spinaciae) was general on the leaves in 4 crops grown for seed on Vancouver Island and the lower mainland, B.C.; damage was slight (W. Jones). The disease affected a few to 90% of the plants in seed crops in the Armstrong and Pemberton districts; little injury was caused. It was very heavy on one planting of Bloomsdale Long Standing, while a few

Scattered plants were affected in one of King of Denmark (G.E. Woolliams). A slight infection was recorded at Saskatoon, Sask. Some damage was done to the lower leaves of a seed crop of Bloomsdale Long Standing, several acres in extent, at Streetsville, Ont. (J.K. Richardson). It was reported several times in the Montreal region, Que.

MOSAIC or YELLOWS (virus) affected 20% of the plants in a fall-sown crop in Lincoln Co., Ont. A trace of mosaic was seen in a planting in Queens Co., P.E.I.

SQUASH

BACTERIAL WILT (Erwinia tracheiphila). In an isolated 3-acre field in Lincoln Co., Ont., 15-20% of the plants of Hubbard squash were affected; squash bugs were present (J.K. Richardson). About 6% of the plants were affected in a commercial planting at Waterville, N.S.; striped cucumber beetles were quite prevalent. (J.F. Hockey)

BLACK ROT (Mycosphaerella citrullina Gross.) was found affecting a few seedlings in the Laboratory greenhouse, Saanichton, B.C. (W. Jones)

SWEET CORN

SMUT (Ustilago Zeae) was general in southern Ont., but damage was slight (J.K. Richardson). A trace was observed at Macdonald College, Que. (R.O. Lachance)

SWISS CHARD

RUST (Uromyces Betae) was general on one seed crop in Sept., 1941, at Sidney, B.C.; damage was slight.

TOBACCO

These records, prepared by Dr. L.W. Koch, include information obtained by Messrs. R.J. Stallwood and F.A. Stinson in the New Tobacco Belt, from Messrs. H.F. Murwin and R.J. Haslam in the Old Belt of Ontario and from Messrs. J.E. Montreuil and R. Bordeleau, L'Assomption, for the Quebec tobacco-growing area.

Diseases in the Seedbed

BLACK LEG (Erwinia ?aroideae) causes slight damage throughout Ont. In Essex Co., damage did not occur until transplanting began. Infection was usually localized and was often confused with damping-off.

NEMATODES (Heterodera marioni). Two seedbeds in Essex Co., Ont., showed localized infestation. The plants exhibited symptoms of chlorosis and stunting.

DAMPING-OFF (Rhizoctonia sp. and Pythium sp.). Damage from damping-off was important only in canvas-covered, burley seedbeds in Essex Co.,

Ont., where moisture during the seedbed stage was higher than in other parts of Ont. and Que. By transplanting time, this disease was observed in all outside flat-beds examined. In the A-beds and greenhouses where ventilation and moisture could be controlled more satisfactorily, damage was of little economic importance. Rhizoctonia sp. appeared to be much more prevalent than Pythium sp.

BLACK ROOT ROT (Thielaviopsis basicola). Throughout the old and new tobacco belts in Ont., damage from black root rot was generally milder than for several years past. By the end of the transplanting season, it could be observed in many seedbeds in Essex and Kent Counties, but damage was slight due probably to high temperatures which prevailed during the seedbed period. Similarly, in Que., mild symptoms were observed in numerous seedbeds, but the disease caused real damage only in seedbeds:-

(1) Where the soil in the seedbed had not been changed each year, and
(2) Where disinfection or steaming of last year's seedbed soil had not been practised. In Que., two cases of severe injury were also observed in seedbeds where 1-2 in. of new seedbed soil were added to the top of last year's affected soil.

CHLOROSIS (cause unknown), which became apparent usually by a yellowing of the two centre leaves at the 4-6 leaf stage, caused some concern to growers. It appeared consistently only after cool nights and recovery invariably followed within a few days to a week.

MUSHROOMS. Considerable damage from different species of fleshy fungi was experienced in seedbeds of Kent Co., Ont. Affected seedlings were chlorotic and frequently stunted. Often the fruiting bodies became abundant in localized areas in the seedbeds and smothered the seedlings.

YELLOW PATCH (cause undetermined) was the most destructive seedbed disease of tobacco in Ont. in 1941. Twenty-one seedbeds in Essex and Kent Counties, were reported or observed to be affected. Damage varied widely. In mild cases, the plants in localized areas in the seedbeds became chlorotic and stunted. In most severe cases, seedbeds were abandoned or re-seeded. Recovery in various degrees was usually accomplished by thoroughly drying out the seedbeds for at least several days and then watering abundantly. In Norfolk Co., the condition was associated with applications of chicken manure in several severe cases. In Que. the disease caused mild damage.

Diseases in the Field

HOLLOW STALK (Erwinia aroideae). A single case of hollow stalk was observed in a plantation of burley tobacco in Essex Co., Ont. Damage was localized in a poorly-drained area of the field.

NEMATODES (Heterodera marioni) were observed in roots of flue-cured tobacco plants collected from Norfolk Co. Ont. Minor damage was evident in one field of flue tobacco on the Delhi Sub-Station and in a field in the Union district.

ANGULAR LEAF SPOT (Phytomonas angulata). Damage from this disease was much less severe than in 1940. Minor damage was observed in several fields in Essex Co. on Harrow Velvet. A few mild cases were observed in Norfolk Co.

SORE SHIN (Rhizoctonia Solani) caused important losses in Essex Co., Ont., and some damage in Norfolk Co. and in Que. The injury continued to be apparent unusually late in the season. In some fields of flue-cured tobacco near Harrow, as high as 10% of the plants were affected in various degrees of severity. Severely-affected plants often showed wilting of one or more top leaves. Large affected plants often broke off at the ground level when pushed or shaken. In all cases, the region of attack was at or near the ground level. The disease was consistently severe only where heavy crops of rye had been ploughed down and when parts of the rye plant were still incompletely decomposed.

BLACK ROOT ROT (Thielaviopsis basicola). In the Ont. tobacco-growing districts, damage from black root rot was below average. However, in the burley district of Essex Co., on the heavier soils, a number of crops of Green Briar and Halley's Special were ploughed up as a result of early infection by this fungus. Damage was of less importance in the flue-cured area of Norfolk and adjacent counties than usual, due probably to high soil temperatures and low rainfall in the early part of the season. In the latter area, were observed 2 fields, in which the damage was severe.

Due to the unusually low rainfall throughout the tobacco-growing areas of Que., damage from black root rot was mild, even on the susceptible varieties.

MOSAIC (virus). In both the old and new tobacco belts of Ont. and Que., mosaic caused little damage and was less prevalent than usual. In one case, 45% of the plants were affected in Essex Co., where tobacco followed tobacco in the rotation.

RING SPOT (virus). In the old tobacco belt in Ont., minor damage resulted from ring spot on burley varieties. One case was observed in which about 400 plants, at the edge of a field in a more or less circular area, were affected. One case was observed in Norfolk Co.

STREAK (virus) was more severe than for several years. Again this disease appeared to be limited to the Blenheim-Ridgetown area in Ont. Where the disease caused damage, affected plants were usually more numerous at the border of a plantation and in the vicinity of sweet clover. As usual, other cases were observed of single affected plants widely separated in some plantations. Two cases were observed in Norfolk Co., in one of which the tobacco followed sod (weeds and sweet clover), and in the other it followed rye.

BROWN ROOT ROT (cause undetermined) was more severe than usual in Essex Co. and milder, though more prevalent than usual, in the new tobacco belt of Ont. Severe cases could generally be traced to a preceding crop of corn. On the laboratory plots at Harrow, the burley variety, Green Briar, proved resistant for a second year as did also the variety Kelley, and a

strain of Judy's Pride, which have definitely exhibited resistance for some years past. The flue-cured variety, Yellow Mammoth, also appeared to be resistant in some commercial plantations.

FRENCHING (non-parasitic) caused localized damage in both the old and new tobacco belts of Ont. In one field, damage was severe only in a poorly-drained area.

In late August a survey of 250 fields showed 10.8% frenching, ranging from a few affected plants to large areas exhibiting mild symptoms, with occasional severely-affected plants.

FROST INJURY. Somewhat more than one million pounds of flue-cured tobacco were destroyed by frost in Norfolk County, Ont. In Que. frost damage in September was severe on flue-cured tobacco and caused losses of 1¼ to 1½ million pounds. Individual losses ranged from 15% to total loss depending on the maturity of the crop. In the Three Rivers section, losses represented about 2/3 of the production.

HAIL INJURY. Approximately one million pounds of flue-cured tobacco was destroyed by hail in Norfolk Co., Ont., during July.

LEAF SPOT (non-parasitic), which appears annually, was observed more frequently on flue-cured varieties in the new tobacco belt of Ont., though it was present also in Essex Co. and in Que. Only minor damage was caused.

LIGHTNING INJURY was observed in two plantations in Essex Co., Ont. In one of these, all plants in a circular area 60 feet in diameter were killed. In Norfolk Co., two cases were observed.

POTASH DEFICIENCY was observed to be prevalent on burley tobacco in the Leamington area of Ont. and several cases were also observed on flue tobacco in Norfolk Co.

WILT (cause undetermined). This disease, which was reported in 1939, was again present in numerous fields in Essex Co., Ont., particularly in the area north of Leamington. Both burley and flue tobacco varieties were affected. In one field, 9% of the plants were affected. A correlation appeared to exist between incidence of the disease and preceding crops of tomatoes. A severe case of wilt was observed in the Mount Pleasant area of Norfolk Co., and other mild cases appeared throughout the new belt.

MOSAIC (virus). The following additional notes were received: Confirmatory evidence has been obtained that while the virus of tobacco mosaic persists in the soil, the viruses of cucumber mosaic and tobacco streak do not (G.H. Berkeley). Since flue-cured tobacco began to be cultivated in Que., mosaic has continually increased. Today, the disease is most serious on many farms. A rye-tobacco 2-year rotation is being put into general practice as a means of checking the disease. In the Joliette district, up to 80% of the plants were affected in some fields in 1941 (F. Godbout). Three plants in a seed plot at the Laboratory, Fredericton, N.B. were affected by a necrotis XS strain of Solanum Virus 1. A definite mottle and foliar necrosis were evident. (D.J. MacLeod)

TOMATO

EARLY BLIGHT (Alternaria Solani) was general on the lower mainland and Vancouver Island, B.C. (W. Jones). A trace to slight infection was found in the varietal plots at Lacombe, Alta. A trace was recorded on leaves of several varieties in the University garden, Winnipeg, Man. (J.E. Machacek). Mixed infections of early blight and Septoria leaf spot were observed in southern, Ont. (J.K. Richardson). Early blight was observed on the Island of Orleans, Que. (D. Leblond). A general infection was observed in Hants and Kings Counties, N.S.; late in the season over 50% of the foliage was affected in one field (J.F. Hockey). A moderate infection was recorded on Sept. 12 on Bonny Best in Queens Co., P.E.I. (R.R. Hurst)

LEAF MOULD (Cladosporium fulvum) was found causing moderate damage to Vetomold in 15 greenhouses in the Victoria district, B.C. The disease was prevalent causing much damage in greenhouses in the Vancouver area. It was also found in the open in September on Vancouver Island (W. Jones and W.R. Foster). Leaf mould was less destructive this fall in greenhouses in the Harrow district, Ont., than in 1940, due to the temperature being higher than average. Where the resistant Vetomold variety was planted, infection was still quite general, indicating the widespread distribution of Strain 5. Where in a single test, the improved Vetomold V 121 was used, infection was negligible. Some damage was observed in a late field crop, where infection was widespread (L.W. Koch). Leaf mould slightly infected Earliana and Bonny Best in P.E.I. in September. (R.R. Hurst)

FRUIT ROT (Fusarium sp.) was observed on the Island of Orleans, Que. (D. Leblond)

NAILHEAD (Macrosporium tomato) caused damage towards the end of the early field crop in localized areas in Essex Co., Ont. (L.W. Koch)

PHOMA ROT (P. destructiva) was general and caused considerable damage in September in North Saanich Co., B.C.; it was the most prevalent and destructive disease affecting the fruit of the out-door crop during a wet period at harvest (W. Jones). It was observed on the Island of Orleans, Que. (D. Leblond)

BACTERIAL CANKER (Phytomonas michiganensis) was affecting 20% of the plants in a field at Vernon, B.C., in August (G.E. Woolliams). In 2 fields of the canning crop in Kent Co., Ont., 2% and 3% of the plants respectively showed fruit and foliage symptoms; the damage was slight. (L. W. Koch)

BACTERIAL SPECK (Phytomonas tomato (Okabe) Magrou) was found in 10 fields out of 12 examined in Man. The average infection was slight, but one grower in St. Vital suffered heavy losses. The pathogen was isolated from 8 different collections and each isolate was capable of reproducing the disease. The organism agrees with Okabe's original description in all respects except that it liquifies gelatine more rapidly. The disease was first observed in 1940, (P.D.S. 20:58 under the name Black Scab). (W.A.F. Hagborg)

BACTERIAL SPOT (Phytomonas vesicatoria). Affected specimens were received from Bagot, Man. The organism was isolated and its pathogenicity proved. This is the first record of its occurrence in Man. (W.A.F. Hagborg). Bacterial spot was epidemic in a few commercial plantings in Kings Co., N.S. The fields had been set out with plants, which had been raised from untreated seed. The plants were becoming defoliated by mid-August. (J.F. Hockey)

LATE BLIGHT (Phytophthora infestans) was fairly general and caused considerable damage to the fruit in gardens on the lower mainland and Vancouver Island, B.C. (W. Jones). The disease caused slight damage to the fruit in Kent Co., Ont., near the close of the canning season (L.W. Koch). Late blight was reported to have caused complete loss of the crop from 150 plants at Ste. Anne de la Pocatiere, Que.; affected fruits were submitted (H.N. Racicot). A general epidemic of late blight developed in Hants and Kent Counties, N.S. Fruit infection varied from 5 to 40%. The season was wet and cool. The most serious infection was in a planting adjacent to a potato field, where late blight appeared about 2 weeks before it was noticed on the tomatoes (J.F. Hockey). Late blight was most destructive this year in N.B. The epidemic on the tomato became established earlier than on the potato. Most of the tomatoes in gardens in York and Carleton Counties were destroyed before any appreciable amount of blight was visible on potato foliage (J.L. Howatt). The disease probably caused heavy losses throughout P.E.I. (R.R. Hurst)

BUCKEYE ROT (Phytophthora parasitica) was apparently destructive in Middlesex Co., Ont., as affected tomatoes were received from 4 growers (G.H. Berkeley). Buckeye Rot (Phytophthora terrestris) was fairly general in out-door crops during a rainy period on Vancouver Island, B.C. (W. Jones)

SOIL ROT (Rhizoctonia Solani) was observed causing damage to seedlings in numerous flats and outside seed beds for the early field crop in Essex Co., Ont. (L.W. Koch)

