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Roshni Patel; July 26, 2006

DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

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SEVENTEENTH ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY

1937

Compiled by:
I. L. CONNERS
Plant Pathologist.

FOREWORD

The Seventeenth Annual Report of the Canadian Plant Disease Survey has been prepared according to the same plan as previous reports.

My sincere thanks are due to my many collaborators for the material submitted. I am especially indebted to Prof. J.E. Howitt, Ontario Agricultural College, Guelph; and Messrs. Fernand Godbout and Edouard Lavallee, Provincial Horticultural Service, Montreal, Que. Reports on special surveys, one on tobacco by Dr. G.H. Berkeley and another on strawberries in Ontario by A.A. Hildebrand have been freely drawn on and were often copied verbatim. Dr. R.C. Russell's report on the phenological data collected at Winnipeg, Man., Saskatoon, Sask., and Edmonton, Alta., in 1937 is also included.

June 15, 1937,
Central Experimental Farm,
Ottawa, Canada.

I. L. Conners,
Plant Pathologist.

New or Noteworthy Diseases

Stem rust of wheat caused severe damage in the south-central and south-eastern parts of Manitoba, but the damage was slight in other parts of Western Canada. Rust appeared the last few days in June and spread rapidly. By the end of the first week of July it was present on susceptible common wheat varieties throughout the wheat growing area of Manitoba and the adjacent sections of Saskatchewan. Severe drought conditions in both Manitoba and Saskatchewan prevented its development. Stem rust was destructive in Prince Edward Island in late August and here and there in other places in Eastern Canada. Stem rust caused severe damage to oats at scattered points in New Brunswick, Nova Scotia and Prince Edward Island. These outbreaks were found centred about plantings of barberries. Elsewhere in these provinces oat stem rust was unimportant. The removal of the barberry would be a great boon in these districts.

Crown rust was very general in the Maritime Provinces, but it reached epidemic proportions very early near plantings of buckthorn (Rhamnus cathartica).

Leaf blotch (Pyrenophora Tritici-repentis (Died.) Drechsler (Helminthosporium Tritici-repentis) was reported for the first time as parasite of wheat when it was found causing a severe wilting and spotting of the leaves of Durum wheat near Melita, Man. Its usual host is Agropyron repens.

A fungus, referable to Cryptoascus Petri, was found on the roots of wheat in Prince Edward Island in 1936 and again in 1937. Its parasitic capabilities remain to be investigated. It also occurs on barley and oats.

While browning root rot (Pythium spp.) has been recognized as an important disease in Saskatchewan, this was the first year a severe epidemic was encountered in Manitoba. It was destructive to wheat on summerfallow in the Dauphin, Gilbert Plains, Grandview, Roblin and Russell areas in June.

Besides the rusts, the special survey of cereal diseases in the Maritime Provinces in 1937 revealed others also important. The oat smuts were present in two-thirds of the fields visited, the average infection being 2%. While no comparable data is available for 1936, the smuts appear to have been less prevalent this year than last. Nevertheless 16% of the fields visited contained 5% or more smut. In addition a smartweed (Polygonum lapathifolium) affected by smut (Ustilago utriculosa) was common especially in fields of oats. The weed seeds were evidently sown with the grain. It

was concluded that little attention was given to seed treatment. Leaf blotch (Helminthosporium Avenae) was a very common disease, and from studies by other workers, it is inferred that the weather greatly favoured its development in 1937. It probably caused considerable injury as a seedling blight. However, several investigators have shown that leaf blotch can be readily controlled by the use of the organic mercury dusts. These facts clearly emphasize the need of popularizing the organic mercury dust treatments in the Maritime Provinces.

The survey for the oat nematode (Heterodera schachtii) in Waterloo county, Ont., was continued and nematodes were found to a greater or less extent on nearly every farm in an area of 300 square miles. In addition samples of oats attacked by nematodes were received at Guelph from widely scattered areas of the province. However there are only two areas in which serious, widespread outbreaks have been recorded, viz. in Waterloo, and in Simcoe and Ontario counties.

A disease known as mid-vein spot (Mycosphaerella carinthiaca Jaap) was found on red clover at Woodstock, N.B. in 1936. This is a new record for Canada and probably for North America. Ramularia Trifolii Jaap is stated to be the conidial state.

The causal organism of bacterial wilt and rot of potato has been isolated and shown to be very closely related to both Phytomonas michiganensis, the cause of bacterial canker of tomatoes and Bacterium sepedonicum Spiekermann (Phytomonas sepedonica according to Bergey's terminology), the cause of bacterial ring spot of potatoes, a disease recorded from Germany and very similar to the one found here. The disease is now known to occur in Canada in Quebec and New Brunswick.

Violet root rot (Rhizoctonia crocorum) was recorded for the second time in Canada when two potato tubers affected with the disease were received from Winterburn, Alta. The disease was present in only a few hills.

Potato tubers affected with what appears to be dry rot (Fusarium Solani (Mart.) App. & Wr. var. eumartii (Carp.) Wr. were received from south-western Ontario this year; definite information of its occurrence in 1936 was also obtained. It has not been recorded before in Canada.

A wilt of unknown cause appears to be present on potato in the Prairie Provinces. The most striking symptom of the disease is the purple colour of the margins of the leaves

on the upper parts of the plant. It appears to be very similar to the wilt reported from Minnesota and Wisconsin.

Yellow dwarf (virus) was found in Middlesex county, Ont., chiefly on Dooley potatoes. While the disease has not been reported previously in the Survey, it has been present for the past few years.

A disease of tomatoes which answered perfectly the symptoms of stem girdle (Phytophthora parasitica) as described by Reddick was found in a greenhouse at Grimsby, Ont. This is apparently the first report of its occurrence in Canada.

Thrystroma compactum (Sacc.) v. Höhn. has been found fruiting on dead twigs of elm from Levis, Que. and Port Hope, Ont. This appears to be a new record for Canada.

Leaf blister or spot (Taphrina sp.) was found in fruit on leaves of the red maple (Acer rubrum) collected at Portland, Ont. This appears to be a new disease in Canada.

The rust, Coleosporium Campanulae, recorded in Canada for the first time from collections in B.C. has since been reported to the Survey from Ontario and Nova Scotia. Diseases on ornamentals unrecorded previously in Canada are: Leaf Spot (Phytomonas Geranii) on Geranium sanguineum at Winnipeg, Man.; Leaf Curl (virus) on cultivated geranium (Pelargonium) at Fonthill, Ont., although it was probably present in Ontario for the past 10 years; Ink Disease (Mystrosporium adustum Massee) on iris var. Imperator at Victoria, B.C.; Coryneum Canker (Coryneum microstictum Berk.) on roses at Niagara Falls, Ont. in 1929; Downy Mildew (Peronospora sparsa Berk.) on several varieties of roses at West Vancouver, B.C.

The Weather and Its Influence on Plant Diseases

The season of 1937 was in general favourable for plant growth in the coastal sections of British Columbia. This was especially true on Vancouver and the neighboring islands, where the precipitation is generally low during the summer months. In 1937 the rainfall was 1.5 inches above the average for June at Sidney, although no rain fell in July. Cereals and small fruits were particularly benefited.

January and February were colder than in 1936, rainfall in March was below average and spring was rather late. During the heavy rains in June, the various foliage diseases such as apple and pear scab, reached almost epidemic proportions. Late blight of potatoes appeared on the mainland near the end of July, about two weeks later than last year. It is believed the drier weather in early July delayed its appearance. Rainy weather around harvesting time was favourable to downy mildew infection of the cones of the hop crop and much damage resulted. While rainfall was heavy during June, damage caused to the various diseases was about average for the region.

Weather conditions throughout the cultivated sections of Alberta were unusual in 1937. With the exception of a small area centering on the St. Paul district, no rain of any account fell until the middle of July. The lack of rain combined with the very light precipitation in 1936 resulted in a drought. High temperatures were frequent and drying winds prevailed, and the soil moisture was so deficient that a very light crop seemed certain, but beginning July 14, very heavy rains fell in a wide radius about Edmonton. Good rains also fell over the area south and east roughly bounded by a line extending from Calgary to Drumheller and northeast to Vegreville. After July 15 the temperature was cool. The Peace River country, including Grand Prairie and the adjacent areas in British Columbia did not receive rain until early August, when the main wheat crop was nearly ripe. Yields of late-seeded crops, particularly oats, potatoes and pastures improved. Soil and weather conditions were, in general, not favourable to disease development. Severe killing frosts were very late; consequently late fields of wheat, barley, oats, potatoes, and other crops continued to grow until October.

In Saskatchewan seeding was well under way on April 27. Moisture conditions varied from good in the eastern and northern areas to poor in most of the south, central, and western areas, with very little subsoil moisture. The weather was cool at that time. The early part of May was alternately cool and warm with no rain and growth was slow. There was some rain at Saskatoon on the 11th and 12th and

again on the 24th. This last rainfall was received also in parts of the south, east, and north. Germination in the drier areas was uneven and some soil drifting occurred. Some good rains fell during the last week of May in the Saskatoon district and the weather was moderately warm. The first week of June was cool and dry. High winds in the south did serious damage to the crops which were already suffering from drought. Pastures also were in bad shape. No rain fell until June 23. By this time the crops in a large area of the province had deteriorated seriously from drought. Summerfallowing was late and was not being done at all in some areas because of lack of moisture and feed. Following a few showers on the 23rd, 24th and 26th, the province experienced a period of very hot dry weather with high winds. This lasted until July 14 and July 15, when general rainfall improved the feed situation but it was too late to save the crops in southern, central and western Sask. Rain also fell on the 20th, 21st, 22nd and 24th. These rains permitted germination of late-sown coarse grains. Some damage was done by hail. The weather remained alternately cool and warm with scattered showers early in August. Harvest began early in August and general by the 10th. The weather was moderately warm and dry during most of the month. Some districts in the drought areas received rains late in August and during September and were able to produce fair crops of late oats both for feed and seed, there being no killing frost until Oct. 5. These rains also improved potato crops in those areas. Soil moisture in some parts of the drought area improved greatly during September and early October.

The crop season, then, was marked by extreme drought. Stem rust was present in a negligible quantity; browning rootrot was widespread, but its symptoms and effects were confused by drought. Common rootrot was found everywhere and was severe in some of the dry areas. Another feature was the severity and extent of root and bulb rot of ornamentals such as gladiolus.

Rainfall, air temperature and soil temperature at Saskatoon are given below:

	Total Rainfall	Mean Air Temp.	Mean soil temp.at 6 ins.
April	0.49		
May	1.29	54.5° (12.5°C)	9.5°C
June	0.48	64.2° (17.9°C)	16.9°C
July	0.96	71.2° (21.8°C)	20.5°C
August	1.33	64.8° (18.2°C)	16.7°C

Seasonal rainfall 1937 April-July 3.22 ins.
" " 1904-1920 " " 6.92 "

In the Niagara peninsula of Ontario the early part of the season was cool with plenty of moisture. These conditions favoured the development of leaf curl, which was very prevalent in a number of orchards. It also favoured the development of Verticillium wilt in peaches, sweet cherries and other susceptible hosts. Continued showers and fog on May 26-27 resulted in a heavy infection of brown rot on the young fruit of sour cherries as the shucks were splitting. Losses amounting to 75% of the fruit occurred. Other stone fruits escaped due to the earlier splitting of the shucks. The greater amount of moisture in June favoured development of powdery mildew and shot-hole on both sweet and sour cherries. Late season rains caused late scab infection of apples.

Winter conditions in New Brunswick set in earlier in 1936-37 than for the previous year. The soil froze and thawed a number of times in October and ploughing operations ceased November 7. The December rainfall, totalling 5.38 inches, was the heaviest ever reported at the Fredericton Station. Light snowfalls and rains during December and January, followed by cold weather, covered the fields with ice. Owing to the absence of snow in the early winter months, frost penetrated to a greater than average depth. Low rainfall in April and the first week of May, militated against the rapid thawing of the soil. However, a heavy rainfall on May 10 brought out all the frost, but owing to frequent rains thereafter, seeding was delayed until May 29. The lack of snow, heavy rains and intermittent thawing and freezing resulted in a great amount of winter killing to such ornamental plants as the tulip, hollyhock, honeysuckle, foxglove, spirea, phlox, etc. Many coniferous trees and hedges were also injured, as well as hay and clover. Ascospores of the apple scab fungus were first discharged May 10th, at which time the blossoms were in the pre-pink stage. Heavy to light discharges were recorded until after the flowers had bloomed. The spread of apple scab was enhanced by the rainy weather of May and June, which prevented timely applications of fungicides, and delayed as well, seeding operations in many parts of the Province. The rainfall of July and August was meager, and the hot weather in these months was responsible for early maturing of most crops. Leaf rust of wheat was first recorded July 10, stem rust August 4 and late blight of potatoes July 11. The fall was open and favourable for harvesting. On October 17 and 18, 8 degrees of frost were recorded, causing considerable damage to potato tubers.