LEAF SPOT (Septoria Lycopersici) was more common and severe than in former years in Man. Infection varied from slight to severe. It caused less damage than usual in the early field crop in Essex Co., Ont. (L.W. Koch). Leaf spot was extremely severe in fields along the north shore of Lake Ontario. Many fields were almost defoliated by the end of August and resulted in a marked decrease in yield and the quality of fruit for canning. In other parts of Ontario the disease was less severe (J.K. Richardson). It was observed on the Island of Orleans, Que. (D. Leblond). A slight general infection was present in a few fields of Bison about Falmouth, N.S. (J.F. Hockey)

WILT (Verticillium albo-atrum) was general in greenhouses at Victoria, B.C., and caused the loss of 2-5% of the crop. (W.R. Foster)

MOSAIC and STREAK (virus) affected 50 to 100% of the plants in almost every greenhouse operated by Chinese growers about Victoria, B.C., while infection was 5-10% in 12 greenhouses of Caucasian growers. (W.R. Foster)

MOSAIC (virus) was found affecting 20% of the plants in a greenhouse at Armstrong, B.C.; affected plants were stunted and usually occurred in groups of 3-4 plants. A few affected plants were found in a field being grown for seed at Vernon (G.E. Woolliams). Mosaic was present in a greenhouse at

Edmonton, Alta. (A.W. Henry). In varietal test plots of unstaked plants in Lincoln Co., Ont., infection varied from 0-100% and averaged less than 5%; affected plants were severely damage (J.K. Richardson). Mosaic affected 85% of the plants in a greenhouse at Oromocto, N.B. The fruit was reduced in size but was marketable. The virus was identified as Nicotiana Virus 1 (D.J. MacLeod). Mosaic was very prevalent in Hants and Kings Counties, N.S., in fields adjacent to one greenhouse or in other fields planted with transplants from this source. Only a few plants were affected by streak (J.F. Hockey). Mosaic affected 15% of the plants at the Station, Charlottetown, P.E.I. (R.R. Hurst)

STREAK (virus). A few affected plants were found in a field at Vernon, B.C. (G.E. Woolliams). Streak affected 10% of the plants in a greenhouse at Oromocto, N.B. The disease was caused by a combination of Solanum Virus 1 and Nicotiana Virus 1. (D.J. MacLeod)

YELLOWS (curly top virus) was general and destructive from Summerland, B.C., southward causing up to 25% loss. The severity of infection decreased towards the north and no disease was found beyond Vernon. (G.E. Woolliams)

BLOSSOM-END ROT (non parasitic) caused slight damage in gardens at Edmonton, Grainer and St. Paul, Alta. It was commoner than usual at Saskatoon, Sask., causing slight damage; specimens were received from Glenside. Blossom-end rot was moderate on different varieties at Morden, Man.; a trace occurred on several varieties in the University garden, Winnipeg. The disease was recorded causing considerable injury in Ont. at Oakville, Humberside, Kirkton, Goderich, Red Wing and Toronto (J.E. Howitt). Blossom-end rot was abundant and destructive everywhere in Que. Blossom-end rot was reported less frequently than usual in P.E.I.

BLOTCHY RIPENING (non-parasitic) caused severe damage in one greenhouse, at Gordon Head, B.C., in June (W.R. Foster). The trouble caused very heavy losses at Charlottetown, P.E.I., in September. (G.C. Warren and R.R. Hurst)

COARSE FRUIT (cause unknown) affected 50% of the fruit in an early planting of Vetomold at Victoria, B.C., in May; affected fruit were rough and of second quality. (W.R. Foster)

POTASH HUNGER (potash deficiency) was observed in one garden at Charlottetown, P.E.I. (R.R. Hurst)

TURNIP

SCAB (*Actinomyces scabies*) was general on limed soils in Kamouraska and L'Islet Counties, Que., on Laurentian swedes and in a few cases the damage was so severe that the whole crop was unmarketable. Actinomyces has been isolated from the lesions. The disease was observed in one unlimed field, which had received a dressing of manure containing sawdust 14 years ago (R.O. Lachance). Traces were observed in P.E.I.

LEAF SPOT (Alternaria Brassicae) caused considerable damage to the foliage of Purple Top turnips at the Station, Sidney, B.C.

LEAF SPOT (Cercosporella albomaculans). Traces were observed in Queens Co., P.E.I. (R.R. Hurst)

SOFT ROT (Erwinia carotovora) affected an occasional plant both in the seed crop, and also in the commercial root crop in P.E.I. (R.R. Hurst)

DOWNY MILDEW (Peronospora Brassicae) slightly infected 6 seed crops on the lower mainland, B.C., and one at Pemberton. Usually it occurs on the leaves and only occasionally on the pods.

BLACK LEG (Phoma lingam) was found in 21 fields of seed crop out of 24 examined. Infection was a trace to 25%; in most of the affected plants, no seed was produced because the bulb was destroyed (R.R. Hurst). The disease was also found in 6 fields grown for stecklings; infection was a trace to 5% in the infected fields. In general the disease was widespread and caused severe losses on many farms. (G.W. Ayers)

CLUB ROOT (Plasmodiophora Brassicae). In 2 fields of swedes at Lennoxville, Que., 20% and 75% of the plants respectively were affected. In general the disease was much less destructive than usual. (F.S. Thatcher). Heavy club root infection early in the growing season caused a crop failure in 3 fields in P.E.I. In fields of roots for stecklings, the disease was found in 8 fields; infection varied from a trace to 60% in the infected fields and averaged 25.6%. (G.W. Ayers)

POUTS (Thrips sp.). An injury similar to that already described on potatoes (q.v.) was also found on turnip seedlings. (Jean B. Adams)

MOSAIC (virus). A severe infection of mosaic was observed in swede turnips grown for stecklings in Annapolis Co., N.S. In one field counts of affected plants ranged from 48 to 100%; in an adjacent field 22% were affected. Mosaic has been spread, in all probability, by the practice of raising turnips for stecklings, and for seed in adjacent areas in the same field. Other fields planted with seed from the same source but isolated from the seed crop were free from mosaic. (J.F. Hockey)

BROWN HEART (boron deficiency) was quite prevalent in fields around Galt, Ont.; many of the affected turnips showed secondary rot (G.C. Chamberlain). According to Mr. W. Strong, Inspector of Fruits and Vegetables, Guelph, almost every turnip was affected by water core (brown heart) in fields of early turnips about Mildmay and Walkerton, Ont. About 10% of the turnip crop inspected showed this condition. Around Rockwood, about half the turnips developed water core in the past year. In Puslinch district on the lighter land, some fields were affected 100%. On the heavier land, only a trace of water core was found. In the other counties of the province, water core occurred only to a minor extent (J.E. Howitt). Brown heart was present in only one field in all fields of table stock surveyed in L'Islet Co. All producers had used fertilizers containing borax. The affected field had been heavily limed some 12 years ago. The trouble was corrected by applying borax

on Sept. 15, either as aspray or broadcast (R.O. Lachance). Out of 81 fields of swedes grown for stecklings which were inspected, 17 were affected by brown heart in amounts varying from a trace to 60% and averaging 7.2%. (G.W. Ayers)

FALSE BLOSSOM (cause unknown) affected a trace to 4% of the plants in 5 out of 24 fields of swedes grown for seed in P.E.I.; no seed was produced on affected plants (R.R. Hurst). This would appear to be identical with Sterility, reported below.

STERILITY (cause unknown) was again observed in seed plots of Laurentian and Wilhelmsburger varieties in York and Carleton Counties, N.B.; a trace to 2% of the plants were affected. The symptoms were described last year (P.D.S. 20:62). (D.J. MacLeod)

VEGETABLE MARROW

CURLY TOP (virus) was found in several fields of vegetable marrow being grown for seed around Grand Forks and Kelowna, B.C. Usually only a few plants were affected, but in a few fields 20-25% were diseased. (G.E. Woolliams)

IV. POTATO APHID VECTORS IN NEW BRUNSWICK

by

Jean Burnham Adams

The role of the insects called aphids, in the transmission of potato virus diseases is a complex one. Not only are there several species of aphids found on potato foliage in New Brunswick, but the effectiveness of these species as vectors (disease inoculators) varies widely with the species, and with the virus concerned.

During the summer season, roughly June 20 to September 10, aphids may be found on potato foliage in New Brunswick. Four species of these insects are found, Macrosiphum solanifolii Ashmead (the gei of Koch), Aphis abbreviata Patch (Aphis rhamni Boyer), Myzus persicae Sulzer and Myzus pseudosolani Theobald.

Macrosiphum solanifolii Ashmead is a large, active aphid, which overwinters in the egg stage on various species of Rosa, wild and cultivated. This aphid is the most apparent on potato foliage due to its larger size, its restlessness and its characteristic habit of feeding on the more terminal growth. Both Myzus persicae and Aphis abbreviata feed on the lower two thirds of the plant, and confine themselves largely to the under sides of the foliage. In addition to this fact, these species are much shorter legged, comparatively smaller and sedentary in habit. In this way such species often escape ready detection. This in all probability explains why a rose bush eradication program was instituted in the State of Maine in the twenties. Macrosiphum solanifolii was very evident, so also was disease spread. The entire field of knowledge at that time was limited and the most obvious conclusions were accepted - the spread of disease was connected with the abundance of M. solanifolii. An eradication of its winter host should control the aphid. Unfortunately, rose bush eradication was difficult and even where it was undertaken with some degree of success, disease transmission continued. Further search began to reveal the role of Myzus persicae and so the program was dropped.

Aphis abbreviata overwinters in the egg stage on Rhamnus cathartica L. and possibly on other species of Rhamnus. Myzus pseudosolanii Theobald is largely confined to the environs of garden plots, since it overwinters on Digitalis sp. in this province

Myzus persicae Sulzer, by far the most efficient vector of virus diseases of the potato, has become generally abundant in southwestern New Brunswick, and during the past few years has been anually recorded in limited numbers from other parts of the province. Considerable difficulty has been encountered in determining its overwintering host. On two occasions fall migrants and on one occasion, sexuales, have been taken from Prunus virginiana L. and P. pennsylvanica L.f. During 1941, (1) numerous forms were collected in the very early spring from Prunus nigra Ait. and in the autumn of 1941, migrant forms were also collected from wild plum. This suggests strongly that wild plum may be one of the major factors in the distribution of Myzus persicae Sulzer in New Brunswick.

1/ Gorham, R.P., Ann. Rep. Ent. Soc. Ont., No. 72, 1942.

The comparative effectiveness of the four species in regard to virus transmission has been examined carefully by numerous research workers in North America and Europe. References are numerous which establish the fact that Myzus persicae is by far the most effective vector, particularly in the case of leafroll transmission. Davies in collaboration with Whitehead and Currie in 1932 (Ann. Appl. Biol. 19:539) made these following statements: "In samples taken from leafroll plants, transmission only occurred when they included Myzus persicae.....", and "Cases of transmission occurred when only one specimen of Myzus persicae from a leafroll plant was used....." "In the case of 20 Macrosiphum solanifoli no transmission occurred until Myzus persicae were among them....."

In 1934, (Ann. Appl. Biol. 21:283) Davies discusses the merit of aphid species in their roles as disease vectors. He states, "There is now general agreement that Myzus persicae Sulzer is the species of aphis which is most generally responsible for the dissemination of the leafroll disease of potatoes. Smith has shown that one or two individuals only of Myzus persicae are sufficient to transmit leafroll from an infected to a healthy plant."

The role of Aphis abbreviata Patch as a vector of leafroll has been studied at the Maine State Experiment Station in more recent years. Although the viruses of potato diseases may occasionally be carried by Macrosiphum solanifolii Ashmead, and Aphis abbreviata Patch, the effectiveness of Myzus persicae Sulzer so far surpasses that of the other two as to make studies of these species secondary.

In the case of Myzus pseudosolani Theobald, its relative lack of abundance makes it a negligible factor of disease transmission in New Brunswick.

During the past ten years, Myzus persicae Sulzer has been used by the laboratory here in studies on virus resistance in potaotes. The bulk of the studies to date has been in regard to the resistance of horticultural hybrids to Solanum Virus 3 (A). The efficiency of Myzus persicae can be noted when it is realized that an original total of over 12,000 seedlings has been reduced by greenhouse inoculations via M. persicae to slightly more than 200 survivors in 1941. These 200 plants have been tested repeatedly and seem to be escaping because of a true virus resistance.

More recently this species is being used in similar tests using Solanum Virus 14 (leafroll) instead of Solanum Virus 3 (A). Its effectiveness has been noteworthy and its use quite satisfactory.

V. DISEASES OF FRUIT CROPS

APPLE

FIRE BLIGHT (Erwinia amylovora). Infection was moderate to severe on several trees in the orchard at the Dominion Experimental Station, Lethbridge, Alta. (A.W. Henry and G.B. Sanford). It was also observed at the Horticultural Station, Brooks (G.B. Sanford); a trace was found on Pyrus ussuriensis at Beaverlodge (W.C. Broadfoot). This is the first report of fire blight in Alberta. The disease is now known from every province of the Dominion. H. R. McLarty and G. E. Woolliams (Rept. Dom. Botanist for 1930: 114.1931) have demonstrated that Pyrus ussuriensis is moderately susceptible.

The fire blight epidemic this year was the most severe ever experienced at the Experimental Station, Morden, Man. Thousands of trees of various ages were destroyed. Several varieties, notably the Tate-Dropmore pear, formerly considered resistant, were attacked. The organism was isolated and was found to be pathogenic to apple, apricot, plum and sand cherry, although cross inoculations indicated that there may be some specialization on the different hosts. The probability of physiologic specialization and also of disease escape even in fairly severe epidemics suggests the advisability of developing some means of testing new varieties of fruit trees by artificial inoculation. Fire blight was also observed at Winnipeg and Miami, but the infection was moderate (W.A.F. Haghorg).

Fire blight was quite prevalent in many orchards in Ont. In several orchards inspected, the diesase had caused considerable injury, especially on Greening (J.E. Howitt). Fire blight was observed several times. It was most severe on Yellow Transparent, on which overwintered cankers were quite commonly found (G.C. Chamberlain). A severe epidemic of fire blight developed in the Ottawa district in June, both on the Ont. and Que. side of the river. The disease was also severe in the orchard at the Central Experimental Farm. Many of the infected trees in garden and home orchards are varieties of crab apple and Yellow Transparent with some Alexander. (H.N. Racicot)

Throughout the apple districts in south-western Quebec fire blight was present in dangerous amounts; careful pruning in the fall will be necessary to prevent a possible devastating epidemic in 1942. An exception was the Abbotsford district, where most growers have continually made a serious effort to carry out control recommendations. In this district, an appreciable amount of fire blight was detected in only one orchard, which still retains the remnants of a block of highly susceptible varieties. The potential menace of such varieties was best illustrated at Franklin Centre, where a small ill-kept, unpruned, almost worthless orchard consisting largely of sickly Alexander trees, was the focus of infection for several neighboring well-cared-for orchards. In most districts, McIntosh showed a higher incidence of spur blight than Fameuse, the reverse of what usually happens. Due to the unusually dry summer, fire blight did not actually develop to the extent at first anticipated. On the other

hand, vigorous vegetative growth can be expected following the short crop this year (F.S. Thatcher). Several trees of Wolf River and Wealthy were severely affected in a small neglected orchard at Beaumont (R.O. Lachance). Fire blight was recorded on trees in abandoned orchards in P. E. I. (R.R. Hurst)

ROT (Gloeosporium album) was very common on apples in cold storage at Fredricton and Keswick Ridge, N.B. (S.F. Clarkson)

RUST (Gymnosporangium clavipes). A trace was present on Rome Beauty in the spray plots at Kentville, N.S.; a trace was also found on other varieties in commercial orchards in Kings Co. (J.F. Hockey). The rust, Gymnosporangium Juniperi-virginianae, was abundant on apple in the immediate vicinity of the red cedars in an old pasture in Norfolk Co., Ont., but it was present to a slight extent only in apple orchards surrounding the pasture. (J.E. Howitt)

TWIG BLIGHT (Nectria cinnabarina) was found affecting 2-3% of the twigs of Rome Beauty and Gano in several orchards in Kings Co., N.S. (J.F. Hockey)

EUROPEAN CANKER (Nectria ditissima) was present on over 10% of young Delicious and Wagner trees in an orchard block in Kings Co., N.S. (J.F. Hockey)

ANTHRACNOSE (Neofabraea malicorticis) was general and caused moderate damage on the lower mainland and Vancouver Island (W. Jones). New cankers were more numerous than usual in the Salmon Arm district probably on account of extensive rains in the early fall of 1940. (G.E. Woolliams)

BULL'S EYE ROT (Neofabraea malicorticis or N. perennans) was reported to have caused considerable loss of fruit in storage during the winter of 1941. (H.R. McLarty)

ROT (Penicillium expansum) was recorded affecting apples in storage at the Station, Fredricton, N.B.

TWIG BLIGHT (Phoma Mali) caused moderate damage in the University orchard, Winnipeg, Man.; Pycnidia were abundant on the twigs. According to Freeman Weiss (P.D.Reptr. 25: 374. Aug. 1, 1941) Phoma Mali Schulz & Sacc. is probably a synonym of Phoma ambigua Sacc. = Phomopsis ambigua (Sacc.) Trav., the conidial stage of Diaporthe ambigua Nit. (W.A.F. Hagborg)

BLACK ROT (Physalospora obtusa) caused severe leaf spot and canker on a few neglected trees at Pomeroy Ridge, N. B. (S.F. Clarkson). Black rot was observed in several orchards in P. E. I.; a heavy infection occurred on Alexander in Kings Co. (R.R. Hurst)

CROWN GALL (Phytomonas tumefaciens) was found on one McIntosh tree in an orchard in Queens Co., P.E.I. This is the first record of the disease on apple in P.E.I. (R.R. Hurst)

CROWN OR COLLAR ROT (Phytophthora Cactorum) of apple is one of the most destructive diseases in the Okanagan valley, B.C. It is estimated that at least 2% of the apple trees in the district are diseased and in some orchards, 40% have been found affected. At the present time, a high percentage of the affected trees die. Typical symptoms have been produced in 70 trees of various ages by inoculation with P. Cactorum under field conditions. To initiate infection, so far it has been necessary to insert the inoculum in a wound to the depth of the cambium. For the control of the disease, the present recommendations are to avoid excessive soil moisture, to clear away the soil around the crown of affected trees for the warm months since the development of the pathogen is checked by the drying of the tree crowns and to plant seedlings at the base of an affected tree and graft their tops into healthy tissue in the trunk above the rot. Experiments are in progress to devise a method of protecting the trees through the use of fungicides applied to the soil around the crowns and to select Phytophthora-resistant varieties or rootstocks which may be used for replacements or in new orchards. McIntosh appears to be resistant. (H.R. McLarty and M.F. Welsh)

POWDERY MILDEW (Podosphaera leucotricha) moderately infected the foliage on Vancouver Island, B.C. (W. Jones). Although powdery mildew was very prevalent on the foliage in the Okanagan Valley, it did little damage to the fruit (R.E. Fitzpatrick). A light scattered infection was present on unsprayed Cortland trees in an orchard in Lincoln Co., Ont. (G.C. Chamberlain). Powdery mildew has been quite prevalent on the foliage of young McIntosh trees in York and Charlotte Counties, N. B., for the last 2 years. Many growers do not spray young trees the first or second year after they are planted (S.F. Clarkson). The disease was observed on young wild trees along roadside in Queens Co., P.E.I. (R.R. Hurst)

SILVER LEAF (Stereum purpureum). Several young McIntosh trees were found affected in York and Queens Co., N.B.; in most trees only leaf symptoms were visible, but a severe canker was present on a few trees. (S.F. Clarkson)

PINK ROT (Tricothecium roseum) was noticed on apples on the market at Charlottetown, P.E.I.

SCAB (Venturia inaequalis) was moderate on the lower mainland and Vancouver Island, B.C. (W. Jones). Apple scab is a minor disease in the Okanagan valley and is of economic importance only in the northern sections of the district at Salmon Arm and Vernon. Three sprays, pink, calyx and first cover give adequate control when they are properly applied. In this district, Elgetol, containing di-nitro-cresol as the active principle, has been used with considerable success to kill out the fungus in the leaves as they lie on the ground over the winter. (H.R. McLarty). Scab was present around Grand Forks, where it ordinarily does not occur; a long period of rainy weather in May and June probably accounts for its occurrence (G.E. Woolliams).

Scab was of minor importance in most districts in Ontario. In the Niagara Peninsula, ascospores were discharged in quantity, but conditions

were unfavourable for primary infection. Initial discharge occurred early, on April 20, while the major discharge took place May 16-28. The first critical infection period occurred on May 31 and primary infection was noted on June 20. Secondary infection was well established in early July, when foliage infection was 13% on unsprayed trees and 1-6% on sprayed. Very little further spread took place and the fruit remained clean (G.C. Chamberlain). Scab development was unusually slight in western Quebec, many orchards being almost free.(F.S. Thatcher). Scab was more easily controlled than usual in western Que. due to the lack of rain. Some primary infection was present at the end of June, but very little secondary infection developed. (F. Godbout). About Quebec city, excellent clean fruit was produced in family and small commercial orchards, where the trees were sprayed, but the crop was unusually poor in the unsprayed. (O. Caron)

Apple scab was very prevalent and destructive in N.B. Perithecia were more numerous than for several years. Ascospores were formed and coloured at Fredericton on April 22, in the southern part of the province on May 8-10 and in the eastern area May 21-24. Initial ascopore discharge took place at Fredericton May 20-25, when buds were in the pink stage. Primary infection was found affecting sepals and leaves when the trees were in full bloom on June 4. Early scab was severe in some orchards, causing cracking and deforming of the fruit. However, most growers obtained good control of scab with the applications up to and including the first cover spray and accordingly omitted the second cover spray. The weather was subsequently very cool with frequent heavy rains and little sunshine with the result that late scab was prevalent on the fruit. (S.F. Clarkson)

Ascospores were late in maturing in the Annapolis valley, N.S., but they were produced in abundance early in a 20-day period of rain in May. Under the conditions prevailing it was difficult to spray and as a result considerable early scab infection occurred. The first scab lesions were found on May 27 and scab had become very abundant in many orchards by June 10. Heavy applications of spray reduced spread of the disease and late scab infection was much less than anticipated. Fruit of excellent quality was produced in well-sprayed orchards, where growers were able to commence operations early in May, but fruit of a lower quality due to scab and insects was harvested in most orchards in which only 3 or 4 sprays were applied (J.F. Hockey). Scab was very severe in P.E.I. Initial ascospore discharge occurred on May 15 and by that date 2 sprays had been applied. Due to broken weather, it was difficult to adhere to a regular spray schedule. Foliage infection developed very early and late scab infection was heavy. As a result much of the crop was unmarketable. (R.R. Hurst).

MOSAIC (virus) was found on a few trees of Wolf River and Wealthy at Woodstock, N.B. A mosaic-like mottle was also noted on the variety Bethel in York, Sunbury, Queens and Charlotte Counties. (D.J. MacLeod)

BITTER PIT (non-parasitic) affected a trace to 40% of the fruit on Baxter and Wealthy trees in York Co., N.B. The trouble was more prevalent on trees suffering from winter injury or otherwise unhealthy than on vigorous ones. (J.L. Howatt)

CANKER (cause unknown). McIntosh trees bearing large often deep cankers on the trunk and limbs were found at Hampton, Lower Gagetown and Keswick Ridge, N.B. So far the cause has not been determined. (S.F. Clarkson).

CHLOROSIS (non-parasitic). Several trees were slightly to moderately affected at the Station, Lethbridge, Alta. (G.B. Sanford)

DROUGHT SPOT, CORKY CORE and DIE BACK (boron deficiency). Some drought spot and corky core occurred in the Okanagan Valley, B.C., in orchards that were treated with boric acid at the rate of 0.5 lb. per tree three years ago. All trees in the experimental plots have remained healthy after 6 years. As a result of the general applications in 1936 and in 1939, a considerable reserve of boron has been built up in the soil and it will probably be 1943 or 1944 before a third application will be necessary (H.R. McLarty). Drought spot was found affecting a number of large Wolf River apples in an orchard in Queens Co., N.B. Internal cork affected 65% of the apples on about 100 Cortland trees in the spray pl t at Springhill, while fruit on McIntosh and Lobo trees in the same block were normal. The apples were slightly pitted over their entire surface. (S.F. Clarkson)

FASCIATION. The branches on one Fameuse tree at Woodstock, N.B., were found to be fasciated and twisted spirally. (D.J. MacLeod)

FROST INJURY. A drop of the temperature to 27° F. on May 27 followed by high winds caused considerable injury to leaves in orchards in N. B.

LEAF SCORCH (cause unknown) was not as severe as in 1940 in the Okanagan Valley, B.C., but was present to some extent in the same orchards that were affected last year. The trouble seems worse on trees with heavy crops. Its lower incidence this year may be due to the fact that the crop was light in 1941. (R.E. Fitzpatrick)

LEAF SPOT (?Hormodendron sp.) caused severe defoliation in several places in the Okanagan Valley, particularly in the Oliver district. It appeared in mid-season. The prolonged wet period may be responsible for its occurrence. The leaves show typically a scorching around the edge of the leaf and an indeterminate spotting of the leaf surface. (R.E. Fitzpatrick and H.R. McLarty)

NITRE BURN caused a severe burning of the leaves and defoliation in an orchard in Lincoln Co., Ont., due to cyanamid being carried by the wind to the foliage when an application of the fertilizer was being made to asparagus. (G.C. Chamberlain)

HAIL affected from 15 to 90% of the fruit in the orchards in Hemmingford and Frelighsburg districts, Que. (F.S. Thatcher)

POTASH DEFICIENCY. Symptoms of deficiencies of potash and magnesium were encountered in varying degrees in southwestern Quebec, particularly in the Chateauguay, Frelighsburg and Abbotsford districts. The symptoms were most pronounced on gravelly soils, particularly where a "hard-pan" was present near the surface and were probably more conspicuous due to the drought. (F.S. Thatcher) Potash deficiencey was observed affecting the occasional tree in Queens Co., P.E.I. (R.R. Hurst)

RUSSETING (spray injury) was not general this year in the spray plots in York Co., N.B., since the weather was generally fine during the application of the early sprays. Apples sprayed with Bordeaux at the pre-pink, pink and first cover stages were rough to the touch. Fruit sprayed with iron-sulphate lime-sulphur were smoother and more highly coloured. (S.F. Clarkson)

WATER-CORE (non-parasitic) was more common than usual in McIntosh in York Co., N.B. All the fruit were affected in some old unknown varieties. (J.L. Howatt)

WINTER INJURY was unexpectedly severe and widespread in southwestern Quebec. Although rather extensive areas of the bark were killed, injury did not usually penetrate the innermost bark or cambium. The trees made remarkable recovery, but complete recovery will depend on the conditions during the winter 1941-42. It would appear that fertilizers too high in nitrogen were being used in the more severely injured orchards. (F.S. Thatcher)

APRICOT

CORYNEUM SPOT (C. Beijerinckii) was severe affecting all the fruit in one orchard in the Okanagan Valley, B.C.; the value of the fruit was halved. In general, the disease was not severe. (H.R. McLarty)

FIRE BLIGHT (Erwinia amylovora) A moderate infection was observed particularly on the branches of apricot at the Station, Morden, Man.; this is the first record of the disease on apricot in Manitoba. (W.A.F. Hagborg)

BLACKBERRY

ORANGE RUST (Gymnoconia Peckiana) was found moderately infecting Kittatinny in a planting in Lincoln Co., Ont. (G.C. Chamberlain)

BLUEBERRY

GREY MOULD (Botrytis cinerea) affected an occasional flower or fruit cluster of Vaccinium pennsylvanicum in the Tusket district, Yarmouth Co., N.S. (J.F. Hockey)

RUST (Calyptospora Goeppertiana) was found in almost every blueberry barren in Yarmouth Co., N.S., but it caused little damage due to the low percentage of affected plants. (J.F. Hockey)

RED LEAF (Exobasidium Vaccinii) was the most prevalent disease in the Tusket district, Yarmouth Co., N.S. It completely affected 3-10% of the clump areas and resulted in a loss of 1-3% of the fruit. (J.F. Hockey)

POWDERY MILDEW (Microphaera Alni var. Vaccinii). A light general infection was observed in the Tusket district, N.S., but little damage was apparent. (J.F. Hockey)

CHERRY

STORAGE ROT (Alternaria, Botrytis, Rhizopus, etc.) affected up to 30% (av. 11%) of the fruits in a shipment of Lambert cherries from Creston, B.C., received in Toronto. An early shipment to Ottawa showed 2% due to Botrytis. The fruit was apparently allowed to become overmature. (H.N. Racicot)

BLACK KNOT (Dibotryon morbosum). A moderate infection was found in 4 orchards in Queens Co., P.E.I., and also in Kamouraska Co., Que.

SHOT HOLE (Higginsia hiemalis (Cylindrosporium hiemale) caused much damage in nurseries on Vancouver Island and the lower mainland, B.C. (W. Jones and W.R. Foster). A moderate infection was found on the European dwarf or ground cherry (Prunus fruticosa) at Morden, Man.; some seedlings appeared to be immune (W.A.F. Hagborg). Shot hole, epidemic in 1940, was of little importance in 1941 except in one orchard in Lincoln Co., Ont., where considerable defoliation occurred. The orchard is on light soil, low in fertility; this may have affected the prevalence of the disease. A light infection was noted in a nursery in Welland Co. (G.C. Chamberlain). Shot hole caused slight damage at the Station, Kentville, N.S. Traces were present in all cherry orchards in P.E.I.