The winter of 1936-37 was one of light snowfall in Nova Scotia and frequent intervals of mild weather. The ground was frequently bare and conditions generally were

such that organisms, which over-winter on fallen leaves, etc. made an early development in 1937. Vegetation was not affected to the same degree, as the air and soil temperatures during March and April were close to average. May and June were months of higher precipitation than normal, with the result that early rusts, mildews, and leaf spots made quick progress on unprotected plants. The months of July and August were comparatively dry and a slight drought experienced. Many annuals appeared to suffer at this time, particularly sweet corn, but no permanent injury resulted.

The fall months were close to average in temperature and precipitation. Considerable damage resulted to the apple crop from heavy winds during the early part of the harvest season, both as windfalls and as bruised and blemished apples whipped but not dropped by the winds. The late fall months and early winter were mild and open with trees going into the winter in good condition. Normal defoliation of trees was the rule.

Crops were planted at the usual time in Prince Edward Island except in the western districts, where excessive soil moisture conditions necessitated a delay in seeding. Grains were planted early in an effort to escape rust epidemics. June was cool with heavy rainfall and high humidity. Associated with these conditions was a severe epidemic of Botrytis twig blight, a hitherto unreported disease of wild cherry (Prunus pennsylvanica). Botrytis blight of peonies was quite prevalent during June and early July.

July and August were hot and dry, one heavy rainfall only having occurred during these months, this being on August 11. Crops suffered considerably from the drought, and wilt of Irish Cobbler potatoes was more severe than during any previous year on record.

Symptoms developed early and were marked owing to the dry conditions prevailing during the growing season. Moisture and temperature conditions in 1936 were favourable to growth of potatoes and wilt was not so serious a factor. In 1935 plants were exposed to a dry period from July 22 to August 20 and wilt was only slightly less severe than in 1937.

Late and early blight of potatoes were not serious factors affecting production during the past season. Considerable late blight was in evidence on late Green Mountain stock in September, this month being cool and damp with wide fluctuations in temperature.

Crown rust of oats was very severe during the past summer. The most severe outbreak observed occurred on the Experimental Farm plots which are in close proximity to buckthorn (Rhamnus cathartica) the alternate host of crown rust. Stem rust of wheat reached serious epidemic proportions in some localities.

Brown rot of stone fruits was quite severe on sweet cherries and plums, infection on the hosts occurring in June when high moisture conditions prevailed; thus it would appear that the hot weather served to promote its growth within the host tissue. During the fall when the plums were ripening the excessive rainfall caused considerable spread of this disease from fruit to fruit. Shot hole of cherries was more prevalent than usual, spray schedules at present in use by fruit growers being apparently ineffective in checking this disease. Infection and subsequent development of this destructive disease was much greater during the early part of the season when high moisture conditions prevailed.

Except for those diseases discussed above, foliage and other diseases did not materially effect production during the season of 1937. Lack of complete turnip brown heart control by borax has been attributed to the lack of sufficient moisture to render the boron available.

Recording Phenological Data

R.C. Russell

In the table below is summarized the phenological data gathered at Winnipeg, Saskatoon and Edmonton in 1937. We had no one stationed at Indian Head last summer, so no records appear for that place. The observations for the other places were made by B. Peturson, R.C. Russell and G.B. Sanford.

Table 1. Summary of Phenological data taken at Winnipeg, Saskatoon and Edmonton in 1937.

Name of Plant	Winnipeg		Saskatoon		Edmonton	
	a	b	a	b	a	b
Pulsatilla ludoviciana	-	11/4	17/4	26/4	6/5	10/5
Populus tremuloides	30/4	2/5	20/4	27/4	13/4	18/4
Phlox hoodii	-	-	28/4	4/5	-	-
Acer negundo	7/5	7/5	3/5	5/5	2/5	4/5
Ranunculus ovalis	-	-	2/5	5/5	-	-
Cogswellia villosa	-	-	29/4	6/5	-	-
Betula papyrifera	15/5	-	4/5	6/5	30/5?	3/6?
Hierochloe odorata	19/5	20/5	12/5	15/5	-	-
Amelanchier alnifolia	15/5	17/5	7/5	12/5	9/5	13/5

Table 1 (Cont'd)

Name of Plant	Winnipeg a	Winnipeg b	Saskatoon a	Saskatoon b	Edmonton a	Edmonton b
Smilacina stellata	27/5	31/5	18/5	22/5	10/5	15/5
Thermopsis rhombifolia	-	-	7/5	13/5	5/5	8/5
Viola rugulosa	-	-	very scace		7/5	10/5
Elaeagnus commutata	-	-	28/5	31/5	-	4/6
Anemone canadensis	15/6	18/6	8/6	13/6	-	-
Achillea lanulosa	-	-	13/6	15/6	-	10/6
Diholcos bisulcatus	-	-	7/6	13/6	-	-
Rosa (alcea ?)	-	-	15/6	19/6	-	1/6
Bromus inermis	24/6	26/6	21/6	25/6	18/6	20/6
Lactuca pulchella	-	-	-	6/7	-	-
Spiraea alba	-	-	28/6	2/7	-	-
Steironema ciliatum	1/7	5/7	-	5/7	-	-
Grindelia perennis	-	-	14/7	19/7	-	-
Oligoneuron canescens	-	-	16/7	28/7	-	-
Aster laevis (purple)	-	-	4/8	11/8	-	-
Prunus pennsylvanica	-	-	18/5	22/5	11/5	13/5
Cirsium (lanceolatum?)	8/7	10/7	8/7	14/7	-	-
Galium boreale	-	-	-	-	15/6	20/6
Quercus macrocarpa	28/5	29/5	-	-	-	-
Ulmus americana	4/5	5/5	-	-	-	-
Prunus americana	17/5	17/5	-	-	-	-
Viburnum lentago	4/6	8/6	-	-	-	-
" opulus	13/6	15/6	-	-	-	-
" pubescens	14/6	15/6	-	-	-	-
Cornus stolonifera	30/5	3/6	-	-	-	-
Symphoricarpos occidentalis	23/6	27/6	-	-	-	-
Gaillardia aristata	-	-	20/6	25/6	-	-
Campanula petiolata	-	-	20/6	25/6	-	-
Mentha penardi	-	-	-	5/7	-	-

Comparing these data with those obtained last year, it appears as though the two seasons were about equally early at Winnipeg. At Saskatoon the 1937 season was about a week earlier than the previous season until towards the end of May when it began to lag so that during June both seasons were about equally advanced. After the excessive heat of late June and early July the 1937 season became more advanced so that at harvest time it was again about a week ahead. The 1937 season at Edmonton was somewhat earlier than the 1936 season throughout April, May and June, but there is no data for July or August.

It has been suggested that we attempt to correlate our phenological data with records taken at the Experimental Farms situated at Winnipeg, Saskatoon and Edmonton

on the date of seeding, emergence and harvest of the earliest sown wheat each year. This has been done for the years 1936 and 1937 at Saskatoon and the agreement is remarkably close as may be seen by comparing the data in the following table with the conclusions, given in the previous paragraph, regarding the relative earliness of the two seasons at Saskatoon.

Table 2 Concerning the development of Marquis wheat in 1936 and 1937. Compiled from data supplied by the Field Husbandry Department of the University of Saskatchewan.

Year	Seeding	Emergence	Heading	Harvest
1936	22/4	9/5	26/6	29/7
1937	14/4	1/5	23/6	19/7

In conclusion there are several things in connection with the collection of phenological data which are worth considering:

(1) It is best to select species which are under daily observation.
(2) Insofar as possible observations on each species should be made on the same individuals or in the same situation each year.
(3) A sufficient number of species should be recorded to give a continuous record throughout the season. While it was suggested last year that 15 was sufficient, it would probably be better to plan on recording about six per month during May, June and July with two or three for April and the same number for August, depending on the earliness of the season.

I. DISEASES OF CEREAL CROPS

WHEAT

STEM RUST (Puccinia graminis) appeared late on the lower mainland of B.C., and caused practically no damage.

Traces of stem rust were found the third week of August at Ponoka, Lacombe and Nanton, Alta., and there was a light to medium infection in the experimental plots at Lethbridge. Traces to slight or moderate amounts of rust were present in late crops at Edmonton in September.

Stem rust was first found at Saskatoon, Sask. on July 31. The average damage over eastern and northern Saskatchewan was but a trace for the prevailing drought was unfavourable for rust development.

Stem rust of wheat appeared in south-western Manitoba during the last few days in June. It spread rapidly northward and eastward and by the end of the first week in July it was present on susceptible common wheat varieties throughout the whole of the wheat growing area of the province. From late June, however, until the end of the crop season severe drought conditions prevailed in the northern part of Manitoba and along the western edge of the province south to the international boundary. In the dry area rust although early established, made but little progress due to adverse moisture conditions. However, in the south-central and south-eastern parts of Manitoba precipitation for June and July exceeded the normal by from 10 to 200% and throughout this area rust developed rapidly and became quite severe. The western and northern boundaries of the severe rust area were rather indefinite but coincided generally with the boundaries of the heavy precipitation area. In general the heavy rust infections were confined to the area south and east of a line drawn northeasterly through Waskada in south-western Manitoba to Strathclair and thence eastward through Neepawa to Winnipeg. In the drier sections the severity of infection on Marquis, Ceres, and Reward ranged from a trace to 30% and in the heavy precipitation area it ranged from 20 to 90%. Of the three varieties mentioned Marquis was the most severely affected and Reward the least. Only traces of rust occurred on Renown and Thatcher.

Seeding operations were completed a little earlier than normal in most districts in Manitoba in 1937. In the south-western and central-western districts seeding was slightly ahead to one week ahead of normal and in the northern districts seeding was decidedly ahead of normal in some cases being as much as ten days to two weeks ahead.

The south-eastern half of the Red River Valley, however, was an exception where spring work was delayed by adverse weather and seeding operations were about a week behind normal.

Due to the dry weather and early seeding and ripening of the crop in northern and extreme western Manitoba, stem rust caused only slight damage in some instances and no damage whatever to the greater part of the crop in this area. But in the heavy precipitation area, particularly in the south-central districts, Marquis, Ceres and Reward were severely damaged by rust. However, even in these districts some of the earliest sown common wheats escaped appreciable damage. Most of the crop, however, was greatly reduced in grade and yield. None of the fields observed were completely destroyed by rust, as was the case in 1935, but some of the latest sown fields of Ceres and Marquis graded only "Feed" and were reduced 70 per cent or more in yield. The reduction in yield of Marquis and Ceres in the heavy rust area amounted probably to 35 per cent or more. Renown and Thatcher were not at all damaged by stem rust.

Only very light infections of stem rust occurred on durum wheat and practically all the durum crop escaped rust injury. A few late sown fields of durum in south-central Manitoba were quite heavily infected by rust and were damaged somewhat. The percentage of fields thus affected was very small. (B. Peturson)

Stem rust was recorded in 32 fields out of 42 examined in N.B., N.S. and P.E.I. Infection ranged from 40 to 90% in the last two weeks of August in P.E.I., while 10 to 40% of rust was not uncommon in N.B. and N.S., especially near the Northumberland Strait. No local epidemics traceable to barberries were observed.

LEAF RUST (Puccinia triticina) was moderate on Marquis, Little Club, Thatcher and Renown in the rust nursery at Agassiz, B.C., but only a trace was present on H-44-24 x Reward R.L. 1097.

Traces of leaf rust were observed in southern and central Alberta. It was notably scarce, especially in the Edmonton district, where stem rust was fairly common. Leaf rust was only reported from eastern Saskatchewan.

Leaf rust, like stem rust, was heavier in the south-west section of the crop area in Manitoba than in the north and east. In the south-west the average infection on Marquis, Ceres, and Reward was about 20%. Of the new stem rust resistant varieties, Renown was more resistant to leaf

rust than the standard varieties, whereas Thatcher, Apex, and McMurchy were all much more susceptible.

Leaf rust was reported in 24 out of 34 fields examined in the Maritime Provinces. Infections ranging from 50 to 80% were not uncommon, especially in P.E.I., where leaf rust was widespread and destructive in 1936.

STRIPE RUST (Puccinia glumarum) was severe on Egyptian Amber, moderate on Dawson's Golden Chaff, and absent on Baldwin, Berkeley Rock, Golden Sun, Imperial Amber, Marshal Foch, Oro, Red Rock, Ridit, Sun, Victor and Yeoman in a test of 26 winter wheat varieties at Sidney, B.C. (W.R. Foster)

BUNT (Tilletia caries and T. laevis). A summary of the bunt situation in Western Canada prepared from the records of the Western Grain Inspection Division was supplied by Dr. W.F. Hanna.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1 to October 31, 1937.

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Smutty
Hard Red Spring	30,569	96	0.3%
Garnet	2,232	2	0.1
Amber Durum	10,612	14	0.1
White Spring	8	0	0.0
Alberta Red Winter	86	15	17.4
All Classes (including mixed classes)	43,541	127	0.3%

The percentage of cars grading smutty during the first quarter of the crop season 1937-38 was 0.3%, while the figure for the corresponding period in 1936-37 was 0.8%. For the past six years the percentage of cars grading smutty in Western Canada has been less than one per cent.

Bunt is fairly prevalent in winter wheat in the Armstrong and Enderley districts, B.C. even where the seed was treated. The varieties Oro and Ridit have proved resistant.

About 1% of bunt was found in 4 fields in southern Alberta and in one field at Morinville, out of 35 examined.

A trace of bunt was found in one field near Bath, N.B. (both T. caries and T. laevis) and in one field in Queens county, P.E.I.

LOOSE SMUT (Ustilago Tritici). A 2% infection was recorded in 3 fields and a trace in 7 others out of 35 examined in Alberta. Loose smut was found in 15 out of 61 fields examined in Saskatchewan. It was reported as follows in Manitoba: Reward, 6 fields out of 6, av. infection 0.8%; Marquis 2 fields, trace; Ceres, 11 fields out of 14, av. inf. 0.8%; Thatcher none in 7 fields; Durum, traces in 9 fields out of 15.

Loose smut was very prevalent in Kent county, Ont.; in some fields 15% of the heads were destroyed, and the average loss wass 5 to 6%. Traces of loose smut were recorded in 2 fields in N.B., and in one each in N.S. and P.E.I. out of 26 examined. In a separate survey in P.E.I. infection varied from a trace to 2.5%.

BLACK CHAFF (Phytomonas translucens var. undulosa). A trace was reported on Reward at Lacombe, Alta. It caused slight damage in 5 fields out of 41 examined in Manitoba.

BASAL GLUME ROT (Phytomonas atrofaciens). A trace was present in fields at Edmonton, Lacombe and Calgary, Alta. A trace was also reported from St. Claude, Glenboro, Darlingford and Morden, Man.

ERGOT (Claviceps purpurea). Ergot sclerotia were sent in a sample of Durum wheat from Moose Jaw, Sask.; a slight infection was observed at Winnipeg, Man. A trace of ergot was seen in a field at Coronation, N.B., and in Huron wheat at Charlottetown, P.E.I.

GLUME BLOTCH (Septoria nodorum) was reported as follows: trace to slight infection in 7 out of 35 fields in Alta.; diseased specimens received from St. Walburg, Sask., where it was said to be common; moderate infection in 3 fields, slight in 7 and trace in 5 out of 28 examined in the Maritime provinces and in some instances the leaves were also infected.

SPECKLED LEAF BLOTCH (Septoria Tritici) moderately infected a field at Olds, Alta., and a trace to slight infections were present in several others in central and northern Alta. A moderate infection was reported on Durum wheat from Medora, Man.

SPOT BLOTCH (Helminthosporium sativum) was severe in a number of fields at Starbuck, Man., while adjacent barley fields were scarcely affected. The same pathogen also caused a trace of Head Blight and Black Point at Edmonton.

LEAF BLOTCH (Pyrenophora Tritici-repentis (Died.) Drechsler (Helminthosporium Tritici-repentis) caused a severe wilting and spotting of the leaves of Durum wheat in the vicinity of Melita, Man. (J.E. Machacek). It has been reported previously from Manitoba on Agropyron repens.

CLADOSPORIUM LEAF SPOT (Cladosporium graminis). A trace was found at Olds and Brooks, Alta.

FOOT ROTS. A trace of Take All (Ophiobolus graminis) was found in one field at Spy Hill, Alta., out of 90 examined. Common Root Rot (Helminthosporium sativum and Fusarium spp.) affected 18 fields out of 35 inspected. It caused slight to moderate damage in 2 fields in northern Alberta and a trace to slight damage in the other affected fields.

Common Root Rot was widespread in Sask., where it was reported in 109 out of 115 fields. It was severe in scattered areas of the dry belt. In the rod row plots of wheat which were sown at intervals of two weeks in studies on rust resistance, Reward was outstandingly and consistently the most severely diseased. Prematurity Blight (cause unknown) was severe on Durum wheat at Saskatoon, Sask., but slight on common wheat. It caused a trace of damage in 3 fields out of 61 examined. Common Root Rot was severe in patches at Morden and Pipestone, Man. and infection was slight at Carmen and Homewood.

Root Rot (Cryptoascus sp.). On July 29, 1936 the roots of White Fife wheat at Malpequi, P.E.I. were found by Mr. R.R. Hurst to be heavily infected by an unknown fungus. The wheat was evidently injured, but whether the injury was due to this fungus on the roots or to leaf rust, which was extremely heavy last year could not be determined. Traces to small amounts of the fungus were present in many other fields including the plots at Charlottetown.

The original area was again visited in 1937 and fresh material was sent to Dr. G.R. Bisby, Imperial Mycological Institute, Kew, England. The perithecia develop in clusters on a limited stroma with the spores lying free in the cavity of the perithecium. Dr. Bisby obtained a few perithecia in culture and found small evanescent asci containing commonly two spores, sometimes one or three. He would place the fungus in the genus Cryptoascus Petri, the

type species being C. oligosporus, which Petri found on the roots of the olive. It was found in one field of oats, 3 fields of wheat, and three of barley in 1937. It appears to be most prevalent on wheat. None of the crops appeared to be seriously diseased. (I.L. Conners).

Browning Root Rot (Pythium spp.) was confined mainly to the north-eastern and eastern parts of Saskatchewan. It was particularly severe in some districts, notably in parts of zone 4 and southward into zone 3. It is difficult to explain from a study of the temperature and rainfall data, why the disease was so conspicuous this year as compared with last in these zones. It was reported from many distant districts in the north-east for the first time. It is true that the spring of 1936 was earlier than that of 1935, but the average temperature were about the same. In this connection it might be recalled that temperature-tank experiments have repeatedly shown that browning root rot is more severe at higher than at lower temperatures. It seems plausible that sudden temperature changes at a critical time might have a greater influence on the onset of the disease than has been thought hitherto.

In many diseased patches the yield was estimated to be as much as 30% below that of healthy parts, or a total reduction of about 10% in yield over the entire summer-fallow field. Under field conditions, Thatcher appears to be the least susceptible of the common varieties.

Pythium arrhenomanes Drechsler and P. tardicrescens Vanterpool n. sp. were the two pathogenic species most frequently isolated from diseased roots.

Grass hosts: To the grass hosts previously reported (P.D.S. 13:20 and 14:7) must be added the following which developed brown root lesions containing oospores when grown in naturally infested browning soil: Agropyron Smithii Rydb., Agrostis alba L., Elymus canadensis L., Festuca elatior L., Panicum miliaceum L., Poa compressa L., Poa pratensis L., Setaria lutescens (Weigel) Stuntz, S. viridis (L.) Beauv., and Stipa comata Trin. & Rup.

For purposes of record it might be mentioned that in the examination of wheat and grass roots, vesicles and arbuscules of a mycorrhigal fungus are frequently encountered. Also spherical bacterial clumps are occasionally observed at the ends of root hairs of the common cereals (cf. F.C. Gerretsen, Ann. Bot. n.s.1: 207-230. 1937).

Some fields of barley on summerfallow in zone 3 were very severely attacked by browning root rot. It is significant that barley on stubble showed little signs of the disease. As is the case with wheat, practical control of the disease on barley was obtained by using phosphate fertilizer. (T.C. Vanterpool)

Browning Root Rot was found causing moderate damage as a result of an intensive survey of 29 fields in zone 2, west, southwest and south of Saskatoon in June. Examination of the root system showed from 2 to 60% of roots affected or an average of 14%. The symptoms were obscured by drought. (H.W. Mead)

A severe epidemic of Browning Root Rot occurred in wheat on summerfallow in the Dauphin, Gilbert Plains, Grandview, Roblin and Russell areas in June. This is the first severe outbreak to be observed in Manitoba. (J.E. Machacek and T.C. Vanterpool)

HEAD BLIGHT (Fusarium spp.). A scattered trace of infection was found at Winnipeg, Man. The following species were isolated: Fusarium Poae (Peck) Wr., F. culmorum (W.G. Sm.) Sacc. and F. Equiseti (Cda.) Sacc. A trace was also recorded at Kelwood. Traces were found in P.E.I. on Huron and on the rod row varieties at Charlottetown.

GLUME DISCOLOURATION. A trace was observed on Renown wheat at Westbourne, Man. An Alternaria sp. was isolated.

ROOT NODULES (Cause unknown) were found on the laterals of sickly plants in a field near Rosthern, Sask. on June 8. The diseased plants occurred in patches.

POWDERY MILDEW (Erysiphe graminis) was heavy on winter wheat at the Experimental Station, Sidney, B.C. It moderately affected wheat at Lethbridge, Alta., and a trace was present at Fallis.

NUTRITIONAL? MALADY. What appears to be a nutritional malady has been under observation for several years in wheat a few miles west of the town of Peace River, Alta. Neither the foliage nor the roots are visibly deformed or lesioned. Despite the method of soil preparation and variation in rainfall, the affected plants are characteristically stunted, lack the normal colour of ripening grain and have spikes which are often completely sterile, or contain a few scattered grains. For several years after the ground was broken, excellent crops were obtained. Now the

condition indicated above occurs in varying degrees from complete sterility and marked stunting to near-normal plants depending on the location in the field. The trouble has been observed on one entire section, the owner of which is in despair for a remedy. It also occurs on other farms in the vicinity.

A somewhat similar injury was observed in a sample of wheat grown at Meadow Lake, Sask. in 1937 and forwarded by Dr. P.M. Simmonds. Another sample, grown on land recently reclaimed at Kootenay Flats, B.C., was forwarded by Mr. C. B. Twigg, Provincial agent for that section. (G.B. Sanford)

OATS

STEM RUST (Puccinia graminis) was general and caused moderate to severe damage at Duncan, B.C. and on Lulu Island. Infection was a trace to slight in the University plots, Edmonton, Alta. Elsewhere rust was practically absent, although there was a heavy second growth which remained green throughout September. No stem rust was reported in Sask.

Stem rust of oats was co-extensive with stem rust of wheat but very much lighter. Most fields showed only traces. In a few instances the severity of infection average 10%. Damage due to rust was therefore very slight in Man. (B. Peturson)

Traces of stem rust were found in 60 and readable percentages in 44 out of 233 fields examined in the Maritime Provinces. While traces of stem rust began to be fairly common after Aug. 16, severe outbreaks of stem rust were found as early as Aug. 4. Several of these were investigated and in every instance the outbreaks centred about plantings of barberry. Some of the plantings were single bushes, others were hedges. It was estimated that the average damage was 40% within half a mile of each planting and it was nearly 100% in the first 100 yards. The damage was negligible elsewhere. (I.L. Conners)

CROWN RUST (Puccinia coronata) was general throughout southern Manitoba. It was nowhere present in sufficient intensity to cause any damage.

Crown rust was far more prevalent in the Maritime Provinces than stem rust. Most fields showed traces after July 28. Traces were found in 80 fields and readable percentages in 100 others out of 213 examined. Outbreaks were found centred about plantings of buckthorn (Rhamnus

cathartica) in the early part of the season. Later the rust became very general and was severe in all late fields. (I.L. Conners)

Crown rust was also prevalent in Eastern Ontario. In some of the worst centres buckthorn plantings and escapes are known to occur.

SMUT (Loose smut, Ustilago Avenae and Covered smut, U. Kolleri). A trace of loose smut was reported from Summerland, B.C. and one per cent of covered smut in a field at Langley.

Covered smut was found in 5 fields in Alta., infection varying from a trace to 6%. Loose smut was reported in 4 and covered smut in 5 out of 18 examined in Sask.; covered smut affected 5% of heads in Anthony oats at Saskatoon.

Smut was reported in 22 fields out of 24 examined in Manitoba; the average damage was 6%.

The oat smuts were very prevalent in Western Ontario. In many fields 15% of the heads were destroyed; a conservative estimate would be an average loss of 5% of the heads. (J.E. Howitt and R.E. Stone)

Loose smut infection varied from a trace to 6% in 30 fields examined in the southern part of Gaspe country.