BROWN ROT (Sclerotinia fructigena). A slight infection was reported on Vancouver Island and the lower mainland, B. C. (W.Jones) Blossom blight caused slight damage at the Station, Kentville, N.S. (D. MacLeod)

BLOSSOM BLIGHT (Sclerotinia ?laxa) caused moderate damage to sour cherries on Vancouver Island, B.C.; it was more severe than in 1940. (W. Jones)

POWDERY MILDEW (Podosphaera Oxyacanthae) moderately infected scattered trees in an orchard in Lincoln Co., Ont. (G.C. Chamberlain)

LEAF CURL (Taphrina Cerasi) was found on a few trees at Courtenay, B.C.; the fungus was determined by Dr. A.J. Mix. (W. Jones)

LITTLE CHERRY (?virus) is an important disease in the Kootenay Lake district, B.C. It was first noted in an orchard at Willow Point in 1933 and in 3 additional orchards in 1934. For several years it appeared to be confined to Willow Point, but it has now spread through a considerable portion of the Kootenay orchards. The only symptom is that the fruit on affected trees do not develop to normal size. As a result the crop is of little or no value. Preliminary tests by W.R. Foster indicate that the disease is caused by a virus (J.E. Eastham and H.R. McLarty). For a more extended account of the disease see Ann. Report B.C. Dept. of Agr. for 1940. 35:50-54. 1941.

MOTTLE LEAF (virus). Since 1940, 36 additional trees have been found at Nelson City, B.C., affected as follows: Bing 24, Royal Anne (Napoleon) 9, Black Republican 2, seedling 1. (T.B. Lott). Mottle leaf affected 1% of the trees in an orchard of Lambert and Bing at Keatings (W.R. Foster). Four trees of Black Tartarian were found affected in Essex Co., Ont.; leaves were narrow, sometimes mottled with leaf margin irregular. (G.C. Chamberlain)

RING SPOT (probably virus). Three trees were found affected in an orchard of 75 Montmorency trees in Lincoln Co., Ont. Diseased trees were characterized by delayed foliations, the smaller leaves showing distinct ring spot and mottling, which later became necrotic resulting in shot hole or extensive dead areas. New growth developed and the trees appeared to recover. (G.C. Chamberlain)

SPRAY INJURY from arsenical sprays was widespread in the Okanagan Valley, B.C., and was no doubt due to the exceptionally wet season (H.R. McLarty). Yellow leaf, as a result of injury by lime sulphur, was moderate on Seneca in an orchard in Lincoln Co., Ont.; this variety is very susceptible under hot dry weather conditions. Yellow leaf was slight to moderate in several orchards of Montmorency particularly where Bordeaux mixture was used in the schedule, but it was also found where straight lime sulphur was applied. (G.C. Chamberlain)

CRANBERRY

RED LEAF (Exobasidium Vaccinii) was observed occasionally in P.E.I. (R.R. Hurst)

LEAF BLIGHT (Naevia Oxycocci) Dearn.) affected almost 100% of the leaves in one bog and trace to 5% in 2 other bogs in Kent Co., N.B., and a trace in a 4th bog in Sunbury Co. (J.L. Howatt and S.F. Clarkson). The heavy infection was on plants of Vaccinium macrocarpon. (I.L. Conners)

FROST caused slight damage to the tips of the vines in the bog at Rusagonis, N.B.

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola). Infection was general on black currant on the lower mainland, B.C. (W. Jones) Blister rust was abundant on black currants on the Island of Orleans, Que. Traces of rust were observed in 3 out of 10 plantings inspected at Ste. Famille as early as July 16. The rust gradually spread and increased in intensity as the season advanced so that infection was severe in most of the plantings on September 18. (O. Caron). Infection was severe on black currants at Fredericton, St. Andrews, St. Quentin and Sackville, N.B., sometimes causing partial defoliation (S.F. Clarkson). Infection was heavy in 10 gardens on red currant in Queens Co., P.E.I.; it was also severe on black currant. (R.R. Hurst)

LEAF SPOT (Mycosphaerella Ribis (Septoria Ribis). A slight infection was general in the University plots, Saskatoon, Sask. It was prevalent and severe on Kerry, Eagle and Topsy at Indian Head.

POWDERY MILDEW (Sphaerotheca mors-uvae). Only a trace was present this year at Saskatoon, Sask.

GOOSEBERRY

LEAF SPOT (Mycosphaerella Ribis (Septoria Ribis) was prevalent and severe at Indian Head, Sask.

RUST (Puccinia Pringsheimiana) was generally prevalent in June, specimens being received from Digby, Annapolis and Kings Counties, N.S. (J.F. Hockey)

POWDERY MILDEW (Sphaerotheca mors-uvae). A trace to slight infection was found at Beaverlodge, Alta. A light infection was found marking the fruit in Lincoln Co., Ont. A heavy infection caused severe damage in Queens Co., P.E.I.

GRAPE

POWDERY MILDEW (Uncinula necator) is the most important disease of grape in the Okanagan Valley, B.C., at the present time. It has been particularly severe on European varieties. It caused heavy losses in some vineyards in the Oliver district.

LOGANBERRY

DRY BERRY (Haplosphaeria deformans). Infection was general and affected up to 25% of the fruits in many plantations on the lower mainland and Vancouver Island, B.C. (W. Jones and W.R. Foster)

LEAF SPOT (Septoria Rubi). Infection was general and damage was moderate in sheltered plantings on the lower mainland and Vancouver Island, B.C. (W. Jones)

PEACH

SCAB (Cladosporium carpophilum) was found in several orchards in widely separated districts in the Niagara Peninsula, Ont. (G.C. Chamberlain)

BACTERIAL SPOT (Phytomonas Pruni) was found in an orchard at Fenwick and another at Port Dalhousie, Ont. (G.C. Chamberlain)

STORAGE ROT (Rhizopus sp.) caused a 30% loss in a shipment of fruit from the Okanagan Valley to Victoria, B.C.

BROWN ROT (Sclerotinia fructicola) caused considerable damage to the fruit in one garden at Victoria, B.C. (W. Jones). Little blossom blight and brown rot were present in the orchards this season in the Niagara Peninsula as the weather was comparatively dry. (R.S. Willison)

POWDERY MILDEW (Sphaerotheca pannosa) caused no severe losses in the Okanagan Valley, B.C., this year, but the disease was present. Little foliage infection occurred before midsummer. (R.E. Fitzpatrick)

LEAF CURL (Taphrina deformans) was unusually prevalent in the Okanagan Valley, B.C., this spring, although in only a few orchards was it severe enough to cause any real damage. (R.E. Fitzpatrick)

PRUNE MOSAIC (virus). Symptoms similar to those obtained in 1940 on peach by inoculation with prune mosaic virus (P.D.S. 20:82) were found for the first time in various parts of the southern Okanagan Valley during the orchard survey. Affected trees numbered 211 out of 5,137 examined. Transfers from peach to either peach or prune have yet to be completed. (T.B. Lott)

WESTERN X DISEASE (virus) reported last year as a "suspected virus disease" (P.D.S. 20: 79) was found again in the southern Okanagan Valley. In 3,649 trees new infections amounted to 1.1% this year compared to 1.7% before any diseased trees were removed. In the central Okanagan no infections were found in 259 trees surveyed compared to 2, since removed, found last year. Symptom expression was much less definite this year than in 1940. (T.B. Lott). Western X disease was first observed

in the Okanagan Valley in 1939. The areas most severly affected are Osoyoos and Oliver. It is now present also in orchards in Utah, Idaho, Oregon and Washington; in some orchards, 40 to 50% of the trees are affected and affected trees rapidly become unproductive. So far the highest infection in any orchard in the Okanagan has been 7%. (H.R. McLarty)

X DISEASE (virus). Although X disease was first found in the Niagara Peninsula, Ont., in 1941, the disease was apparently present in some orchards as early as 1937. Affected trees have been located mainly in the Bartonville district, but some 70 trees have been found in Niagara Township, Lincoln Co., and one near Beamsville (G.H. Berkeley, Can. Horticulture & Home Magazine 64:206. 1941). At almost every location diseased chokecherries were found in close proximity to the infected trees. This close association between chokecherry and peach has been demonstrated in Connecticut. Indeed spread of the disease apparently depends on the presence of chokecherries relatively close to the peach.

ETHYLENE DICHLORIDE INJURY. In one young orchard near St. David, Ont., the crowns of several trees were injured by ethylene dichloride emulsion used in the control of the peach borer. Damaged trees were partially to completely girdled resulting in gradations of injury from slight stunting and pale foliage to the death of the tree. (R.S. Willison)

INTERNAL BROWNING (non-parasitic). At harvest the flesh of the ripe fruit of Sea Eagle, grown in the Laboratory orchard, St. Catharines, showed a ring of more or less dessicated brown tissue around the pit. Frequently, lenticular cavities appeared in the brown flesh about the apical region of the pit. In some fruits the affected tissue was watersoaked or only partially browned. Sea Eagle is a white fleshed variety from South Africa. (R.S. Willison)

SPRAY INJURY. Shot hole and defoliation was severe on both peach and apricot in the Okanagan Valley, B.C.; from a careful examination of many affected orchards it was quite evident that the trouble was due to the affects of lead arsenate spray (H.R. McLarty). Severe foliage burn and defoliation were caused by the omission of hydrated lime in the zinc-lime-arsenical spray in several orchards in the Niagara Peninsula, Ont. (G.C. Chamberlain)

SUTURE SPOT (cause unknown) was looked for in the district between Beamsville and Grimsby, Ont., where it was prevalent on Elberta in 1940 (P.D.S. 20:80). A few affected fruits could be found on most of the trees in the earlier varieties, Golden Jubilee, Vimy and Valiant, but the bulk of the crop was normal; on these varieties suture spot appeared as a red, soft, juicy, riper wedge of tissue along the suture. Elberta fruits were free from the trouble. Several specimens were found, however, exhibiting symptoms as described in 1940, but sometimes resembling those of the earlier varieties. (R.S. Willison)

WIND DAMAGE. Heavy gales caused considerable damage in late September in the Niagara Peninsula, Ont. Damage was greater to trees under late

cover crop cultivation than to those under early cover cropping. In the Laboratory orchard, St. Catharines, each block receiving a different treatment contains 48 trees; damage was as follows:

Variety	Number damaged	Beyond Repair	Required wiring
Elberta			
late	9	2	2
early	4	0	2
White-fleshed			
late	8	1	3
early	4	1	2

(G.H. Berkeley)

WINTER INJURY. Considerable dead wood was apparent in many orchards in Lincoln Co., Ont., due to heavy moisture and late growth of trees in the fall of 1940. Some young trees also died, but drainage was not the best in those orchards. (G.C. Chamberlain)

PEAR

FIRE BLIGHT (Erwinia amylovora). A severe outbreak occurred in a few orchards in the Okanagan Valley, B. C. In general, the disease was no more prevalent than usual. The disease has been very successfully controlled by the persistent clean-up of the over-wintering cankers (H.R. McLarty). Several varieties of pears were attacked at the Station, Morden, Man. Large cankers were common even on the Tate-Dropmore pear, formerly considered to be resistant (W.A.F. Hagborg). The disease moderately infected Bartlett in an orchard in Kent Co., Ont., but without involving the main branches. (G.C. Chamberlain)

RUST (Gymnosporangium clavipes) caused slight damage in an orchard at Kentville, N.S. (D. MacLeod)

CROWN GALL (Phytomonas tumefaciens). Two-year-old trees, which were making poor growth were found to be quite heavily infected by crown gall in an orchard in Lincoln Co., Ont. (G.C. Chamberlain)

POWDERY MILDEW (Podosphaera leucotricha) caused damage to the fruit in some orchards in the Okanagan Valley, B.C. Apparently the disease spread from apple to pear (R.E. Fitzpatrick). Russetting of pear fruit is very common throughout the district. (H.R. McLarty)

SCAB (Venturia pyrina) was severe on D'Anjou at the Station, Sidney, B.C., but it was negligible on the other varieties; the disease was more prevalent than usual on scattered trees on Vancouver Island and the lower mainland (W. Jones). Scab was very severe on unsprayed trees

in several counties in N.B. (S.F. Clarkson). It was very severe on Flemish Beauty in an orchard in Queens Co., P.E.I.

STONY PIT (virus) was moderate on Bosc and D'Anjou varieties at the Station, Sidney, B.C. (W. Jones)

BITTER PIT (cause unknown) occurred in the D'Anjou variety in the Okanagan Valley, B.C., and caused appreciable losses in some shipments. (R.E. Fitzpatrick)

BLACK END (cause unknown) was present to some extent in most blocks of Bartlett pears in the Okanagan Valley, B.C. (R.E. Fitzpatrick). Black end was found affecting most of the fruit on scattered trees of Kieffer in an Ontario orchard. (G.C. Chamberlain)

IRON CHLOROSIS (lime induced) occurred on trees of pear, apple and cherry in certain restricted areas in the Okanagan Valley, B.C. It is worse in some years than others. In severe cases, no commercial crop is produced. (H.R. McLarty)

FROST INJURY. Typical russet banding developed on 75% of the Kieffer pears in an orchard in Kent Co., Ont., as a result of low temperatures when the trees were in bloom. Apple trees, which were in bloom a little later, escaped injury. (G.C. Chamberlain)

PLUM

BLACK KNOT (Dibotryon morbosum) was reported from 7 widely scattered localities in Que. Black knot appears to be fairly well controlled in a number of commercial orchards near Moncton, N.B., where the trees are sprayed according to the same schedule as apples. The disease is widespread and frequently severe in N.B. (S.F. Clarkson). Infection was a trace to very severe on Damson, Gage and other plums in Queens Co., P.E.I.; specimens were received from other parts of the province.

FIRE BLIGHT (Erwinia amylovora). A slight infection was observed at Morden, Man., on a few hybrid plums. The organism was isolated and found capable of attacking plum, apricot, apple and cherry when inoculated into wounds. (W.A.F. Hagborg)

BROWN ROT (Sclerotinia fruticola) was general and caused severe damage on occasional trees on Vancouver Island and the lower mainland (W. Jones). The disease was fairly common at the Station, Morden, Man., but it caused no serious damage (W.A.F. Hagborg). Brown rot destroyed 50% of the fruit in an unsprayed orchard at Chute à Blondeau, Ont. (H.N. Racicot) It caused slight to moderate damage in sprayed orchards in Westmoreland Co., N.B. (S.F. Clarkson). Considerable blossom blight occurred early in June in Kings Co., N.S.; the fruit was fairly

free from rot, where the trees were sprayed, but 50% or more were affected on unsprayed trees (J.F. Hockey). Brown rot was unusually destructive this year in P.E.I. in both sprayed and unsprayed orchards. Mr. Hockey suggested that the trees be more severely pruned and thinned to permit a better circulation of air. (R.R. Hurst)

PLUM POCKETS (Taphrina communis) destroyed one-third of the plums in an orchard at Venlaw, Man. (H.N. Racicot). The disease was very prevalent in northern Ont. on wild plums and cultivated varieties derived from Prunus americana and P. nigra (J.E. Howitt). Plum pockets was reported from Ste. Rosalie, Joliette and Sherbrooke, Que. Specimens were received from 2 orchards in P.E.I.

RUST (Transchelia Pruni-spinosae) was fairly general in the fall at the Station, Sidney, B.C. (W. Jones)

SHIRO LINE-PATTERN MOSAIC (virus) was first noticed in Ont. in 1938 (P.D.S. 19:92). It is now known to occur in two orchards (G.H. Berkeley, Can. Horticulture & Home Magazine 64:211. 1941).

PRUNE

PRUNE DWARF (Prunus virus 6) was observed in Ont. in 1937 (P.D.S. 19:91 and 20:79 as prune mosaic) and in the following year in B.C. (P.D.S. 18:86 and 20:82). In 2 out of 3 infected orchards in Ont., the disease was observed after Damson plums had been top-worked with Italian prune. To date the disease has been transmitted by budding and grafting only. For a fuller account see G.H. Berkeley, Can. Horticulture & Home Magazine 64:211. 1941.

SPRAY INJURY. In an orchard in Lincoln Co., Ont., sprayed twice with nicotine sulphate and soap for the control of aphids, with a week between applications, the leaves became spotted and yellow, followed by severe defoliation and drop of fruit. A similar case due to the same spray was seen in a 2nd orchard. (G.C. Chamberlain)

MINERAL DEFICIENCY. A condition thought to be due to lack of phosphate and potash caused a rolling of the leaves, purpling of the veins and marginal scorch in an orchard of Italian prune in Lincoln Co., Ont. This condition was also found in sour cherries in the same orchard and in several other orchards in the vicinity. (G.C. Chamberlain)

QUINCE

LEAF BLIGHT (Fabraea maculata (Entosmosporium maculatum) caused severe damage to the leaves in nursery stock at Sardis, B.C. (W. Jones)

RASPBERRY

SPUR BLIGHT (Didymella applanata) was conspicuous on the canes in a commercial planting of Latham and Cuthbert in Middlesex Co., Ont.; the planting had been allowed to become too thick (G.C. Chamberlain). The disease was general on the Island of Orleans and was very common in almost every plantation visited. Traces of spur blight were present on Taylor and Newburgh in the varietal plantings at Kentville, N.S. The disease was heavy on Viking in a planting in Queens Co., P.E.I.

ANTHRACNOSE (Elsinoe veneta) was found consistently affecting cane growth of Taylor in southern Ont.; damage appeared negligible. (G.C. Chamberlain). Some anthracnose was found on Latham, Taylor and Indian Summer in a varietal planting at Kentville, N.S. A trace was present on Lloyd George in a planting in Queens Co., P.E.I.

CANE BLIGHT (Leptosphaeria Coniothyrium). Traces were found on most varieties in the varietal planting at Kentville, N.S.

YELLOW RUST (Phragmidium Rubi-idaei) was general particularly on Cuthbert on the lower mainland, B.C.; it causes considerable reduction in yield. (W. Jones)

CROWN GALL (Phytomonas tumefaciens). Some 20% of the canes were affected in planting stock of Latham in Welland Co., Ont.; both crown and root galls were present (G.C. Chamberlain). A trace of crown gall was found in York and Sunbury Counties, N.B. It was recorded on Viking in Queens Co., P.E.I.

LATE RUST (Pucciniastrum americanum). A slight infection was observed on June 25 on young white spruce and the lower branches of a few older trees near a raspberry plantation, located in York Co., N.B., and where this rust has been severe in recent years. No infection was found beyond one-half mile from the plantation. Examination of the needles revealed aecia and subcuticular pycnia, which agreed with the published descriptions. It affected 5-75% of the fruit in this plantation of Viking and Newman in 1941. The rust may be found on immature or ripe fruit and its sudden "over-night" appearance on picked fruit makes them unsaleable. The uredinia are rather inconspicuous, but once the spores have escaped, their brilliant orange colour in mass renders them easily noticeable. If the fruit are now critically examined it is relatively easy to pick out the infected druplets. Probably spore development continues after the fruit is picked and instead of being carried away the spores collect at the mouth of each uredinium (S.F. Clarkson and I.L. Conners). Late rust was observed on the Island of Orleans, Que. Infection was very heavy in several plantations of Viking in Queens Co., P.E.I., and ruined a large part of the late picking. (R.R. Hurst)

LEAF SPOT (Septoria Rubi) was observed on the Island of Orleans, Que. It was quite common and caused some damage in raspberry plantations in York, Sunbury and Charlotte Counties, N.B.

POWDERY MILDEW (Sphaerotheca Humuli). A trace was found at Lacombe, Alta. Powdery mildew was heavy on Latham in a planting in Lincoln Co., Ont. (G.C. Chamberlain)

GREEN MOSAIC (virus) affected 10-20% of the plants in 4 plantings at Dewdney and Matsqui, B.C., and all the plants of Latham in a nursery at Sardis. The disease is widely distributed and growers have not yet taken to planting certified stock. (W. Jones)

LEAF CURL (virus) affected 25% of the plants in a Cuthbert plantation in Lincoln Co., Ont.; the plantation is no longer profitable. A 1% infection was also found in a Latham plantation, in which variety it is uncommon (G.C. Chamberlain). Two affected plants were found in the Marcy variety at Kentville, N.S.

MOSAIC (virus) affected 10% of the plants in 2 plantings at Dewdney, B.C. (W. Jones). It affected 50% of the plants of unknown variety at Grand Forks. Only one slightly affected plant was found at the Station, Beaverlodge, Alta. Mosaic was severe in several gardens at Saskatoon, Sask. Mosaic was widespread and quite common in commercial plantings especially those of Viking, Cuthbert and Latham over 3-4 years old in Ont. Several nursery plantings of Latham and one of Cuthbert were not certified because they contained too many mosaic-affected plants to permit rogling. The disease was present in one Newburgh nursery planting, but the variety rarely shows mosaic infection. The amount of mosaic found in Taylor seems to be increasing. In a planting of Cumberland black raspberry in Middlesex, Co., Ont., 5% of the plants showed mosaic; it caused a serious stunting and failure of crop in the affected plants (G.C. Chamberlain). Mosaic was common everywhere in Que. It affected 16% of the Viking plants and 46% of the Latham in a planting in Sunbury Co., N.B. (D.J. MacLeod). Mosaic was present in Viking, Latham, Taylor and especially Prussen in the varietal plantings at Kentville, N.S. Various amounts of mosaic were observed in Viking, Lloyd George and other varieties in P.E.I.

NECROTIC FERN-LEAF MOSAIC (virus). Symptoms similar to those described by G.C. Chamberlain (Sci. Agr. 22:2. 1941) were common on plants of Newman, Cuthbert and Latham at Abbotsford, Mission, Hatzic and Sardis, B.C.; in several plantings up to 50% of the plants were affected. (W. Jones)

YELLOW BLOTCH CURL (virus). A slight infection was observed in Cuthbert in the Hatzic and Mission districts, B.C. (W. Jones). Yellow blotch curl was an important disease in 3 Cuthbert plantings encountered in Middlesex, Ontario and Wentworth Counties respectively during inspection. (G.C. Chamberlain)

SAND CHERRY

BROWN ROT (Sclerotinia fructicola) slightly infected twigs and fruit at Morden, Man.

STRAWBERRY

GREY MOULD (Botrytis cinerea) was found particularly on the lower leaves in several strawberry plantations in the Grand Lake area, N.B. It also caused some decay of the fruit. (S.F. Clarkson)

LEAF SCORCH (Diplocarpon Earliana (Marsonnina Fragariae) moderately affected British Sovereign at the Station, Sidney, B.C.; none was found on John, Robert, Ralph and William. (W. Jones)

LEAF SPOT (Mycosphaerella Fragariae (Ramularia Tulasnei) was general and caused slight damage on the lower mainland and on Vancouver Island, B.C. At the Farm, Agassiz, B.C., leaf spot was severe on Simcoe, moderate on Borden, Laurier, Louise and Bowell, while Cartier, Abbot, Lavergne, Herman and King were clean (W. Jones). Leaf spot was very severe on Senator Dunlop, Louise, Martha, MacKenzie and King and a trace was present on Premier, Henry, Laurier, Lemieux, Simcoe, Dorsett and Robert in the variety tests at Fredericton, N.B. It was also very severe on Senator Dunlop at McLean Settlement on July 17 (S.F. Clarkson). Leaf spot was quite heavy at the Station, Charlottetown, P.E.I., and adversely affected the yield. (R.R. Hurst)

POWDERY MILDEW (Sphaerotheca Humuli) was heavy on Senator Dunlop in a planting in Queens Co., P.E.I.

JUNE YELLOWS (?virus) was observed in Dick in a planting in Queens Co., P.E.I. (G.C. Warren)

POTASH DEFICIENCY affected about 24% of the plants in 6 plantings in P.E.I.

ROOT ROT (cause unknown) is becoming more general in strawberry plantings on Vancouver Island, B.C.; at present the disease occurs in scattered patches in the fields (W. Jones). A.A. Hildebrand and P.M. West (Can. Jour. Res. 19(Sec. C):183-210. 1941) have recently published some interesting observations on the causes of strawberry root rot. Their studies on the decomposition of the tissues of red clover and of soybeans, two crops used in rotation with strawberry, indicate that the ability of soybean to control strawberry root rot depends primarily on the carbohydrate type of breakdown which the plant undergoes in diseased soil causing a highly favourable shift in the microbiological equilibrium. The putrefactive decomposition of red clover, on the other hand, did not induce these salutary effects.

In N.B. strawberry root-rot infected soil was found deficient in nitrate nitrogen, nitrite nitrogen, potassium, calcium, manganese and soluble aluminium compounds; acidity ranged from pH 4.8 to 5.5.

YOUNGBERRY

CROWN GALL (Phytomonas tumefaciens) was found on a few plants in one plantation at New Westminster, B.C.

VI. DISEASES OF FOREST AND SHADE TREES

ABIES - Fir

Sooty Mould (Dimerosporium Abietis) was common on the foliage of white fir, A. grandis, at Cowichan Lake, B.C. (J.E. Bier)

Needle Cast (Hypoderma robustum) occurs commonly on the older needles of A. grandis at Cowichan Lake, B.C.

Witches' Broom (Melampsorella Caryophyllacearum). A trace was observed on A. balsamea in Queens Co., P.E.I.

Root Rot (Poria Weirii) is killing some A. grandis in the southeastern section of Vancouver Island, B.C. and in the vicinity of Vancouver. It is also killing patches of A. amabilis at elevations of 3,000 to 4,000 ft. near Youbou, B.C.

Rust (Uredinopsis macrosperma) caused some defoliation of 1-year-old needles of A. grandis at Cowichan Lake, B.C.

ACER - Maple

Tar Spot (Rhytisma acerinum). A few spots were observed on leaves of A. rubrum at the Botanical Garden, Montreal, Que. (J.E. Jacques)

Wilt (Verticillium) affected one side of several trees of A. saccharum bordering a garden in Welland Co., Ont.; raspberries infected with wilt and tomatoes were growing in the immediate vicinity. (G.C. Chamberlain)

AESCULUS - Horsechestnut

Leaf Blight (Guignardia Aesculi) was heavy on many trees at Charlottetown, P.E.I.

Canker (Nectria cinnabarina) Cankers were abundant on the twigs and branches of one tree at the Station, Fredericton, N.B.

AMELANCHIER

Leaf and Fruit Spot (Monilia Amelanchieris). A trace of infection was found at Beaverlodge, Alta. (W.C. Broadfoot)

ARBUTUS MENZIESII

Leaf Spot (Ascochyta Hanseni Ell. & Ev.) was observed at East Sooke, B.C., in Nov., 1940. (I. Mounce and I.L. Conners).

CASTANEA SATIVA - Chestnut

Blight (Endothia parasitica) was present on one tree at Agassiz, B.C. (J.E. Bier)

CHAMAECYPARIS

Root and Crown Rot is causing considerable damage to ornamental varieties of Chamaecyparis in commercial nurseries at Vancouver, B.C. It agrees well with the disease described by J.A. Milbrath (Phytopath. 30:788. 1940) and reported to be due to a new species, Phytophthora lateralis. (J.E. Bier)

CORNUS NUTTALLII - Flowering Dogwood

Leaf Blight (Monilia Corni) was general and caused slight damage on Vancouver Island, B.C., in April and May. (W. Jones)

Powdery Mildew (Phyllactinia corylea) was general in October on Vancouver Island, B.C.

Crown Canker (Phytophthora Cactorum) appeared to be quite common in Vancouver, B.C. Many ornamental trees have been killed. The disease has not been observed as yet on Vancouver Island. (J.E. Bier)

CORYLUS - Filbert

Leaf Spot (Septoria corylina) was general on a hedge of C. americana at Morden, Man.; infection was moderate.

COTINUS COGGYGRIA - Smoke Tree

Wilt (Verticillium sp.) affected two smoke trees at Peterborough, Ont. A Verticillium was readily isolated from the affected twigs. According to my correspondent the trees are about 3 years old and until this year made splendid growth. The first signs of wilting were noticed in July in one tree and the condition became progressively worse. The second tree, some 40 ft. away from the first, did not show signs of infection until about 6 weeks later. I have previously isolated the fungus from maple. The disease has been reported on smoke tree in the United States. (T.R. Bender, N.J. Agr. Exp. Sta. Nursery Dis. Notes 13, (No. 2):5-7. 1942). (F.L. Drayton)

CRATAEGUS - Hawthorn

Rusts. Gymnosporangium globosum and G. clavipes were fairly abundant on hawthorn in the vicinity of a neglected pasture in Norfolk Co., Ont. (J.E. Howitt)

Leaf Spot (Entomosporium Thuemenii) caused severe defoliation of C. Oxyacantha var. splendens at the Green Timbers Forest Nursery, B.C.

JUGLANS - Walnut

Bacterial Blight (Phytomonas Juglandis) was more severe than usual on Vancouver Island, B.C., and it caused considerable damage. (W. Jones)

JUNIPERUS

Rusts (Gymnosporangium spp.). The following rusts were observed on red cedar, J. virginiana, within a localized area in a neglected pasture in Norfolk Co., Ont.: Numerous witches' brooms caused by G. nidus avis, the number of old dead witches' brooms indicated that the rust had been present for some time; G. clavipes, fairly abundant; a widely spread infection of G. globosum; G. Juniperi-virginianae, very abundant killing many of the younger trees (J.E. Howitt). G. nidus-avis is known on Amelanchier intermedia from Ont. (J.C. Arthur, Man. Rusts in U.S. and Can. 369. 1934), but the telia have not been reported previously. Approximately 20 galls of G. Juniperi-virginianae per tree were present on Juniperus virginiana intended for export from Richmond, Ont. Old flowering crabs were reported growing 100 ft. from the cedars and neglected apple trees in a field probably 200-300 ft. away (L.L. Conners). Rust (G. Juniperi-virginianae) was noted commonly on wayside trees in Essex, Norfolk and Lincoln Counties; infection was very abundant. A light infection of G. clavipes on J. communis was

found near a large orchard at St. Joachim, Que.; no injury was noted on the apples.