Out of 166 fields examined in the Maritime Provinces, loose smut was found in 22, covered smut in 42 and both smuts in 43, a total of 107 infected fields with an average infection of 2% in the fields examined. Although smut was less prevalent than last year, 27 fields revealed 5% or more of smutty heads. The highest infections were 35% of covered smut, 25% of loose smut and mixed infection of 10% loose and 13% covered smut. In addition smartweed (Polygonum lapathifolium) affected by smut (Ustilago utriculosa) appeared to be of rather common occurrence, especially in oats. The weed seeds were evidently sown with the oats, so that the oat seed was also contaminated with the smartweed smut spores.

HALO BLIGHT (Phytomonas coronafaciens). A light infection was observed at Edmonton and Fallis, Alta. It was prevalent in the Sudbury distrist, Ont., and often destroyed 3 to 4% of the heads. (J.E. Howitt and R.E.Stone)

FOOT ROT. Common foot rot (Helminthosporium and Fusarium spp.) was reported to have caused severe damage in one field at Craigmyle, Alta.

Common foot rot caused moderate damage in 9 fields out of 18 examined in zones 3 and 4 in Sask. Prematurity Blight (cause unknown) caused a trace of damage in 2 fields in Sask.

LEAF BLOTCH (Helminthosporium Avenae) was one of the common diseases of oats in the Maritime Provinces. Out of 159 fields the disease was severe in 10, moderate in 49, slight in 52 and a trace in 17, or a total of 129 infected fields.

BLAST (Non-parasitic) was reported in all 12 fields examined in Manitoba, the average damage was 25.9% of the spikelets.

It was very prevalent in the farming districts around Sudbury, Ont. In many fields 5% of the spikelets were destroyed.

Blast was recorded in 120 fields out of 155 examined in N.B., N.S. and P.E.I. as follows: trace in 4 fields, 1-5% blasted spikelets in 59; 10% in 41; 20% in 15 and 30% in one field.

NEMATODE (Heterodera schachtii). In May of 1936 the Botanical Department of the Ontario Agricultural College, was asked to find the cause of the failure of the oat crop on many of the farms in Waterloo county. Inspection trips were made in company with the Chemistry Department in May and June. Nematodes were found in fifteen fields, scattered over an area of approximately 300 square miles. Samples of the soil were taken by the Chemistry Department from these fields. Soil tests showed that the soil in all these fields but one was alkaline. The soil in nine fields rated medium as to available phosphoric acid. In five fields available phosphoric acid was definitely low and in one only it was high.

In 1937 the survey was continued and nematodes found to a greater or less extent on nearly every farm in the area in Waterloo county. Mr. J. Laughland of the Field Husbandry Department also received samples of oats attacked by nematodes from the following places: Georgetown, Halton county; Marden, Wellington country; Maxville, Glengarry county; Jarvis, Haldimand county; Woodstock, Oxford county; Port Dover and Waterford, Norfolk county; Brantford and Scotland, Brant county; Tehkummah, Manitoulin district; Maple, York county; Inglewood, Peel county; Ayton, Gray county.

It would seem from the above that nematodes are pretty well established throughout the Province. Waterloo and Simcoe are the only two counties however, in which serious, widespread outbreaks of the oat nematode have been recorded. Oat material collected in Waterloo county was sent to Dr. D.F. Putman, who positively identified the nematodes as Heterodera schachtii. The nematodes present in the collections received by Mr. Laughland are believed to be Heterodera schachtii, but have not been definitely determined. (J.E. Howitt)

BARLEY

STEM RUST (Puccinia graminis). A trace of rust was found on barley at Edmonton, Alta., in late September. Rust was found in 3 fields out of 13 in zone 3 in Sask.; the heaviest infection was 5% at Redvers.

Stem rust was general throughout the crop area in Manitoba in 1937 and was moderately severe. In fact it was more severe than in 1936. (B. Peturson)

Stem rust was prevalent on barley at St. Martin, Que.

Stem rust was observed in 13 fields out of 59 examined in N.B., N.S., and P.E.I. Usually only a trace of rust was present but a 20% infection was found in one field near a barberry hedge at River John, N.S. (I.L. Conners). Stem rust was fairly abundant on late seeded barley in P.E.I. (R.R. Hurst)

LEAF RUST (Puccinia anomala). A trace was found at Edmonton, Alta. in late September. The rust was identified by Dr. Margaret Newton. It was observed in 5 fields out of 59 examined in N.B., N.S., and P.E.I. It was again fairly prevalent in the plots at Fredericton, N.B.

STRIPE RUST (Puccinia glumarum) was not noticeable about Edmonton, Alta. until July 20; from then on it continued to increase on Hordeum jubatum until late in September. It was collected by Dr. G.B. Sanford on this host only in favourable locations at several points including Athabasca, Smith and Pouce Coupe in the Peace River district, but it was very scarce in southern Alberta, where it it usually common during late August.

COVERED SMUT (Ustilago Hordei) was reported as follows: 25% in a 2-acre field at Australian, Cariboo county, B.C.; 10% in one field at Cardston, Alta. and 1-2% in several others in central and northern Albta.; trace in one field in zone 3, Sask.; 0.6% in 7 fields out of 10

examined in Man.; heavy for the past two years in a field at Carleton Place, Ont.; present in 23 fields out of 59 in N.B., N.S., and P.E.I., highest infection, 8%.

LOOSE SMUT (Ustilago nuda) was recorded as follows: a trace to 2% in 3 fields out of 12 examined in Alta.; a trace in 3 fields out of 13 in Sask.; 0.5% in 11 fields out of 15 in Man.

Loose smut was very common throughout Ontario, particularly in the following varieties of barley: O.A.C. 21, Velvet and Nobarb. At least 15% of the heads were destroyed in some fields of these varieties (J.E. Howitt and R. E. Stone). It was reported to be heavy in the Ottawa valley by the Seed Branch inspectors. Loose smut was recorded in 7 fields out of 59 examined in N.B., N.S., and P.E.I., the highest infection being 2%.

STRIPE (Helminthosporium gramineum). A trace was reported in one field in Sask. and in another at Crystal City, Man. It was not found in the Maritime Provinces.

FALSE STRIPE (Cause unknown) was recorded as follows in Man.: Garson, trace; Homewood, slight infection on 5% of plants; Melita, slight on 25% of plants; Brokenhead River, general light infection; Morden, severe on Trebi only.

NET BLOTCH (Helminthosporium teres) was fairly general in several fields at Pitt Meadows, B.C.; a trace in one field in Sask.; trace at Morden, Rothwell, and Beaudry, Man., slight at Elie and Glenboro; present in 36 fields out of 59 examined in N.B., N.S., and P.E.I. and infection moderate to severe in 13.

SPOT BLOTCH (Helminthosporium sativum). Traces were present in 4 fields and severe in one other in Man. Spot blotch was heavy in a field at Hartland, N.B., and slight to moderate in two others in the same province.

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) was present in 10 fields out of 13 examined in Saskatchewan and caused moderate damage.

Seedling blight (Helminthosporium, Fusarium, etc.) was very prevalent in the Sudbury area, Ont. Fields were observed in which 15% of the seedlings had been killed by these soil-inhabiting organisms (J.E. Howitt and R. E. Stone).

ERGOT (Claviceps purpurea) was reported as follows: slight infection, Winnipeg, Man.; prevalent in Velvet and Nobarb barley in Ont., samples of Nobarb containing over 10% of ergot were examined; very little present in 1937 in P.E.I., three samples received for identification; a trace in a field near Truro, N.S.

POWDERY MILDEW (Erysiphe graminis) was general but caused slight damage at the Agassiz Station, B.C.; traces were seen late in the season in P.E.I.

BACTERIAL BLIGHT (Phytomonas translucens) was found in 2 fields out of 8 examined; all the leaves of Regal barley were affected at Winnipeg, Man., and half the leaves in a field at La Salle.

HEAD BLIGHT was present in 17 fields out of 57 examined in the Maritime Provinces. Diseased material was sent from 11 fields in N.S. and N.B. and from 5 varieties under test at Fredericton and Nappan to Dr. W.L. Gordon, Dom. Rust Research Laboratory, who isolated and determined the fungi. Fusarium Poae was the sole or dominant fungus in 9 collections. In two of these, F. avenaceum was also present. Helminthosporium sativum was the sole or dominant fungus in five collections, while Alternaria sp. only was isolated from one collection. Helminthosporium teres was also present with H. sativum in one collection. Dr. Gordon also finds Fusarium Poae commonly associated with blight in Western Canada. In only one collection was present the pinkish discoloration usually associated with Fusarium head blight.

BLACK POINT (Bacteria and Fusarium spp.). A moderate infection was observed at Fallis, Alta.

SCALD SPOT (Rhyncosporium Secalis). A moderate to heavy infection was present in the experimental plots at Edmonton, Alta.

RYE

STEM RUST (Puccinia graminis). Traces were present in the winter rye plots at Fredericton, N.B. and Kentville, N.S. Agropyron repens was found heavily rusted on several occasions near barberries in N.B.

LEAF RUST (Puccinia secalina). Traces were observed in a few fields in Man.; in one at Deleau 10% infection was reported. Infection was 30-40% in the winter rye plots at

Fredericton, N.B. and traces were present at Kentville, N.S.

ERGOT (Claviceps purpurea) slightly infected rye at Winnipeg, Man. and traces were present at Beausejour and Brandon. It was prevalent in rye in Ontario. Ergot began to show up in winter rye plots at Fredericton, N.B. by July 20, the variety Cornell showed 6.0% ergot on August 5 and all the unharvested varieties were severely affected by ergot on Aug. 28.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

COMMON LEAF SPOT (Pseudopeziza Medicaginis) is general on all varieties each year on Vancouver island and in the Fraser valley, B.C.; it was general on the lower leaves of alfalfa at Summerland, B.C. A light infection was observed at Beaver Lodge and Edmonton, Alta. A trace was present on the lower leaves of alfalfa at Morden, Man. A heavy infection occurred in a field near Newcastle and at the Fredericton Experimental Station, N.B. Both alfalfa and sweet clover was conspicuously free from leaf and stem blemishes in the University plots at Saskatoon, Sask.

DOWNY MILDEW (Peronospora aestivalis). Lytton has been consistently affected and is obviously more susceptible than any of the other popular varieties grown in the Fraser valley, B.C. The disease was not as prevalent as in 1936 (W. Jones). Downy mildew was severe in patches at Winnipeg, Man.

YELLOWS (Boron deficiency) was fairly common at the Summerland Experimental Station, B.C.

ROOT ROT (Cylindrocarpon Ehrenbergi Wr., Sclerotinia sp. etc.). A light infection was found in the experimental plots at Edmonton and Lacombe, Alta., and in several fields at Lacombe.

Root Rot (Sclerotinia sp.) and Winterkilling caused moderate damage in May at Saskatoon, Sask.

WHITE SPOT (Non-parasitic) was conspicuous on specimens received from Acton, Ont., at the Central Laboratory in June.

DWARF (Undetermined) is apparently prevalent in the Cariboo district and other parts of the interior of B.C. While no survey has been made, reports indicate it to be rather widely spread, particularly in the irrigation areas. (W. Jones)

COMMON CLOVER

MID-VEIN SPOT (Mycosphaerella carinthiaca Jaap). Specimens of red clover collected at Woodstock, N.B. in 1936 and affected with an unknown fungus were sent to the Imperial Mycological Institute. Mr. E.W. Mason identified the fungus to be Mycosphaerella carinthiaca. He reports -

"This species was described by Jaap on Trifolium medium from the Austrian Alps in 1908 and later on the same host from Switzerland. Ramularia Trifolii Jaap was stated to be the conidial state (Ann. Mycol. 6:210, 8:145, and 15:106). In 1922 it was recorded on Trifolium pratense in Wales (Rev. Appl. Myc. 1:422). The present collection is no doubt the same thing as that recorded from Wales, material of which is preserved in Herb. Kew." (I.L. Conners)

COMMON LEAF SPOT (Pseudopeziza Trifolii) was unusually heavy in September on red clover in all parts of P.E.I.

POWDERY MILDEW (Erysiphe Polygoni) caused slight damage in York county. It was heavy on red clover in September in P.E.I.

RUST (Uromyces Trifolii) was present on alsike clover in several fields on Vancouver island and in the Fraser valley and on N.Z. white clover at Agassiz, B.C. A general light infection of aecia and uredinia occurred on alsike at Winnipeg, Man. Rust slightly damaged clover at the Fredericton Station, N.B. It was heavy on red clover, moderate on white, and light on crimson clover (T. incarnatum) at Charlottetown, P.E.I.