MORUS - Mulberry

Canker (?Phytomonas mori). Infection was heavy and damage was severe at Summerside, P.E.I.; a trace was also observed at Charlottetown. (R.E. Balch and R.R. Hurst)

PICEA - Spruce

Rust (Chrysomyxa ledicola) was common on young trees of P. Mariana in York and Sunbury Counties, N.B. It caused some defoliation (J.L. Howatt). It partially defoliated P. canadensis at Otterburne and Steinbach, Man. A slight infection was also found on a spruce hedge at the Dominion Laboratory of Plant Pathology, Winnipeg. (J.H. Craigie and A.M. Brown)

PINUS - Pine

Rust (Cronartium coleosporioides). Slight infection was noted in the seedling beds on lodgepole pine at the Acadia Forestry Station, Fredericton, N.B. in 1941. However in 1940, it was estimated that nearly 10% of the seedlings were diseased (J.L. Howatt). The identification was confirmed by R. Pomerleau who has recently reported this rust in Quebec (Mycologia 34:120-122. 1942).

Rust (Cronartium ribicola) was general on Vancouver Island and in the Fraser Valley, B.C. Although white pine usually occurs mixed with other species, forming only a small percentage of the stand, almost all the young growth is infected (J.E. Bier). The white pine plantation of A. Joly de Lotbiniere at Pointe Platon, Que., on the south shore of the St. Lawrence, 30 miles up the river from Quebec city was inspected on May 14, 1941. The plantation was set out in 1908 and originally consisted of about 400 trees imported directly from Germany. When the trees were first examined in 1921, it was found that 66% of the 372 trees in the plantation bore the aecial stage. At the present time 46 are left. Careful examination revealed only one tree infected by blister rust. There has always been an abundance of the alternate host within 200 ft. of the pines. Dead and discoloured limbs were generally absent and only one small branch canker was found (A.W. McCallum). About 10% of the trees in a 2-3 acre block in the University of N.B's forest tract were found to be cankered near the base (J.L. Howatt). Mature aecia were abundant on white pine at Kentville, N.S. on May 26 (J.F. Hockey). Blister rust was reported at East Brideford, P.E.I. (R.R. Hurst)

Rusts (Cronartium spp.) were reported as being serious on lodgepole pine about Terrace, B.C. The gall rust (C. Harknessii) is frequent on lodgepole pine in the Cowichan Lake region.

The rot and fruiting bodies of Stereum sanguinolentum were found on the roots of a number of recently killed P. ponderosa in a 8-year-old plantation at the Green Timbers Forest Nursery, B.C.

POPULUS - Poplar

Leaf Blight (Linospora tetraspora Thompson). Infection was severe on P. tacamahaca between Innisfall and Red Deer, Alta. (G.B. Sanford). G.E. Thompson (Can. Jour. Res. (Sec. C) 17:232-238. 1939)

reports the disease from B.C., Alta., Ont. and Que.

Leaf Spot (Marssonina Castagnei). Infection was severe on P. tremuloides at Fort Garry, Man., in late August.

Rust (Melampsora Medusae). Infection was moderate at Fort Garry and severe at Plumas, Man.

Rust (M. occidentalis) was common on P. trichocarpa at the Green Timbers Forest Nursery, B.C.

Leaf Blight (Sclerotinia bifrons) was common in York and Sunbury Counties, N.B.

Leaf Spot (Septoria populicola) was general on P. trichocarpa in southern B.C.

PSEUDOTSUGA TAXIFOLIA - Douglas Fir

Damping-Off. About 11 million Douglas fir seedlings are produced annually in the 2 Provincial Forest Nurseries in B.C. Considerable damping-off was observed during May and June, 1941. Isolations were made from 288 infected seedlings. They yielded the following fungi, which were identified by W.L. Gordon and J.E. Machacek: Fusarium avenaceum from 55 seedlings; F. oxysporum, 22; F. sambucinum f.1, 23; Pythium sp., 15; Rhizoctonia Solani, 82; R. Solani and F. spp., 13; R. Solani and Pythium, 4; Fusarium and Pythium, 7; Mucor ?racemosus, 49; and Gliocladium roseum, 5. (J.E. Bier)

Leaf Blight (Adelopus Gaeumannii) is universally present on 3-, 4-, 5-, and occasionally 2-year-old-needles on Vancouver Island and in the Fraser Valley, B.C. Infected needles have been found 85 ft. from the ground. The disease does not appear to cause any significant damage.

Dwarf Mistletoe (Arceuthobium Douglasii) is reported on Douglas fir near Nelson, B.C.

Armillaria Root Rot (A. mellea) is causing some mortality of Douglas fir on Vancouver Island, and in the Fraser Valley, B.C.; it appears to be most prevalent around Vancouver.

Root Rot (Fomes annosus) is affecting a few 20 to 30-year-old-trees of Douglas fir at Cowichan Lake, B.C.

Canker (Phomopsis lokoyae) has been found at Cowichan Lake and Green Timbers, B.C. In most instances the lesions are delimited by callous tissue before the girdling is completed.

Bacterial Galls (Phytomonas pseudotsugae Hansen & Smith) similar in every respect to those described by H.N. Hansen and R.E. Smith (Hilgardia 10:569-577. 1937) on Douglas fir in California were found in 20-year-old stands at Cowichan Lake, B.C.

Root Rot (Poria Weirii) is serious in 10- to 60-year-old stands of Douglas fir in the south-eastern part of Vancouver Island, B.C. The pathogen has been found causing a saprot in 200-year-old-trees and is a common saprophyte on stumps and logs of old fir. The disease was found on the mainland near Vancouver and Hope in 1941.

Leaf Blight (Rhabdocline Pseudotsugae) is common on one and two-year old needles at Cowichan Lake, B.C.

QUERCUS - Oak

Root Rot (Armillaria mellea) is common on 300- to 400-year-old-trees of Q. Garryana in the vicinity of Victoria, B.C.

Die Back (Phomopsis quercina) is very common on the younger trees.

Top Rot (Polyporus sulphureus) is becoming serious in the old trees. (J.E. Bier)

Leaf Blister (Taphrina caerulescens) moderately infected leaves of Q. macrocarpa at Beaverlodge, Alta.

RHAMNUS PURSHIANA - Cascara

Rust (Puccinia coronata). Aecia were abundant in a 5-acre plantation of 2-year-old trees at Green Timbers Forest Nursery, B.C., in 1940. The rust caused some defoliation and the death of a number of young stems. Infection was very slight in 1941. (J.E. Bier)

SALIX - Willow

Blight (Fusicladium saliciperdum and Physalospora Miyabeana) was found a second time in B.C. Two large diseased trees and a few smaller ones were located near Chilliwack by Mr. G.E.W. Clarke, District Horticulturist. All trees known to be diseased have been destroyed (J.E. Bier). The disease was reported from the vicinity of Sherbrooke, Que. In the region of Ste. Anne de la Pocatiere, some willow trees have escaped injury from willow blight and appear to be immune. A few trees have also escaped in the Gaspé. (E. Campagna)

Canker (Cytospora sp.) is present on S. sitchensis at Cowichan Lake, B.C.

Twig Blight (Marssonina sp.). The fungus was found associated with lesions girdling some of the smaller stems of weeping willow on Vancouver Island and about Vancouver, B.C.

Rust (Melampsora spp.) was common on willow near Saanichton, B.C. (J.E. Bier). A heavy infection of M. Bigelowii was general about Plumas, Man., on Aug. 12; there was considerable defoliation. (A.M. Brown)

Tar Spot (Rhytisma salicinum) was common on willows at Green Timbers, B.C.

SORBUS - Mountain Ash

Canker (Cytospora leucostoma). A moderate to severe infection was present on European mountain ash at the Station, Beaverlodge, Alta. (W.C. Broadfoot)

Coral Spot (Nectria cinnabarina) was found on the branches and trunk of S. alnifolia at the Botanical Garden, Montreal, Que. Branch cankers can be removed, but those on the trunk usually necessitate the removal of the entire plant, especially in young specimens. (J.E. Jacques)

THUJA - Arborvitae

Blight (Coryneum Berkmanni) is causing a severe blight of T. orientalis in the Vancouver area, B.C. Commercial nurseries have stopped propagating this species on account of the disease.

Needle Spot (Keithia thujina) is universally present on western red cedar (T. plicata) in B.C. The fungus has not been found on 2-year-old seedlings in the nursery at Green Timbers, although trees and hedges in the immediate vicinity are infected.

Fomes annosus has been isolated from a rot in the crown of several 30-year-old trees of T. plicata at Cowichan Lake, B.C. (J.E. Bier)

TSUGA HETEROPHYLLA - Western Hemlock

Dwarf Mistletoe (Arceuthobium campylopodum f. tsugensis) is abundant on western hemlock at Cowichan Lake and near Vancouver, B.C.

Root and Butt Rot. Fomes annosus appears to be the causal agent of a root and butt rot in 85-year-old western hemlock in the Fraser Valley, B.C.

Root Rot (Poria Weirii) has caused some mortality in 10- to 50-year-old trees on Vancouver Island and in Vancouver, B.C.

ULMUS - Elm

Black Spot (Gnomonia ulmea). A moderate infection was observed on Aug. 20 in Lincoln Co., Ont.; it was causing the leaves to yellow and drop prematurely (G.C. Chamberlain). A light infection was present at the Botanical Garden, Montreal, Que.; it did not cause any premature fall of the leaves (J.E. Jacques). Black spot was noted in York Co., N.B., and in the more severely infected trees it caused premature defoliation. (J.L. Howatt)

Coral Spot (Nectria cinnabarina). Examination of the hedges of Chinese elm (U. pumila) at the Botanical Garden, Montreal, Que., revealed that 60-70% of the individual trees bore fructifications of Nectria and 4% were so badly affected that they will have to be replaced. (J.E. Jacques)

Winter Injury was severe in a hedge of Chinese elm at Summerside, P.E.I. (R.R. Hurst)

INSECTS

A slight to moderate infection of Empusa ?Aphidis was noted on Myzus persicae etc. in fields in York, Carleton and Victoria Counties, N.B. An Empusa also attacked the aphids in the Laboratory greenhouse, Fredericton, during periods of high humidity. The latter formed a perfect stage. Whether there is more than one species involved has not been determined, but I have never seen resting spores in aphids parasitized in the field. (J.L. Howatt)

A few tarnished plant bugs, Lygus pratensis, were found in York Co., N.B. which were apparently killed by a species of Empusa. (J.L. Howatt)

A species of Empusa was found killing 15% of the adults of Thrips nigropilosus Uzel and a smaller proportion of the larvae by G.G. Dustan on Chrysanthemum in an experimental greenhouse at Vineland Station, Ont. The conidia resembled very closely those of E. Fresenii Nowakowski, but the spherical, beautifully ornamented resting spores are quite unlike those described for that species. (I.L. Conners)

VII. DISEASES OF ORNAMENTAL PLANTS

ACONITUM - Monkshood

Powdery Mildew (Erysiphe Polygoni) was troublesome on A. bicolor at Indian Head, Sask.

ALTHAEA ROSEA - Hollyhock

Leaf Spot (Cercospora althaeina). Moderate infection was recorded on the leaves of some plants in Man. and a trace at Souris, P.E.I.

Rust (Puccinia Malvacearum) was recorded as follows: Widely distributed on the lower mainland and on Vancouver Island, B.C.; fairly heavy at Armstrong and Lytton; in spite of the comparatively dry summer, very prevalent and causing injury in many parts of Ont.; present and sometimes heavy throughout P.E.I.

ALYSSUM

Downy Mildew (Peronospora parasitica) was found in 2 gardens at Fredericton, N.B. Some White Rust (Cystopus candidus) was also present. (J.L. Howatt).

ANEMIA

Leaf Spot (Phyllosticata Pteridis Halsted) lightly infected the ferns: A. densa, A. rotundifolia, Asplenium nidus, Coniogramme japonica, Lygodium circinatum and Phymatodes muscifolium in a greenhouse, Montreal Botanical Garden, Montreal, Que. The damage was nil. These ferns are kept in a greenhouse at 60° F. and a rather high humidity. Only a few spots appeared on the fronds. The pathogen was not observed in fruit on A. densa and frequently the ash-grey centres fall out. The fungus, however, was isolated. This appears to be the first record of the disease in Canada. (J.E. Jacques)

ANTIRRHINUM - Snapdragon

Rust (Puccinia Antirrhini) was reported as follows: Common in gardens on the lower mainland and Vancouver Island, B.C., and damage considerable; slight damage in a garden at Saskatoon, Sask.; infection moderate late in the season, but less than in former years at Winnipeg, Man.; slight damage in a garden in York Co., N.B.

Yellows (virus) severely affected 50% of the plants in a garden in Queens Co., P.E.I.

ASTER

Powdery Mildew (Erysiphe Cichoracearum). Patches of mildew were present on the lower leaves of some plants of A. novae-angliae in late summer at the Botanical Gardens, Montreal, Que.

BEGONIA

Stem Rot (Botrytis cinerea) was observed in the greenhouse at Toronto, Ont., by W.A. Fowler: "the stems turn brown at the soil level and eventurally shrivel and die". It has been seen before on snapdragon and calendula. (F.L. Drayton)

BERBERIS - Barberry

Rust (Puccinia graminis) was seen on a few bushes at Courtenay, B.C. (W.R. Foster). Pycnia and aecia were abundant on a barberry at Winnipeg on June 12; infection was heavier than in former years. (A.M. Brown)

BOLTONIA

Streak (virus) affected 20% of the plants in the border at the Station, Fredericton, N.B., causing a severe streaking of the leaves and stems. The disease advanced acropetally and in severe cases most of the leaves died and remained hanging to the stems. There was a marked clearing of the veins followed by a necrosis of the veinal network, ultimately resulting in collapse of the leaf. The disease was transmitted by grafting to healthy Boltonia, but attempts to transmit the virus by sap and insect were unsuccessful. The disease overwinters in the affected clumps. It is considered to be a new virus. (D.J. MacLeod)

CALENDULA

Yellows (Callistephus virus 1) severely affected 10% of the plants in the border at the Station, Fredericton, N.B. (D.J. MacLeod). Yellows is widespread and occasionally prevalent in P.E.I. Plants produce good bloom in the early season, but inevitably develop "yellows" by mid or late summer. (R.R. Hurst)

CALLISTEPHUS - China Aster

Rust (Coleosporium Solidaginis). A slight infection was noted in October at Winnipeg, Man.