SOOTY BLOTCH (Cymadothea Trifolii) was general on red clover, but caused little damage in the Fraser valley, B.C.; it was also present on white clover at the Sidney Station. It was common at the Fredericton Station, N.B. and abundant in September on red clover in P.E.I.

LEAF SPOT (Gloeosporium sp.) moderately infected over half the plants in a field at Fallis, Alta.

MOSAIC (Virus). Traces of mosaic were reported on red clover in Queens county, P.E.I.

SWEET CLOVER

LEAF SPOT and STEM CANKER (Stagonospora Meliloti). A trace to slight infection was found in several fields in central and northern Alta.

ROOT ROT (Cylindrosporium Ehrenbergi, Sclerotinia sp. etc.) lightly to severely infected the experimental plots at Edmonton and Lacombe, Alta., and several fields in the Lacombe district. Root rot (Sclerotinia sp.) and Winter-killing moderately affected sweet clover in the University plots, Saskatoon, Sask. in May.

MOSAIC (virus) affected 10% of white sweet clover plants at the Summerland Station, B.C.

LENTIL

ROOT ROT (Fusarium spp.) affected 3% of the plants at Lethbridge, Alta.

VETCH

DOWNY MILDEW (Peronospora Viciae) was common on young plants at Sidney, B.C.

BROOM-CORN MILLET

SMUT (Sorosporium Panici-miliacei) affected 0.75% of the heads at Brandon, Man. and 18% at Fredericton, N.B.

BACTERIAL LEAF SPOT (Phytomonas Holci) slightly infected Japanese millet at Morden and Brandon, Man.

BUCKWHEAT

YELLOWS (Virus). At the Fredericton Station, N.B., infection ranged from 1-50%; every smooth variety of buckwheat showed far less yellows than the rough sorts (J. L. Howatt). Infection was a trace in a field at Millerville, N.B., and about 15% in one at River John, N.S. Judging from the symptoms the buckwheat was affected with Aster Yellows (K. Smith. Textbook of Plant Virus Diseases, p. 216. 1937). (I.L. Conners)

CORN

SMUT (Ustilago Zeae). It was reported that smut is present throughout the Grand Forks district, B.C. and that some fields are badly affected; specimens were also received from Oyama. A trace was present at Morden, Man. Smut was prevalent throughout Ont.; in many fields 5% of the plants were affected (J.E. Howitt and R. E. Stone). A single ear was observed in 1½-acre field in Kings county, N.S.

RUST (Puccinia Sorghi) slightly infected corn at Morden, Man. Traces were also present in P.E.I.

FUSARIUM ROT (Fusarium sp.). Traces were found on corn in November in P.E.I.

FLAX

RUST (Melampsora Lini). Traces of rust were observed at Haywood and Culross, Man.; rust was slight to severe depending on the variety at the Morden Station.

DAMPING OFF and WILT was severe in the first sowing of Bison flax in the University plots, Saskatoon, Sask., slight in the second sowing and absent in the third. The sowing dates were April 20, May 1, and May 15. Rhizoctonia was the fungus most commonly isolated. (T.C. Vanterpool)

WILT (Fusarium Lini) caused a trace of damage to flax injured by heat canker at the Scott Station, Sask. One per cent of the plants were infected in a field at Melita, Man.

A field examination followed by cultural tests indicated that wilt was present in practically every plot of fibre flax at Ottawa, Ont. The diseased areas were rapidly expanding at harvest time due to the warm moist weather. Fibre flax from Tavistock, and Lucknow, Ont., and De Beaujeu, Que., were also affected. (F.S. Thatcher)

BROWNING (Polyspora Lini) a light general infection occurred at Edmonton, Alta.; it was most prevalent on Bison.

HEAT CANKER (Non-parasitic). About a dozen varieties were affected at the Scott Station, Sask., and the amount of injury varied from a trace to 25% depending on the variety.

MANGEL

CERCOSPORA LEAF SPOT (Cercospora beticola) caused slight to severe damage in York and Northumberland counties, N.B.

CROWN GALL (Phytomonas tumefaciens) was found affecting 4 roots in one field at the Charlottetown Station, P.E.I.

CROWN and DRY ROT (Non-parasitic). A disorder, which answers the description of this disease, is common on mangels throughout N.B. Although attempts to control the malady by the use of boron have failed, it is suspected that

the trouble is in part due to boron deficiency and that the failure of previous trials has been due to the use of too small applications of boron salts. (J.L. Howatt)

STRANGLE (Undetermined). Traces were noted in 10 rows in one field in P.E.I. (R.R. Hurst)

FERTILIZER INJURY. Heavy applications of a cyanamid fertilizer on a sandy soil apparently caused the killing of 10% of the young mangels at or just below the level of the ground in a field in Annapolis county, N.S.

SUGAR BEET

BLACK LEG (Phoma Betae) as a leaf spot slightly affected sugar beets at Sidney, B.C.

RUST (Uromyces Betae) was general on the foliage, but caused slight damage to the yield at the Sidney Station, B.C.

SORGHUM

BACTERIAL LEAF SPOT (Bacillus Sorghi). A trace of infection was reported at Brandon, Man.

SUDAN GRASS

BACTERIAL LEAF SPOT (Bacillus Sorghi). Infection was a trace at Brandon, Man.; light to moderate at Morden.

SOY BEAN

BACTERIAL BLIGHT (Phytomonas glycinea). A light infection of two distinct types of blight was found at Olds, Alta. The disease was slight to moderate at Morden, Man. The disease was fairly prevalent in Essex and Kent counties, Ont.

MOSAIC (virus). In nearly every planting of soy beans in Essex county, Ont., 1 to 10% of the plants were affected with mosaic.

SUNFLOWER

WILT (Sclerotinia sclerotiorum). Affected plants occurred here and there at both Morden and Brandon, Man.

RUST (Puccinia Helianthi) was heavy on the lower leaves at Morden and Brandon, Man.; it was prevalent late in the season at Winnipeg.

LEAF SPOT (Septoria Helianthi) lightly infected sunflowers at Edmonton, Alta.

CULTIVATED GRASSES

BROWN TOP (Agrostis)

Stem Rust (Puccinia graminis) moderately affected this grass at West Bathurst, N.B., and near Great Village, N.S., in the vicinity of barberries.

KENTUCKY BLUE GRASS (Poa pratensis)

Leaf Spot (Helminthosporium vagans) was abundant on the leaves and sheaths and uncommon on the inflorescence of Kentucky blue grass on Lulu island, B.C. On the leaves are formed well defined oval spots with light centre and fairly wide dark purplish borders 0.5-3.0 mm. x 1-10 mm. or sometimes more elongated (W. Jones).

ORCHARD GRASS (Dactylis glomerata)

Ergot (Claviceps purpurea) slightly injured this grass at the Fredericton Station, N.B. Ergot heavily infected the following grasses at Winnipeg, Man.: Dactylis glomerata, Agropyron repens, A. dasystachyum, A. repens, A. Smithii, Bromus inermis, and Elymus curvatus.

Brown Stripe (Scolecotrichum graminis) was general and caused slight damage on Vancouver island and the lower mainland, B.C.

Leaf Spot (Mastigosporium album) was also fairly general and caused slight damage in the Fraser River valley and on Vancouver island.

PERENNIAL RYE GRASS (Lolium perenne)

Eye Spot (Ovularia Lolii) was general and caused slight damage on the lower mainland and Vancouver island, B.C.

VELVET GRASS (Holcus lanatus)

Twist (Dilophospora Alopecuri) was fairly general in the Fraser valley, B.C., but it was not as common as in 1936.

TIMOTHY (Phleum pratense)

Leaf Spot (Heterosporium Phlei) was quite general in the Fraser River valley, B.C., and to a slight extent in

the Buckley valley. It was also prevalent in York county, N.B.

Stem Rust (Puccinia graminis Pheli-pratensis) first appeared in the Fraser valley, B.C., about July 1, and became general later; it was not found in mid June in Buckley valley, an area devoted to timothy seed production. A trace was present at the Fredericton Station and in York and Carleton counties, N.B., in September. Stem rust was late developing this year in P.E.I. Plant counts along the roadside gave an average infection of 12% in August and 72% in September.

WESTERN RYE GRASS (Agropyron tenerum)

Smut (Ustilago bromivora). About 50% of the heads were smutted in a field west of Edson, Alta. Fischer (Mycologia 29:408-425. 1937) considers this smut as caused by Ustilago bullata Berk., under which name he combines U. bromivora, and U. Lorentziana.

LAWN GRASS

Brown Patch (Rhizoctonia Solani) was present in material received from Windsor, Ont., and it was described in an enquiry from Welland. (G.C. Chamberlain)

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (Puccinia Asparagi) slightly damaged asparagus at Saskatoon in September.

WILT and YELLOWING (Cause unknown) affected plants here and there at the Brandon Farm, Man.

BEAN

MOSAIC (Virus) affected 50% of the dwarf beans at Summerland Station, B.C. A light infection was reported from Brooks and Edmonton, Alta. Mosaic was severe in Kentucky Wonder pole beans at Winnipeg, Man.; the plants were stunted. In nearly every planting of white beans examined a small amount of mosaic was observed in Essex county, Ont. Traces to 10% of the bean plants were affected in 12 gardens in Queens county, P.E.I.

ANTHRACNOSE (Colletotrichum Lindemuthianum). A trace was found at Brooks and Edmonton, Alta. The general infection was slight, but the disease was heavy on some plants at Brandon, Man. The disease was severe in some instances destroying the crop in Essex county, Ont., particularly in the La Salle district.

In Western Quebec 43 fields of wax beans being grown for seed were inspected twice. The fields were distributed as follows - at St. Eustache, 15; Lacole, 9; St. Valerien, 7; Lanoraie, 12. The degree of infection was: free, 10 fields; traces, 17; 1-10%, 4; 10-25%, 8; 25-100%, 4. It will be seen, however, that anthracnose was less destructive than bacterial blight. Fields where the seed was sown relatively late were less affected by anthracnose than those sown early. Fields with well-spaced rows were cleaner; fields with the seed sown in hills were less diseased although some hills were badly affected (E. Lavallee). Slight infections of anthracnose were reported from York and Westmoreland counties, N.B. The disease was general and caused slight to moderate damage in a few fields and gardens about Kentville, N.S. Slight to severe damage from anthracnose was reported in Queens and Prince counties, P.E.I.

BACTERIAL BLIGHT (Phytomonas Phaseoli) was severe at Brooks, Alta. and light to moderate at Edmonton and Olds. It was slight on one variety at Scott, Sask., and blighted material was sent from Maidstone. A trace of bacterial blight was present on garden beans at Brandon, Man.; a

trace of infection was general at Morden and infection was heavy on Davis White Seeded Wax. It also slightly infected field beans at both Brandon and Morden.

During the latter part of the season bacterial blight became widespread on white beans in Essex and Kent counties, Ont. Premature defoliation was not uncommon, particularly around Ridgetown (L. W. Koch). All the plants were moderately affected in a garden at Dunrobin.

In western Que., where 43 fields were surveyed (see anthracnose), all were affected with bacterial blight; traces were present in 6; 1-10% infection in 12; 10-25% in 7; and 25-100% in 18 (E. Lavallee). It was also noted at St. Thomas, Joliette, Montreal, and Beauce.

It caused slight damage in York and Westmoreland counties, N.B., and was severe in one garden at Kentville, N.S. and another at Charlottetown, P.E.I.

HALO BLIGHT (Phytomonas Medicaginis var. phaseolicola). A light infection was found at Brooks and Edmonton, Alta.

RUST (Uromyces appendiculatus) was observed at Quebec city, Que. It slightly affected a planting in York county, N.B. and one of Scarlet Runner in Queens county, P.E.I.

ROOT ROT (Rhizoctonia sp.) caused considerable damage at Brooks, Alta.

ROOT ROT (Cause unknown) affected odd plants at Brandon, Man.

A root rot, the cause of which was undetermined, was prevalent in the early season on white beans in Kent county, Ont. Infection ranged from a trace to 50% of the plants. The disease was frequently associated with corn maggot injury, particularly around Chatham; it was more severe on the lighter soils.

SCLEROTIAL ROT (Sclerotinia Sclerotiorum) lightly infected beans at Brooks, Alta. It was common where the pods remained damp under heavy foliage in a garden at Kentville, N.S.

GREY MOULD (Botrytis cinerea) caused slight damage to pole beans in several greenhouses in Burnaby, Vancouver, and Pitt Meadows, B.C. It was moderate to heavy at Brooks, Alta.

BROAD BEAN

MOSAIC (virus) etc. moderately affected broad bean in gardens west of and at Edmonton, Alta.

LEAF SPOT (Ascochyta Pisi) was slight on a few plants at Edmonton, Alta.

BEET

CERCOSPORA LEAF SPOT (C. beticola) was present in most gardens in the Fraser valley and Vancouver island, B.C., but the damage was generally slight. Other reports were: slight infection in a few gardens at Edmonton, Alta.; trace at Brandon, Man.; heavy in a garden at Charlottetown, P.E.I., but causing little damage.

BLACK LEG (Phoma Betae). As a leaf spot traces were present in most gardens in the Fraser valley and Vancouver island, B.C. and at Charlottetown, P.E.I.

SCAB (Actinomyces scabies). Traces were reported from one garden at Charlottetown, P.E.I.

BRUSSELS SPROUTS

CLUB ROOT (Plasmodiophora Brassicae) is commonly found on brussels sprouts in Laval county, Que., the damage being slight to heavy. Usually diseased plants are confined to spots in the field. Club root is apparently on the increase in home gardens at Kentville, N.S. The crop is often reduced 75%

CABBAGE

CLUB ROOT (Plasmodiophora Brassicae) was present in several fields at St. Martin and Ste. Dorothee, Laval county, Que.; at St. Antoine, Vercheres county, 75% of the plants were affected in a home garden (E. Lavallee). It was reported as serious in Portneuf county and at Warwick and as present in Chicoutimi. It occurred in several gardens in Queens county, P.E.I.; 15% of the plants were affected in one garden.

BACTERIAL LEAF SPOT (Phytomonas maculicola). Affected specimens were received at the Saanichton Laboratory from Terrace, B.C., an isolated district, 80 miles east of Prince Rupert.

SOFT ROT (Erwinia carotovora) destroyed 0.5% of the plants in a garden at Charlottetown, P.E.I.

YELLOWS (Fusarium conglutinans) was observed in one field at Amherstburg, Ont.; 40% of the plants were affected. (L.W. Koch)

WIRE STEM (Rhizoctonia sp.). In the past few years wire stem has become a very serious disease of seed beds in the Montreal district, Que. (E. Lavallee)

CANTALOUPE (see also Melon)

WILT (Verticillium sp.) caused a 30% loss in two fields of about 9 acres extent in the Saanich district, Vancouver island, B.C.

CAULIFLOWER

CLUB ROOT (Plasmodiophora Brassicae) was very severe on cauliflower in many local gardens at Kentville, N.S. The crop was materially reduced and in some it was a total failure.

CARROT

YELLOWS (Virus) was severe on carrots at Brandon and Winnipeg, Man. This is the first time yellows has been reported to the Survey from Manitoba. (W.L. Gordon)

In a large field of carrots in Gloucester county, N.B., 65% of the plants were affected.

LEAF BLIGHT (Macrosporium Carotae) caused a trace of damage to half an acre field of carrots at Surrey, B.C.

SCLEROTIAL ROT (Sclerotinia Sclerotiorum) caused moderate loss in storage at Kersley, B.C.

One grower lost 50% of his carrots in storage in the fall of 1937 from this disease in York county, N.B.

CELERY

LATE BLIGHT (Septoria Apii). A heavy infection was reported from Peace River, Alta.

Late blight (S. Apii and S. Apii-graveolentis) become very prevalent late in the season in Ontario. In many unsprayed celery fields severe blight was observed on every plant. In well sprayed fields not more than 3-4% of blight was present (J.E. Howitt and R.E. Stone).

The disease was general in Quebec as usual, but commercial control was obtained when a good spray programme with Bordeaux mixture was followed. Most growers in south-

western Quebec carried out such a programme (E. Lavallee). The disease was reported from Montreal, Quebec, Sherbrooke, Chicoutimi, Montmagny, Neuville, Cap-Sante and Portneuf. Traces of late blight were reported from Maugerville and Fredericton, N.B. and Charlottetown, P.E.I.

EARLY BLIGHT (Cercospora Apii) was severe on the experimental plots at St. Catharines, Ont., and in the vicinity.

HEART ROT (Apparently physiological) was fairly general in the celery fields in the Montreal district, Que. It was especially severe in one field at St. Leonard-Port Maurice, where 90% of the plants were affected and in a second at St. Remi, where 20% loss was encountered. It is thought that the particularly wet spring and hot summer favoured the trouble. (E. Lavallee)

BACTERIAL SPOT (Pseudomonas (Phytomonas) Jaggeri) apparently caused severe damage at Terrace, B.C. (W. Jones)

STEM CRACKING (Boron deficiency) was found in six large fields in the Montreal district, Que. It was specially noticeable in fields receiving commercial fertilizer only. No stem cracking was seen in a field of early celery, which received a dressing of chemical fertilizer only, to which borax had been added at the rate of 7-8 lbs. per acre (E. Lavallee).

CUCUMBER

BACTERIAL WILT (Erwinia tracheiphila) caused considerable damage to cucumbers both in the greenhouse and the field in Essex county, Ont. Instances of late as well as early infection were observed (L. W. Koch).

The disease was found in a few fields at St. Martin and Ste. Dorothee, Que. It caused much less damage this year than last (E. Lavallee).

FUSARIUM WILT (Fusarium sp.) appeared in scattered areas in a greenhouse crop in April in Lincoln county, Ont. (G.C. Chamberlain)

SCAB (Cladosporium cucumerinum) heavily infected one field at St. Eustache, Que., at the end of the season (E. Lavallee).

In the plots at the Experimental Station, Fredericton, N.B. six inbred or selected lines of cucumbers remained free from scab and two others showed 1% of the disease. Commercial varieties were affected as follows: Long Paris

Pickling, 4%; Macdonalds, 6%; Straight Eight, 8%; Early Fortune, 9%; Green Pack, 10%; Boston Picking, 13%; Perfection, 17%; Delcrow, 18%; Treil Gurkin, 59% (J.L. Howatt).

Scab caused slight damage on one variety at Charlottetown, P.E.I.

ANGULAR LEAF SPOT (Phytomonas lachrymans) affected 5% of the fruit in a greenhouse at Medicine Hat, Alta.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) was very severe and caused a $1,000. loss in a greenhouse at Medicine Hat, Alta.

ROOT KNOT (Heterodera marioni) was observed in one greenhouse near Leamington, Ont. All plants were severely affected. A heavy application of calcium cyanamide had been made previous to planting. (L.W. Koch)

GREY MOULD (Botrytis sp. cinerea type). A few mature fruits were damaged in York and Sunbury counties, N.B.

MOSAIC (virus) was affecting 10% of the plants in a greenhouse in Lincoln county, Ont., on April 30; the growth was dwarfed and the fruit disfigured.

EGG PLANT

SCLEROTIAL ROT (Sclerotinia sclerotiorum) affected 5% of the plants at the Summerland Station, B.C.

GINSENG

STEM ROT (Undetermined) was causing severe damage in a commercial planting at Covehead, P.E.I. in August (R.R. Hurst).

HOPS

DOWNY MILDEW (Pseudoperonospora Humuli) seriously infected the canes of the Clusters variety during the harvest period at Sardis, B.C., owing to unfavourable weather conditions. The disease was controlled best in 1937 in the Agassiz yards, where the hops had been dusted with a copper lime dust throughout the season. The Clusters variety is very susceptible and it is extremely difficult to control the disease in it during unfavourable weather. No disease was observed on the Fuggles variety this year. (W. Jones)

LETTUCE

DROP (Sclerotinia sclerotiorum) destroyed 1% of the heads in a 2-acre field on low-lying peaty soil at Surrey, B.C. A light infection was observed in gardens at Edmonton, Alta.

GREY MOULD (Botrytis cinerea) affected 50% of the plants of the Hanson variety and caused moderate damage at the Sidney Station, B.C.

TIPBURN (Non-parasitic) affected 75% of the plants at the Summerland Station, B.C.

DAMPING OFF (Cause undetermined) was observed quite frequently in hot beds in the Montreal district, Que.

MELON

BACTERIAL WILT (Erwinia tracheiphila) was found affecting from 1 to 60% of the vines in Essex county, Ont. Numerous complaints concerning this disease were received. (L.W. Koch)

LEAF SPOT (Macrosporium cucumerinum) caused considerable damage at Maugerville, N.B.

LEAF SPOT (Alternaria Brassicae) was general in a field in Wentworth county, Ont. on Sept. 10; the damage was negligible.

SCAB (Cladosporium cucumerinum). A trace of scab was found in two localities in N.B.

ANTHRACNOSE (Colletotrichum lagenarium) was epidemic in Essex county, Ont., and caused severe damage. It was most destructive in the Leamington district, where it destroyed practically all the foliage in some plantations. (L.W. Koch)

WILT (Fusarium sp.) affected up to 75% of the vines on a farm in Haldimand county. According to the grower the disease has been present for at least 3 or 4 years; it appears early in the summer and spreads rapidly, generally killing the entire patch. Short rotations have been ineffective.

ONION

DOWNY MILDEW (Peronospora Schleideniana) was not as widely distributed as last year in B.C., and caused only slight damage. It first appeared near the end of July. The disease was prevalent in a 20-acre muck planting of Yellow Danver in Welland county, Ont. The disease appeared suddenly following a humid period. Diseased specimens were brought to the Central Laboratory by Geo. Gilbert, Seed Branch, Ottawa, from Caledonia Springs. The lesions were covered with Macrosporium parasiticum.

GREY MOULD (Botrytis sp.) caused slight damage to onions in storage at the Fredericton Station, N.B.

NECK ROT (Botrytis Allii). A trace was present at Fredericton, N.B.

SOFT ROT (Erwinia carotovora). Growers in south-western Ontario reported very considerable loss from soft rot in October. (J.K. Richardson)

PEA

POWDERY MILDEW (Erysiphe Polygoni) was heavy on field peas at Brooks, Alta.

Traces of powdery mildew were present in nearly every field inspected in Gaspe-south, and Mr. W.J. Tawse reported later that it became the most destructive disease there in 1937. It causes spots on the pods, which induce severe rotting in storage (E. Lavallee).

A trace was present in York county, N.B. Powdery mildew was heavy and caused moderate damage in Queens county, P.E.I., in September.

LEAF and POD SPOT (Ascochyta Pisi). Infection was moderate to heavy at Edmonton and Lethbridge, Alta., and light at Brooks and Lacombe.

The disease was present in every field of 56 visited in Gaspe-south in July, when careful observations were made on the sources of primary infection. It was found the disease was more prevalent where the old vines had been left on the supporting stakes or in the fields. Each severe infection was found to centre around an old infected vine hanging on a stake or lying on the ground (E. Lavallee).

A slight infection was reported from Queens county, P.E.I.

ROOT ROT (Cause unknown) caused 80% damage to a 20-acre field of Laxton and Lincoln peas on Lulu island, B.C. A few plants were infected at Brandon, Man.

ROOT ROT (Rhizoctonia sp.) caused considerable damage to certain varieties at Brooks, Alta.

ROOT ROT (Fusarium spp.) caused 30 to 40% damage at the Lacombe Station, Alta.; a light infection was found in field peas at Beaverlodge. Fusarium was isolated from root rot affected plants from Renfrew, Ont.

ROOT ROT (Fusarium, Rhizoctonia). A slight amount of damage was commonly reported throughout N.B., due to root rot. (J.L. Howatt)

DOWNY MILDEW (Peronospora Pisi) was general but caused slight damage at the Sidney Station, B.C. (W. Jones). Downy mildew was found in scattered spots in 4 or 5 fields in Gaspe-south, Que. (E. Lavallee).

BACTERIAL BLIGHT (Phytomonas Pisi). A trace was observed at Edmonton, Alta.

LEAF BLOTCH (Septoria Pisi). Infection varied from light to heavy at Edmonton, Alta. and a trace was present at Beaverlodge. The Arthur variety of field peas appeared particularly susceptible at Olds. The disease was slight to moderate on the lower leaves of both garden and field peas at Morden, Man.

Leaf blotch caused severe damage in Queens and Prince counties, P.E.I., in 1937. (R.R. Hurst)

RUST (Uromyces Fabae) moderately infected garden peas at Dunrobin, Ont. It was general in York and Sunbury counties, N.B. and was present in Restigouche and Kent counties; the damage was slight.

A trace was found on peas in a field of wheat near River John, N.S. A collection was sent to Mr. A.M. Brown, Winnipeg, for culture. As a result of his work and that of Mr. F.S. Thatcher (P.D.S. 15:31) three strains of this rust on pea may now be distinguished in Canada: (1) Manitoba strain to which Vicia Cracca is immume and V. Faba susceptible; (2) Nova Scotia strain, confined to pea and (3) Quebec strain to which V. Cracca, at least, is susceptible (I.L. Conners).

A slight infection of rust was observed in Queens county, P.E.I.

MOSAIC (virus) was fairly common at Brooks, Alta.