Wilt (Fusarium oxysporum f. Callistephi) killed scattered plants at Morden and Parkdale, Man; the causal organism was isolated readily from the Morden specimens. (W.L. Gordon)

Yellows (virus). Odd plants were found affected at Brandon and Parkdale, Man. Among the 17 varieties of China aster grown at the Botanical Garden, Montreal, Que., every few plants were free from yellows on Aug. 12; all varieties seemed equally susceptible.(J.E. Jacques). Yellows was widespread and severe on China aster in N.B. The virus was identified as Callistephus virus 1 and was successfully transmitted to healthy China aster by virus-free leafhoppers (Macrosteles divisus) Yellows was also common on yellow hawkweed, Hieracium floribundum Wimm. & Grab. in N.B. The disease was transmitted from this host by leafhoppers to China aster and identified as Callistephus virus 1 (D.J. MacLeod). All plants were affected in several gardens in Queens Co., P.E.I.

CAMPANULA MEDIUM - Canterbury Bells

Leaf Spot (Ramularia macrospora Fres.) caused moderate damage in a garden at Brentwood, B.C. (W. Jones and I.L. Conners)

Crown Rot (Sclerotinia sclerotiorum) was severe in a garden in Queens Co., P.E.I.

CARAGANA

Polyporus Tulipiferae was apparently destructive in a mixed stand with spruce at the Forestry Station, Indian Head, Sask.

Leaf Spot (Septoria Caraganae) was widespread in Saskatoon Sask., in spite of the heat and drought from midsummer onwards; damage was generally light (T.C. Vanterpool). Affected specimens were received from Valor. Infection was general and moderate at Morden, Man., and slight at Brandon and Winnipeg; defoliation was less than in some years.

CHRYSANTHEMUM

Foot Rot affected odd plants at Brandon, Man. Isolations yielded Fusarium oxysporum and F. Solani. (W.L. Gordon)

Spotted Wilt (virus). The plants were slightly to moderately affected in a greenhouse at Redcliff, Alta. The diagnosis was confirmed by Dr. Berkeley. (G.B. Sanford)

CISSUS - Treebine

Black Mould (Hormodendron cladosporioides Sacc.). The fungus was so abundant on the only plant of C. sicyoides grown at the Botanical Garden, Montreal, Que., that it became completely defoliated. It formed a sooty coating on the leaves, which yellowed and dropped. Its growth was favoured by the high humidity in the greenhouse. The plant suffered loss of vigour, but it soon recovered. (J.E. Jacques)

CLARKIA

Foot Rot. A severe infection occurred at Brandon, Man.; isolations yielded Fusarium oxysporum and F. Solani. (W.L. Gordon)

Heat Canker or Girdle was severe on about 35% of the plants in a private garden, Saskatoon, Sask.; Dr. Roderick Sprague suggested the trouble was due to heat, high temperatures of 100°F. having been experienced. (T.C. Vanterpool)

CLEMATIS

Stem Rot (Ascochyta clematidina Thüm.) destroyed all 5 plants in a garden at Charlottetown, P.E.I.; the stems were girdled at the soil level. This has not been previously observed in P.E.I. (R.R. Hurst)

Leaf Spot (Septoria Clematidis). A slight infection was present on C. ligusticifolia at Brandon, Man.

COTONEASTER

Dark Berry (Phytophthora Cactorum) was general in the Victoria and Sidney districts, B.C., on C. horizontalis and caused much damage reducing the ornamental value of the shrub. It was also severe on C. Francheti in several gardens particularly in shady locations, although no disease was seen on this variety in 1939 (P.D.S. 19:102). (W.R. Foster)

CRATAEGUS - Hawthorn

Fire Blight (Erwinia amylovora). A severe infection was present on several trees of C. pinnatifida at the Station, Morden, Man.; first record on Crataegus in Man. (W.A.F. Hagborg)

Rust (Gymnosporangium clavariiforme) was severe on a few trees of C. Oxyacantha in a nursery at Courtenay, B.C. (W.R. Foster and I.L. Conners) It was also observed in P.E.I.

Powdery Mildew (Podosphaera Oxyacanthae) was very severe at Mount Denson, N.S. (J.F. Hockey)

CYCLAMEN

Stunt (Cladosporium Cyclaminis Massey & Tilford). As high as 75-80% of the plants of C. persicum have been observed to be diseased at the Botanical Garden, and in commercial greenhouses at Montreal, Que. The loss was at least 50% and in certain cases was even higher. The affected plants have smaller leaves than the healthy. The most striking symptom is the opening of the flowers below the leaves. Many young flower buds never reach maturity and dry up. The fungus lives in the corm, being largely confined to the crown. It causes a purple coloration of the infected portions. The fungus has been observed in the peduncle just below the flower bud and in very young seedling corms. It is presumed that the pathogen is disseminated through seeds. This disease does not seem to have been reported before in Canada. (J.E. Jacques)

DAHLIA

Mosaic (virus). A plant showing yellowing and distorted leaves, shortened internodes and bushy habit was sent from a nursery at Sussex, N.B. The virus was identified as Dahlia virus 1. (D.J. Macleod).

Stunt (virus) was prevalent in dahlia, especially pompom varieties in P.E.I.; during the past 2 years many gardeners have had to renew completely their dahlia stocks on account of stunt. (R.R. Hurst)

DELPHINIUM - Larkspur

Leaf Spot (Ascochyta Aquilegiae (Rabh.) v. Höhn.) caused well defined black spots on larkspur at Saskatoon, Sask. It has been reported by G.P. Clinton (Conn. Agr. Exp. Sta. Bull. 358. 1934). The fungus was determined by Dr. J.A. Stevenson. It has not been previously reported in Canada. (R.C. Russell and I.L. Conners)

Powdery Mildew (Erysiphe Polygoni) caused slight damage at Indian Head, Sask.

Bacterial Blight (Phytomonas delphinii) affected several clumps in a 2-year old planting at Woodville, N.S. (J.F. Hockey). The disease moderately affected about 50% of the plants observed in Queens and Kings Co., P.E.I., but infection varied widely in different plantings. (R.R. Hurst)

Mosaic (virus) affected 2% of the plants in a garden at Fredericton, N.B. The plants showed marked mosaic and vein-clearing without distortion of the leaves. The virus was not identified (D.J. MacLeod). Mosaic affected 1% of the plants at the Station, Charlottetown, P.E.I., and affected plants were present in 15 gardens examined. (R.R. Hurst)

Fasciation (non-parasitic) was observed in 5 plants at the Station, Fredericton, N.B. (D.J. MacLeod)

DIANTHUS

Foot Rot. Scattered plants were attacked at Brandon and Morden, Man. Isolations yielded Fusarium oxysporum f. ?Dianthi from specimens from both places. (W.L. Gordon)

Leaf Spot (Heterosporium echinulatum) caused considerable damage to carnation in a greenhouse at Langley, B.C.; it is also widely distributed in gardens on Vancouver Island (W. Jones). This leaf spot has been destructive to plants of sweet william, D. barbatus, being grown for seed in the lower part of Vancouver Island (W. Newton). The perfect stage has been recently described by Catharine C. Burt (Trans. Brit. Myc. Soc. 20:207-215. 1941) as Didymellina Dianthi.

Bacterial Leaf Spot (Phytomonas woodsii). A severe infection was found on carnations in a greenhouse at Calgary, Alta. (A.W. Henry). The disease was previously reported from Ont. in 1938 (P.D.S. 18:101).

Rust (Uromyces caryophyllinus) was reported as follows: Slight infection on carnations in a greenhouse at Victoria, B.C.; slight to moderate infection in greenhouses at Calgary, Medicine Hat and Edmonton, Alta.; spreading rapidly in a commercial greenhouse at Sherbrooke, Que., with moderate damage; pinks found affected in a garden at the Acadia Forestry Sta., Fredericton, N.B.

ERYTHRONIUM GRANDIFLORUM - Lambs-tongue Fawnlily

Rust (Uromyces heterodermus) was present at Courtenay and North Saanich, B.C.; pink flowered plants seem more susceptible. (W. Newton)

FILIPENDULA - Meadowsweet

Powdery Mildew (Sphaerotheca Humuli) was severe on plants of F. rubra from a garden in Westboro, Ont., communicated by R.M. MacVicar. On July 5 the affected shoots were variously bent and stunted by the mildew and floral development was completely suppressed. In addition, F. Ulmaria was found affected although not so seriously. S. Blumer (Beiträge Krypt.-Fl. der Schweiz 7, pt. 1:104. 1933) reports that the disease is widespread in Europe and common locally in Switzerland. The oidal stage is very conspicuous on leaves and inflorescence, which are often deformed. Perithecia are not formed abundantly (in contrast to Erysiphe Polygoni (l.c. p. 172), which forms perithecia abundantly and conidia only sparingly on the same host). The disease has been reported from Vermont (U.S.D.A. Dept. Bull. 1366:47. 1926). (I.L. Conners)

GAILLARDIA

Yellows (virus) affected all the plants in 4 gardens and common in others in Queens and Kings Counties, P.E.I.

GARDENIA

Canker (Phomopsis Gardeniae Hansen & Barrett). Only one plant of G. Veitchii was affected and died at the Botanical Garden, Montreal, Que. The first symptoms are brown sunken dead areas on the stem near the surface of the soil. As the lesions enlarge the affected tissue becomes rough and corky. The branches are frequently attacked. If the surface is cut away the diseased tissue appears pale or deep orange, while the healthy is white or greenish white. The canker, small at first, increases in size and finally girdles the stem or branches. The foliage and branches above the cankered area wilt and dry up. The disease does not appear to have been reported previously in Canada. (J.E. Jacques)

GERANIUM

Rust (Uromyces Geranii) heavily infected G. pratonse in a rock garden at Brakley Beach, P.E.I. This is a new record for P.E.I. (R.R. Hurst and I.L. Conners)

GLADIOLUS

Yellows (Fusarium oxysporum) was widespread in Man.; usually only scattered plants were affected, but at Carmen it infected 75% of the plants of King George (W.L. Gordon). Very little yellows was observed this year in P.E.I., probably on account of the wet season. (R.R. Hurst)

Penicillium Rot (P. Gladioli). Occasional corms were found in 4 lots grown in P.E.I. and brought to the Laboratory for inspection. (R.R. Hurst)

Scab (Phytomonas marginata). Slight to modorate infections were found in several plantings at Edmonton, Alta.

Dry Rot (Sclerotinia Gladioli). A slight infection was found at Edmonton, Alta. (A.W. Henry)

Hard Rot (Septoria Gladioli). In one lot of corms examined at the Laboratory, Charlottetown, P.E.I., 2% were affected.

Mosaic (virus). One plant of Doctor Bennett was found affected in N.B. with a definite mosaic and severe break of the flower. The disease was carried over in the corm and cormels. The virus appears to be new. All attempts to transmit the virus by sap inoculation were unsuccessful. No vector has been established. (D.J. MacLeod)

GODETIA

Rust (Pucciniastrum Epilobii) was present on cultivated Godetia at the Acadia Forestry Station, Fredericton, N.B.

HEDERA HELIX - English Ivy

Bacterial Leaf Spot (Phytomonas hederae Arnaud ex. Burkh. & Guterm.). Affected leaves taken from a house plant were received from Toronto, Ont. The diagnosis was confirmed by W.A.F. Hagborg. W.H. Burkholder and C.E.F. Guterman (Phytopath. 22:781-784. 1932) isolated two organisms from the spots. One was found to be pathogenic and the other had a distinct accelerating action on the disease complex. The latter organism is unnamed, according to them, but it appeared to be similar to the epiphyte, Bacterium herbicola aureum. This appears to be the first record of the occurrence of the disease in Canada. (I.L. Conners)

HELIANTHUS - Sunflower

Rust (Puccinia Helianthi) was severe on Sungold sunflower (H. annuus) at the Botanical Garden, Montreal, Que.; it caused little damage for it affected the plants rather late in the season. (J.E. Jacques)

HELICHRYSUM - Everlasting

Yellows (Callistephus virus 1) severely affected 2% of the plants in the border at the Station, Fredericton, N.B. (D.J. MacLeod)

IMPATIENS BALSAMINA - Garden Balsam

Foot Rot. A single plant of Bush Flowered balsam was severely attacked at Morden, Man.; isolations yielded Fusarium oxysporum and F. Scirpi var. acuminatum. (W.L. Gordon)

INULA

Powdery Mildew (Erysiphe Cichoracearum). Two plants of I. Helenium were found slightly affected at the Botanical Garden, Montreal, Que.; an immediate application of sulphur rid them of the fungus. (J.E. Jacques)

IRIS

Blossom Blight (Botrytis sp.) was severe on Mainhillan Gray in the variety rows at Sidney, B.C., while other varieties were free. In the affected plants, the petals were twisted and did not open normally; tissues were soft, but not decayed. In some varieties the stems and blossoms have a flabby wilted appearance followed by death. In others the spikes tend to bend over, while the unopened blossom is soft and sometimes dry and necrotic. (W. Jones)

Eelworms (Ditylenchus dipsaci) slightly infected 2 plantings out of 22 examined on Vancouver Island and the lower mainland, B.C. (R.J. Hastings)

Soft Rot (Erwinia carotovora) partially decayed a few clusters in 2 varieties at the Botanical Garden, Montreal, Que. In every case the iris borer was found associated with the diseased plants. The damage was negligible (J.E. Jacques). Soft rot affected 7 out of 24 plants in one garden and was also common in 6 others in Queens and Prince Counties, P.E.I.

Leaf Spot (Heterosporium gracile) was reported as follows: Trace in 12 plantings, slight in 2 and severe in 8 of bulbous iris in the coastal region of B.C. (R.J. Hastings); severe on Monsignor, Pelldier, Micheline and Candelabre in the variety trial rows at the Station, Sidney, B.C., while several varieties were clean; general in a planting at Armstrong; severe on a few plants at Indian Head, Sask.; infection moderate at Brandon, Man., slight to severe at Morden; slight infection in a planting at St. Catharines, Ont.; damage fairly heavy at the Station, Kentville, N.S.; common in P.E.I.; infection a trace to very heavy. According to J. Emile Jacques (Contrib. Instut. Bot. Univ. Montréal No. 39:7-46. 1941), H. gracile applies to an entirely different fungus; he, therefore, proposes the new combination, Heterosporium Iridis (Fautr. & Roum.) Jacques.

Ink Disease (Mystrosporium adustum). Infection was a trace in all 22 plantings inspected in the coastal region of B.C. (R.J. Hastings)

Bacterial Leaf Blight (Phytomonas tardicrescens (McCulloch) Burkh.) attacked about 10 plants of Rhein Nixe at the margin of a bed at the Botanical Garden, Montreal, Que. Infection was heavy. The development of the disease was favoured by the plants being daily wetted by the sprinklers. The disease appears on the leaves in the form of small pale areas, which enlarge into irregular water-soaked spots or elongated stripes. The margins of the leaves are infected first, but frequently the entire leaf is killed and turns brown. This appears to be an addition to the long list of diseases of iris already known in Canada. (J.E. Jacques)

Grey Bulb Rot (Sclerotium Tuliparum) severely infected a small area in a planting of Wedgewood at Victoria, B.C. It was found previously at Esquimalt (P.D.S. 20:94). (R.J. Hastings)

Mosaic (virus) affected 15% of the plants of Tingitana bulbous iris in a lot being grown in Peel Co., Ont. on Mar. 27; the stock was imported from B.C. (G.C. Chamberlain)

LATHYRUS ODORATUS - Sweet Pea

Root Rot (Fusarium sp.). Damage was a trace in gardens at Lacombe and Edmonton, Alta.