PEPPER

MOSAIC (Virus) affected 10% of the plants at the Summerland Station, B.C., and 3% in a planting in Lincoln county, Ont.

POTATO

Mr. John Tucker, Chief Potato Inspector, has once more provided tabulations on the extent of the seed potato industry, the acreages passing inspection of the leading varieties, the extent that fields failed to pass inspection and the average percentage of the three major diseases: black leg, leaf roll and mosaic. It must be noted that all fields entered for certification are planted with certified seed.

Table 2 - Seed Potato Certification: Number of Fields and Acres Inspected, 1937.

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	3,789	3,104	81.9	15,438	13,111	84.9
N.S.	806	638	72.2	1,528	1,213	79.4
N.B.	1,667	1,496	90.0	8,631	8,053	93.3
Que.	1,620	1,024	63.2	1,741	992	57.0
Ont.	717	559	77.9	1,700	1,292	76.0
Man.	124	112	90.3	284	213	75.0
Sask.	159	141	88.7	306	252	82.3
Alta.	304	268	88.1	377	309	81.9
B.C.	258	199	77.1	373	276	74.0
TOTAL	9,444	7,541	79.8	30,378	25,711	84.6

Acres Entered		Acres Passed	
1936	20,083	1936	16,739
1937	30,378	1937	25,711
Increase of 10,295 acres or 51.2%.		Increase of 8,972 acres or 53.6%	

Table 3 - Seed Potato Certification: Acreages passed by Varieties, 1937.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-B.C.	Total
Green Mountain	4,359	48	5,551	880	117	77	11,032
Irish Cobbler	8,316	302	562	80	242	100	9,602
Bliss Triumph	401	675	1,473			13	2,562
Katahdin	25	138	236	9	380	2	790
Dooley				7	494		501
Netted Gem					2	400	402
Early Ohio						179	179
Spaulding Rose	9		124				133
Warba		1			33	80	114
Chippewa			46		19	13	78
President		14	56	4			74
Gold Nugget					4	37	41
Garnet Chile		25					25
Others	1	10	5	12	1	149	178
TOTAL	13,111	1,213	8,053	992	1,292	1,050	25,711

Table 4 - Seed Potato Certification: Fields Rejected, 1937.

Province	Mosaic	Leaf Roll	Black Leg	Foreign Varieties	Adjacent to Diseased Fields	Misc.	Total
P.E.I.	286	4	7	93	91	204	685
N.S.	87	5	2	15	45	14	168
N.B.	100	2	3	22	13	31	171
Que.	157	12	18	13	78	318#	596
Ont.	10	8	43	31	11	55	158
Man.	0	0	4	1	0	7	12
Sask.	0	0	0	4	0	14	18
Alta.	1	0	21	7	1	6	36
B.C.	9	11	8	2	10	19	59
TOTAL	650	42	106	188	249	668	1,903
Rejections as a percentage of fields:							
Entered	6.9	0.5	1.1	2.0	2.6	7.1	20.2%
Rejected	34.2	2.1	5.6	9.9	13.1	35.1	100.0%

Late Blight 145, Wilts 104.

Table 5 - Seed Potato Certification: Average Percentage of Disease found in the Fields, 1937.

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	.03	.04	.10	.13	.30	.23	.01	.45	.20
Leaf Roll	.16	.13	.04	.14	.10	.01	.01	.02	.65
Mosaic	.51	1.05	.70	.70	.13	.02	-	.21	.93
Fields passed (final inspection)									
Black Leg	.02	.01	.10	.06	.08	.16	.01	.05	.04
Leaf Roll	.01	.06	.03	.10	.07	.01	.01	.01	.13
Mosaic	.11	.18	.29	.34	.08	.01	-	-	.17

There was a very large increase in the acreage planted for certification in 1937, an increase of 10,295 acres or 51.2%. A slightly higher percentage of fields passed inspection with the result that 25,711 acres were passed, an increase of 8,972 acres or 53.6%. The acreage of Green Mountain alone was more than doubled, while that of Irish Cobbler and Bliss Triumph was increased roughly 1,000 acres each. Of the fields inspected, 1,903 or 20.2% failed to pass inspection on account of disease or other causes. The presence of mosaic in excess of the amount permitted was, as usual, the major cause of rejection, being 34.2% of the fields rejected. Late blight and bacterial wilt and rot were nearly as important as mosaic in Quebec.

LATE BLIGHT (Phytophthora infestans) was found in most of the potato growing areas of the lower mainland of B.C. this year. It appeared about July 20, in constrast with its appearance on July 7 in 1936, the earliest appearance on record. However, in certain sections it spread more rapidly than in 1936 and some fields were severely attacked and their yield much reduced. In some instances defoliation by late blight caused a 30% reduction in the yield of marketable potatoes. In other fields the loss was much less, due to the plants being fully grown before late blight developed or conditions being unfavourable for the development of the disease. It is estimated that late blight caused 15% reduction in the yield of marketable potatoes in the Fraser valley in 1937. Most of the crop was harvested while the weather was fine and the soil dry. Although 15% of the tubers in a few shipments of table stock were affected with late blight, the average amount of rot was estimated to be 2%.

While spraying for late blight is not general, many growers now agree that spraying would be advisable and there was an increase in the number who did spray in 1937. Good results were obtained where the spraying was properly done with an efficient machine. In our own spraying experiment on Lulu island this year, the sprayed plots yielded an average increase of 28.5% in marketable potatoes over the unsprayed check plot, a difference of 115 bu. per acre. Late blight rot in the tubers at the time of harvest was: sprayed, 0; check, 1%. (H.S. MacLeod)

Late blight was first reported on July 11 in N.B. Due to the hot dry weather during July and August the disease was held in check. Later, especially in unsprayed fields a large amount of rot developed. In general the disease caused little damage (J.L. Howatt).

Late blight was found in Kings county, N.S. on July 15 and Colchester county on July 28. By August 10 it was fruiting vigorously in Early Bliss Triumph, but the alarmed

growers sprayed heavily with clear bluestone, and only a small amount of rot was found afterwards. Severely blighted fields were found in Colchester, Cumberland, and Pictou counties, but less than 2% of rot developed in the tubers. Drought conditions set in about mid-August which doubtless was also a factor. (W.K. McCulloch)

Late blight was of little consequence until September, when a widespread outbreak developed and caused considerable loss. Many farmers were dismayed to find a high percentage of rot in storage due to this late outbreak in P.E.I. (R.R. Hurst).

RHIZOCTONIA (Corticium Solani) was present in almost every crop of potatoes inspected in B.C., but it varied a great deal in severity in different crops. The disease is generally quite prevalent and it probably causes a greater reduction in marketable potatoes per acre than any other disease. However, it was not nearly as severe on the 1937 crop as it has been in previous years. Sclerotial development was also much less on tubers than usual.

While the moisture and temperature of the soil was probably the chief cause for a light development of the sclerotia on the tubers in 1937, many growers are paying more attention to selection of clean seed for planting, to seed treatment, and to more suitable rotation of crops. In our experiments conducted on Lulu Island this year, the highest yeild of marketable tubers was obtained from the plot planted with clean seed untreated; being 13.5% above the next best, which was from rhizoctonia-affected seed treated with corrosive sublimate. (H.S. MacLeod)

Rhizoctonia was severe on potatoes which were harvested late and the sclerotia were definitely more abundant on potato stock in the Lethbridge area. (J.W. Marritt)

Slight rhizoctonia infection was common in the field in N.S. At tuber inspection, infection ranged from a trace to 80% of crop, with an average of about 6%. Considerable rhizoctonia was found on Bliss Triumph this year, but Katahdin and Irish Cobbler suffered most. (W.K. McCulloch). The white mycelium of the Corticium stage was first noticeable at Glenmount at the base of the stalks on July 10 (K.A. Harrison). There was considerable loss from rhizoctonia due to stolen lesions in July in P.E.I.; it fruited on a trace to 10% of stems in August; sclerotia were beginning to show on the tubers in September (R.R. Hurst).

BLACK LEG (Erwinia phytophthora) affected 32 fields out of 258 inspected in B.C. and resulted in the rejection of 5.

Black leg was more common than usual in the latter part of the season in districts in northern and western Alberta,

where heavy rains occurred from July 15 to the end of September. It was the chief cause of field rejections and some certified seed lots, in which black leg had never been found previously, showed traces. Little black leg was found in northern Saskatchewan and less than the usual amounts occurred in the irrigated districts in southern Alberta (J.W. Marritt). The disease was absent from southern Saskatchewan and not prevalent in Man. (J.W. Scannell)

In N.S. about 9% of the fields inspected showed black leg. Generally it occurred in small amounts, but a new variety, Golden, showed 4% and one field of Green Mountain 12%. Bliss Triumph plantings, which comprise 50% of the total, were practically free from black leg; careful seed treatment is carried out by the growers of Bliss Triumph.

EARLY BLIGHT (Alternaria Solani) was quite prevalent in B.C., especially in areas near the coast. It was severe in some fields in the southern part of Vancouver island and caused moderate reduction in yield (H.S. MacLeod). A light infection was reported at Edmonton, Alta. Early blight was first reported on July 28 in Colchester county, N.S. By the middle of August it was widespread on all common varieties, but the infection was slight. In Antigonish county, along with the early drought, it cut the yield of Irish Cobbler in half (W.K. McCulloch). It caused moderate damage to Irish Cobbler in P.E.I. A trace of Alternaria Tuber Rot was noticed in one lot of Green Mountains in October. (R.R. Hurst).

SILVER SCURF (Spondylocladium atrovirens) was not reported this fall in N.S. nor was it very noticeable in storage last spring (W.K. McCulloch).

POWDERY SCAB (Spongospora subteranea) was reported in 2% of the fields in Kings and Colchester counties, N.S. It was not seen in the other counties visited. Infection was slight except in one field of Bliss Triumph where a 10% infection was present. Variable amounts of powdery scab were noted on Irish Cobbler both this year and last in P.E.I. (R.R. Hurst).

BACTERIAL WILT and ROT (Phytomonas sp.). Since the last Report was prepared the causal organism has been isolated and shown to be very closely related to both Phytomonas michiganensis (E.F. Sm.) Bergey et al, the cause of bacterial canker of tomatoes, and Bacterium sepedonicum Spiekermann (Phytomonas sepedonica according to Bergey's terminology), the cause of bacterial ring rot of

potatoes, a disease recorded from Germany and very similar to this disease (D.B.O. Savile and H.N. Racicot. Bacterial wilt and rot of potatoes, Sci. Agric. 17:518-522, fig. 1-3 1937).

Table 6 summarizes the information available on the distribution of bacterial wilt of potato in Quebec. The disease was somewhat less prevalent in 1937 than in 1936.

Bacterial wilt and rot was first found in N.B. on August 26, in a field of Spaulding Rose. The disease was observed in 36 fields; 21 were Spaulding Rose, 7 Green Mountain, 1 Chippewa and 7 Katahdin. All the fields of Spaulding Rose were grown from seed imported the present season from Maine. One of the Green Mountain lots was planted with seed secured from Quebec in 1937, but the other 6 were planted with N.B. seed of some years' standing. While the seed of the Katahdin and Chippewa lots was not imported this year, the varieties were originally secured from Maine. Of the infected fields, 31 were in Carleton county, 4 in Victoria and 1 in Madawaska. The percentage of diseased plants varied from a trace to 50%, the average being about 20%. (J.L. Howatt and C.H. Godwin).

VERTICILLIUM WILT (Verticillium ?albo-atrum) affected from 2 to 14% of the Irish Cobbler plants in affected fields in Prince and Queens county, P.E.I. and resulted in the rejection of 40 fields.

Table 6 - Seven year summary of field inspection reports on the distribution of bacterial wilt of potato in the Province of Quebec. (B. Baribeau).

	Year						
	1931	1932	1933	1934	1935	1936	1937
Counties:							
Visited	49	44	49	51	52	44	53
Wilt present	18	8	22	34	20	29	25
Parishes:							
Visited	298	207	228	254	209	195	200
Wilt present	50	21	70	159	46	94	84
Fields:							
Visited	2,069	1,394	1,616	1,989	1,717	1,592	1,620
Rejected for wilt.	37	9	34	168	58	160	104

Affected plants show a flagging at the leaf tips followed by a definite wilting, the symptoms developing from terminal leaflets inwards and toward the main stem. The vascular tissue is brownish, the discoloration extending into the tubers (R.R. Hurst).

WILT (Cause undetermined) was reported in Irish Cobbler in Antigonish and Kings counties, N.S., but in very small amounts.

FUSARIUM WILT (Fusarium spp.) was again prevalent in Manitoba and southern Saskatchewan. In the former province it was present in practically every field inspected. Five fields out of 124 were rejected and several commercial fields showed 5% of the plants affected. (J.W. Scannell).