Powdery Mildew (Microsphaera diffusa) was prevalent in P.E.I.

Root Rot (Rhizoctonia and Fusarium spp.) caused slight to severe damage in many small plantings in York Co., N.B. Root rot was severe and destructive in several plantings in P.E.I.

Mosaic (virus) was reported 4 times in P.E.I.; up to 50% of the plants were infected. Flowers were broken, peduncles short and leaves showed a well-defined mosaic. (R.R. Hurst)

Streak (virus) affected up to 100% of the plants in plantings in P.E.I.

Bud-Drop (non-parasitic) was frequently complained of in P.E.I.

LATHYRUS SYLVESTRIS - Flat Pea

Leaf Spot (Ascochyta Pisi) was general in the rows at the Station, Sidney, B.C.

LAVATERA

Foot Rot. Scattered plants were affected at Brandon, Man.; isolations yielded Fusarium oxysporum and F. Solani. (W.L. Gordon)

LIGUSTRUM - Privet

Leaf Spot (Cercosporella sp.) caused severe defoliation of a hedge at Milner, B.C. The fungus was compared with that reported last year in Ont. (P.D.S. 20:94) and was found to be identical with the latter. (W. Jones and I.L. Conners)

LILIUM - Lily

Blight (Botrytis elliptica). A moderate infection was present on the leaves of some plants of L. tigrinum at Morden, Man.

Rust (Uromyces Holwayi) was severe on the hybrid Lilium Humboldti x pardalinum at Duncan, B.C. (W. Newton)

LIMONIUM - Sea-Lavender

Leaf Spot (Cercospora sp.). A severe infection was observed on the leaves of L. sinuatum (L.) Mill. (Statice sinuata L.) at Morden, Man. (W.L. Gordon). Dr. Charles Chupp has identified the material as referable to Cercosporina insulana Sacc. and Cercospora Staticis Lobik, the American material differing from the published descriptions in having conidia 2.5-4.0 u wide. This leaf spot was first noted in Man. in 1938 (P.D.S. 18:108). (I.L. Conners)

LONICERA - Honeysuckle

Grey Mould (Botrytis cinerea) was fruiting on the leaves of honeysuckle at Red Head, N.B.; it affected 25% of the leaves. (S.F. Clarkson)

Powdery Mildew (Microsphaera Alni) was reported as follows: Severe infection at Beaverlodge, Alta.; slight to moderate infection in different spots in a hedge of L. Morrowii at Morden, Man.; slight infection on L. tatarica at the Botanical Garden, Montreal, Que., but immediately cleared up by an application of sulphur.

Frost Injury. On May 12 the temperature dropped to 27°F. at Fredericton, N.B. A marked vein-clearing resembling a virus disease developed on a Lonicera bush near the Laboratory; the effect persisted for several weeks. The same effect was observed on maple and clover. On oats, barley and some grasses, the injury appeared as a definite white banding of the blades. This injury was quite general in N.B. (D.J. MacLeod)

MATTHIOLA - Stock

Root Rot and Stem Blight (Rhizoctonia Solani) destroyed many plants in greenhouses at Picton, Fergus and Brampton, Ont. (J.E. Howitt)

NARCISSUS

Smoulder (Botrytis narcissicola) was usually a trace in the coastal region of B.C. but infection was higher on plantings left down for 2 years or longer. (R.J. Hastings)

Basal Rot (Fusarium bulbigenum). Only a slight infection was observed in the coastal region of B.C. (R.J. Hastings)

Eelworms (Ditylenchus dipsaci) were absent in 43 plantings and present in 20 in the coastal region of B.C.; in the affected plantings damage was slight to moderate. The trouble is on the decline due to the system of treatment now followed. (R.J. Hastings)

White Mould (Ramularia vallisumbrosae) caused severe damage on small-leaved varieties on the lower mainland, B.C., but none on King Alfred; a trace was also present on Vancouver Island. (R.J. Hastings)

Leaf Mould (Stagonospora Curtisii). Infection was general in the coastal region of B.C., but the damage was negligible. (R.J. Hastings)

Mosaic or Stripe (virus) affected about 1% of the plants in the best plantings in the coastal region of B.C., but up to 50% of the plants were diseased in degenerated lots (R.J. Hastings). An entire lot of 1,000 King Alfred bulbs obtained from B.C. developed mosaic symptoms on being forced at Edmonton, Alta. The flowers are apparently not affected. The disease was identified by F.L. Drayton. (G.B. Sanford)

NIGELLA - Fennelflower

Foot Rot. Odd plants were affected at Brandon, Man. Isolations yielded Fusarium oxysoporum and F. Solani var. Martii. (W.L. Gordon)

PAEONIA - Peony

Blight (Botrytis Paeoniae) was reported as follows: Severe on Souvenir du Dr. Bretonneau at the Station, Sidney, B.C.; several varieties were clean; scattered plants blighted at Morden, Man.; severe throughout N.B., but only slight damage at the Station, Fredericton, where a

routine programme of spraying has been followed for the control of the disease (S.F. Clarkson); widespread and frequently destructive in P.E.I.

Leaf Blotch and Stem Spot (Cladosporium Paeoniae) was widely distributed in gardens in the coastal region of B.C.; at the Sidney Station it was moderate on Souvenir du Dr. Bretonneau, Magnifica, Duchesse d'Orleans, Charlemagne, Henri Demay and Marguerite Gerard; other varieties were free. (W. Jones)

Ring Spot (virus) Two per cent of the plants at the Station, Fredericton, N.B., showed a well defined ring spot with slight dwarfing. The disease has been under observation for 8 years and is spreading. (D.J. MacLeod). Diseased plants at Charlottetown, P.E.I., were brought to the attention of D.J. MacLeod, who thought they were affected by ring spot. (R.R. Hurst)

Chlorosis (non-parasitic) was fairly general in peonies at Brandon, Man.; the trouble was partially overcome by spraying the plants with iron sulphate. This is the first time it has been noticed on peony in Man.

PELARGONIUM - Geranium

Leaf and Blossom Blight (Botrytis cinerea) was general and caused moderate damage to the blossoms at the Station, Sidney, B.C.; the trouble was favoured by overhead watering. Leaf spot affected one potted plant in a greenhouse in Queens Co., P.E.I.

PETUNIA

Mosaic (virus) affected scattered plants at Brandon, Man.; this is first time it has been noticed on petunia in Man. Two plants were found in a garden in York Co., N.B., and one in a window box in Victoria Co. affected with Solanum virus 2. The typical mosaic and distortion of the leaves was quite evident in the plants. (D.J. MacLeod)

PHLOX

Powdery Mildew (Erysiphe Cichoracearum) was observed in many gardens throughout Ont., some varieties were badly disfigured. (J.E. Howitt)

Foot Rot was severe at Morden, Man. on P. Drummondii, particularly Crimson Beauty and Salmon Beauty; isolations yielded Fusarium Scirpi var. acuminatum and to a less extent F. oxysporum. A severe foot rot on this host has not been recorded previously. (W.L. Gordon)

Leaf Spot (Septoria divaricata) caused a loss of 10-30% of the foliage of P. paniculata in local plantings at Kentville, N.S. (J.F. Hockey)

Streak (virus). Ten per cent of the plants in a border at Fredericton, N.B., were severely affected by a disease, which caused a streak of the stems and leaves. The affected leaves showed a severe necrosis of the collenchyma of the veins and petioles and a distortion of the lamina. The streak advanced acropetally and in severe cases the leaves died and remained hanging on the stem. There was also a faint clearing of the veins. The disease was repeatedly transmitted by grafting to healthy phlox. It was also established that the disease is carried over from year to year in affected clumps. The virus is not transmissible and no insect vector was found. The virus appears to be new. (D.J. MacLeod)

Leaf Blight. Over 40 varieties of phlox belonging to P. suffruticosa, P. Arendsi, P. maculata and P. paniculata suffered from the

disease at the Botanical Garden, Montreal, Que. It also caused considerable damage in Montreal. The lower leaves begin to yellow and the discoloration moves upward. This is followed by a drying of the affected portions and sometimes of entire shoots. Certain varieties are more readily affected than others, but no variety appears to escape entirely. The trouble was noted for the past few years, and was particularly severe in 1941 (J.E. Jacques). Leaf blight has been noted on several varieties in many gardens in Queens Co., P.E.I.; the damage is severe. The lower leaves are the first to die to be followed by the progressive collapse of those above; often the plant dies. Affected plants seem to suffer especially from red spider (R.R. Hurst). It is highly probable that the leaf blight described in Que. and P.E.I. is identical with the Streak described by Mr. MacLeod. The disease is also destructive in Ont. according to F.L. Drayton. The same disease has been described in the United States (Anon. What causes phlox blight? N.J. Agr. Exp. Sta. Nursery Dis. Notes 10(No. 12):47-50. June 1938). (I.L. Conners)

Yellows (virus) severely affected 5% of the plants in the border at the Station, Fredericton, N.B. The virus was identified as Callistephus virus 1 and was transmitted by the leaf hopper, Macrosteles divisus. The disease was more common in white than in red and purple varieties. (D.J. MacLeod)

PRUNUS

Shot Hole (Coniothyrium sp.) moderately infected a hedge of pin cherry, P. pennsylvanica, at Morden, Man. (W. L. Gordon)

Shot Hole (Higginsia hiemalis (Cylindrosporium hiemale) was common but not severe at the University, Winnipeg, Man.

RHAMNUS - Buckthorn

Rust (Puccinia coronata) moderately infected a hedge of R. cathartica at the Station, Charlottetown, and roadside bushes at Hunter River, P.E.I. (R.R. Hurst)

ROSA - Rose

Canker (Coniothyrium Fuckelii) A fairly high percentage of imported stock from California developed this trouble in greenhouses in Peel Co., Ont. (G.C. Chamberlain)

Black Spot (Diplocarpon Rosae) was reported as: general in gardens in the coastal section of B.C.; prevalent on hybrid tea roses about Guelph and reported to be so from Belleville, Hamilton, Weston and Toronto (J.E. Howitt); general and severe on hybrid tea roses at the Victoria Park rose garden, Niagara Falls, Ont., causing complete defoliation by July 27 (G.C. Chamberlain); all rose bushes remained free from black spot at the Botanical Garden, Montreal, Que., throughout the summer except 4 plants of hybrid tea, which were slightly infected; dry weather and spraying prevented the spread of the disease (J.E. Jacques); widespread and in many instances causing premature defoliation in P.E.I.

Leaf Spot (Mycosphaerella rosicola (Cercospora rosicola). A slight infection was general on several varieties at Morden, Man.

Rust (Phragmidium spp.). A moderate infection occurred on roses at the Station, Fredericton, N.B.

Crown Gall (Phytomonas tumefaciens). Four climbing roses in a garden at Charlottetwon, P.E.I., have been infected for several years. (R.R. Hurst)

Powdery Mildew (Sphaerotheca pannosa) was reported as follows: Moderate infection on Crimson Rambler at St. Catharines, Ont., infection at first mostly confined to blossom clusters, later infecting the canes and causing some defoliation; a light infection on a few bushes of hybrid tea at the Botanical Garden, Montreal, Que.; slight to moderate damage particularly to climbers in home gardens at Fredericton, N.B.; infection heavy on climbers in P.E.I., but less prevalent than usual.

Mosaic (virus) was destructive to some bushes at Morden, Man.; it was first noted at Morden in 1940 when it was reported as Witches' Broom (P.D.S. 20:98) (W.L. Gordon). Mosaic affected a single bush of Else Poulsen at St. Catharines, Ont.; the mosaic was a very definite vein-banding type. (G.C. Chamberlain)

SALPIGLOSSIS

Foot Rot affected scattered plants at Brandon, Man.; isolations yielded Fusarium Solani and F. Scirpi var. acuminatum. (W.L. Gordon)

SAMBUCUS - Elderborry

Leaf Spot (Septoria sambucina) moderately infected some bushes of S. racemosa at Morden, Man.

SENECIO CRUENTUS - Cineraria

Wilt (Pseudomonas sp.) affected a plant in the Laboratory greenhouse, Winnipeg, Man. The causal organism was isolated and its pathogenicity proved. A detailed study of the morphology, physiology and cultural characters of the organism is completed. It can be described as a new species. (W.A.F. Hagborg)

SOLIDAGO - Goldenrod

Rust (Coleosporium Solidagnis) moderately infected the leaves of a Solidago being grown as an ornamental at Morden, Man.

Leaf Spot (Septoria solidaginicola) also moderately infected the leaves of this Solidago at Morden, Man.

SYRINGA - Lilac

Blight (Botrytis cinerea). A slight infection occurred on branches of lilac at Red Head, N.B. A trace was noticed on a hedge at Summerside, P.E.I.

Leaf Blight (Cladosporium sp.) was present on a few bushes in a garden at Milner, B.C. (W.R. Foster)

Powdery Mildew (Microsphaera Alni). A trace of infection was present on Aug. 7 in the Botanical Garden, Montreal, Que. Powdery mildew was sometimes heavy in P.E.I.

Bacterial Blight (Phytomonas syringae) infected a few bushes at Milner, B.C. (W.R. Foster)

Mosaic (?virus). About 2% of the lilac bushes at the Station Fredericton, N.B., showed a definite veinal mosaic. Cuttings of these

bushes also showed a definite mosaic when they were grown in the greenhouse. Attempts to transmit a virus by grafting and sap inoculation were unsuccessful. There was no distortion of the leaf blade. (D.J. MacLeod)

TULIPA - Tulip

Fire (Botrytis Tulipae). Primary infection was absent in 2 fields, less than 0.2% in 30, less than 1.0% in 5, and over 1.0% in 12 of the fields inspected in the coastal regions of B.C.; the disease was only serious in unrogued plantings (R.J. Hastings). Severe damage was found in one garden at Edmonton, Alta. (A.W. Henry). Fire was recorded as causing considerable loss in gardens at Paris, Harley, Pickering, and Mono Road, Ont. (J.E. Howitt). Fire was widespread in P.E.I.; it did a great deal of damage this year both in private gardens and in those from which is usually derived a fair revenue from cut tulips. The disease is definitely worse where the beds have been given a winter cover of litter and in older plantings. (R.R. Hurst)

Storage Rot (Penicillium sp.) Only a trace of storage rot was found in the coastal regions of B.C., due to the improvement in curing, handling, grading, and storage of bulbs. (R.J. Hastings)

Grey Bulb Rot (Sclerotium Tuliparum). A trace was found in one field in North Sannich, B.C. (R.J. Hastings)

Break (virus) affected a trace to 1% of the plants in 38 fields out of 68 inspected in the coastal regions of B.C. In a few small plantings of different varieties, 3-50% of the plants were affected. Rogued plantings were always free from break. (R.J. Hastings)

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