MOSAIC (virus) was present in 75 fields out of 258 inspected in B.C., with the result that 10 were rejected. As in previous years only small amounts of mosaic were found except in the garden plots and gardens on vacant lots at Edmonton, Calgary and Medicine Hat, Alta., and in fields surrounding these centres. The disease was less prevalent than previously, especially at Calgary, due to the use of better seed (J.W. Marritt). Mosaic is not as common in Manitoba as it was formerly. It is hardly ever found in Bliss Triumph, while a few years ago it was not unusual to find 75% of the plants affected with mosaic (J.W. Scannell). Mosaic was found in 64% of the fields inspected in N.S. and 10% were rejected. Infection varied in the individual fields from a trace to 30%. It was most severe in Bliss Triumph and Green Mountain, but is increasing noticeably in Irish Cobbler (W.K. McCulloch).

LEAF ROLL (Virus) was found in 82 fields out of 258 inspected and 9 were rejected for leaf roll in B.C. The leaf roll situation is showing a similar improvement in Alberta as was reported for mosaic. About 30% of the fields entered for certification in N.S. were infected with leaf roll, the infection varying from a trace to 8%. In one commercial field in Colchester county, infection was 40% and the yield was probably reduced 25%. (W.K. McCulloch).

ROOT ROT (Fusarium orthoceras App. & Wr. var. longius Scherb.) Wr.). As a result of root rot 5% of the plants were dead in a field at Rosthern, Saskatchewan on August 20. Similar symptoms were reported in a garden at Unity.

VIOLET ROOT ROT (Rhizoctonia Crocorum). Two potatoes affected with violet root rot were received at Ottawa from

Winterburn, Alta. on October 30. The correspondent stated that he had found affected tubers in one hill of Wee McGregor and a few hills of De Vernon. In 1936, he had noticed in a patch of Nantes carrots, a few having similar symptoms. "The disease attacked the carrots consecutively for a distance of a foot to four or six feet and sometimes in two or more adjacent rows." There were four small infected spots in the patch. The area, where the disease appeared in the potatoes, is distinct, for the land previously in carrots was summerfallowed in 1937.

COMMON SCAB (Actinomyces scabies) was not prevalent in the Prairie Provinces. It was very prevalent in Ont. Fields were observed where over 20% of the tubers showed disfiguring scab spots (J.E. Howitt and R.E. Stone). Scab was found in all counties under inspection in N.S. It ranged from a trace to 15% and averaged about 1.5% of the crop. Heaviest infections were on Irish Cobbler; many clean crops were seen (W.K. McCulloch). In the plots and fields of the Charlottetown Station, P.E.I., scab varied from slight to very heavy. In one experiment where lime was applied in 1936, scab was present as follows: 500 lbs. per acre, one tuber affected out of 526; 1,000 lbs., one tuber out of 868; 1,500 lbs., 18 tubers out of 773; 2,000 lbs., 51 tubers out of 827 (R.R. Hurst).

DRY ROT (Fusarium Solani (Mart.) App. & Wr. var. eumartii (Carp.) Wr.). Diseased tubers affected with what appeared to be this disease were received at Ottawa from Everett, Ont. According to information received by Mr. John Tucker, it affected 60% of the tubers in a field at Alliston and 15% in one at Mt. Bridges in 1936. All fields were planted with Dooley. For an account of the disease see (Carpenter, C.W. Jour. Agr. Res. 5:183-210. 1915). (I.L. Conners)

PSYLLID YELLOWS (virus) was found at Medicine Hat, Calgary and Drumheller, Alta. In all cases it was closely associated with the growing of tomatoes in greenhouses. It was more prevalent and severe at Calgary than last year, while it caused less damage at Medicine Hat. None was found at Edmonton this year and Drumheller was a new centre for the disease (J.W. Marritt).

WILT (Cause unknown). Throughout Alta. and northwestern Saskatchewan there is present a disease, the most striking symptom of which is the purple colour of the margins of the leaves on the upper parts of the plants. It was present in 1936 and has increased this year until it is the most prevalent disease except black leg (J.W. Marritt).

What is probably the same disease, was also noted in Manitoba, where it was severe this year. It may be the same as the wilt reported in Minnesota and Wisconsin (A potato wilt caused by the tarnished plant bug, Lygus pratensis L. J.G. Leach and Phares Decker. Abstract Phytopathology 28:13. 1938; Fusarium avenaceum, a vascular parasite of potato. J.G. McLean. Abstract Phytopathology 28:16. 1938). (I.L. Conners).

YELLOW DWARF (virus) was found in 20 fields chiefly Dooley, out of 100 inspected in Middlesex county, Ont. The highest percentage of disease found in any one field did not exceed one per cent. The inspected fields, however, were planted with better than average seed, which had, in most instances, been certified within the past 2 or 3 years. Most disease was found in fields planted with seed which had been grown locally for 2 or more years. Yellow dwarf appears to be fairly widely distributed throughout the county and it is obvious it must have been present to some extent in locally grown potatoes previous to 1937. The trouble would probably have been found before, but inspections have been confined previously to fields entered for certification. No yellow dwarf was found in fields planted with certified seed which had been brought in from outside districts and grown for the first time in the county (John Tucker). Yellow dwarf has not previously been reported to the Survey, but its occurrence in Ontario was noted by C.C. Wernham in 1933 (Black, L.M. A study of potato yellow dwarf in New York. Cornell Univ. Agr. Exp. Sta. Memoir 209. 1937, p.10). The clover leaf hopper, an important vector of the virus, is also apparently known in Canada. (I.L. Conners).

DRY ROT (Armillaria mellea) affected a few tubers of Columbia Russell on newly cleared land at Golden, B.C.

PHOMA ROT (P. tuberosa) caused severe damage in one bin of Irish Cobbler in P.E.I. in January 1937.

LEAK (Pythium ultimum) caused a loss of 5% in a 4-ton shipment of potatoes from Duncan, B.C. The tubers were harvested October 5, when the temperature was about 70°F. (W. Jones).

NET NECROSIS (cause unknown). One lot of Green Mountain from Carleton county, N.B. showed 15% stem-end browning and net necrosis. Many of the seedling varieties at the Fredericton Station were affected 100%. (J.L. Howatt).

FERTILIZER INJURY. Many misses and weak plants in P.E.I. were attributed to the fertilizer being in contact

with or in close proximity to the seed piece. (R.R. Hurst).

GIANT HILL (virus) was present in 155 out of 258 fields inspected in B.C., but there were no rejections on account of the disease. Traces were found in a field of Green Mountain in P.E.I.

WITCHES' BROOM (virus) was present in 17 fields out of 258 inspected in B.C.; 2 were rejected due to the disease. Witches' broom was again found in a number of fields in small percentages in Alberta and northern Saskatchewan. In a garden at Charlottetown 75% of the plants were affected.

SPINDLE TUBER (virus) was very prevalent in Manitoba, and to a less extent in Saskatchewan. It was found in 23 fields out of 124 in Manitoba. It was noted in the plots at Charlottetown, P.E.I.

BORAX INJURY. Borax in commercial fertilizers applied at the rate of 30 lbs. per acre immediately before seeding caused severe seed-piece rot and stunted the plants in a field of Green Mountain in P.E.I. (R.R. Hurst).

RADISH

CLUB ROOT (Plasmodiophora Brassicae) was not as severe as in 1936 on radish, although other cruciferous crops in the same garden at Kentville, N.S., were destroyed.

RHUBARB

CROWN ROT (Cause unknown) affected 20% of the Victoria plants on a low-lying piece of ground in Sumas county, B.C. The crowns became rotten, showing brownish discoloration of tissue; affected plants eventually died (W. Jones). Only three plants were affected at the Lacombe Station, Alberta. It caused slight damage in the University gardens, Saskatoon, Saskatchewan. Reports of this disease were received from the northern part of the province only, but it is still widespread in Saskatchewan. (T.C. Vanterpool). Odd plants of Ruby were affected at Brandon, Man. Crown rot affected 10% of the Ruby plants in a garden in Queens county, P.E.I.

STREAK (Probably virus) caused about a 3% loss in a 3-year old plantation of Ruby at Saskatoon, Saskatchewan. The disease appears to be spreading. Two plants (Nicotiana sp.), which were inoculated with the juice of streak-

affected rhubarb developed mottling and necrosis. The control plants remained healthy. The plants in this plantation originally came from a Ruby seedling nursery (See P.D.S. 14:46). (T.C. Vanterpool).

WITCHES' BROOM (?virus) affected an occasional plant at Saskatoon, Sask. Dr. H. T. Gussow who saw some of these plants, thought that the trouble might well be due to a virus. (T.C. Vanterpool).

CROWN GALL (Phytomonas tumefaciens). One large gall was seen on rhubarb at Kentville, N.S.

PHYLLOSTICTA LEAF SPOT (P. straminella) was heavy in patches at the Morden Station, Man.

ASCOCHYTA LEAF SPOT (A. Rhei) was very heavy in Queens county, P.E.I. in August.

ANTHRACNOSE (Colletotrichum erumpens) Infection was a trace at Morden, Man.

FROST INJURY to rhubarb at Saskatoon, Sask., set the plants back and delayed the first picking. The petioles became water-soaked near their attachment to the blade; leaves became brown between the viens and finally dried up completely (T.C. Vanterpool). The leaves were severely frosted on May 19 in York county, N.B. (S.F. Clarkson).

SALSIFY

WHITE RUST (Cystopus cubicus) moderately affected salsify in a field in Jacques-Cartier county, Que. (E. Lavallee).

SPINACH

DOWNY MILDEW (Peronospora Spinaciae) scattered infections were present in a 3-acre block of King of Denmark spinach, a supposedly resistant variety, in Lincoln county, Ont. (G.C. Chamberlain).

SQUASH

POWDERY MILDEW (Erysiphe Cichoracearum) was fairly prevalent on Hubbard squash at the Summerland Station, B.C.

BACTERIAL WILT (Erwinia tracheiphila). Scattered vines were affected in a field in Lincoln county, Ont.

SOFT ROT (Rhizopus and Pythium) caused a loss of 10% in stored squash at Halifax, N.S., in November. Rhizopus and a Pythium-like fungus were obtained from the rotting tissue. (J.F. Hockey).

SWEET CORN

SMUT (Ustilago Zeae). Traces only of smut were found in many plantings in King and Annapolis counties, N.S.

LEAF and STALK SPOT (Bacterial origin). Infection was light to moderate in several gardens at Edmonton, Alta., while a trace was present at Lacombe.

TOBACCO

The report on tobacco diseases presented below was prepared by Dr. G.H. Berkeley from notes gathered by himself or supplied to him by Mr. G.E. Turcotte, L'Assomption, Que.; Mr. R. Bordeleau, Farnham, Que.; Dr. L.W. Koch, Harrow, Ont.; Mr. P. Newell, St. Catharines, Ont.; Mr. F.A. Stinson, Delhi, Ont.; and Mr. R.J. Stallwood, Tillsonsburg, Ont.

MOSAIC (virus) was more general in Ontario in 1937 than it was in 1936. Although the average percentage of infection was not high, many fields contained 50 to 75% mosaic-affected plants. Almost without exception, the high percentages were found in fields in which tobacco had been grown in 1936. High incidence of mosaic in tobacco after tobacco has been observed each year for the past four years. Experimental field tests have also demonstrated the same thing. Mosaic was by no means as general in the two tobacco growing districts of Quebec as it was in Ontario, though a few fields with heavy infection were observed. Also overwintering of mosaic in the soil is not as important a factor in Quebec as it is in Ontario. Evidence was obtained which suggests that mosaic is spread more readily by cultivation when the plants are wet than when they are dry. This also has been demonstrated by experimental field tests. Where the preventive measures recommended have been carefully practiced mosaic has been greatly reduced, and in some cases almost eliminated.

RING SPOT (virus). A single case of ring spot was reported by Dr. L.W. Koch in Essex county.

BLACK ROOT ROT (Thielaviopsis radicicola). In the burley and dark tobacco districts of Essex and Kent counties,

Ont., where precipitation in the early part of the season was considerably above normal, black root rot was prevalent, causing moderate loss in some cases. In some fields where drainage was poor the plants in 'low spots' were suffocated by water logged soil conditions. In such cases black root rot may or may not have been a contributory factor. In the new flue cured belt black root rot was more abundant than last year, due to the abnormal rainfall, but cannot as yet be considered of great consequence in this section. In Quebec on the other hand, black root rot was scarce and unimportant because of the dry weather during the early part of the season. Even susceptible varieties on contaminated soil showed little if any effects from this disease. Though black root rot is the most important disease in most seasons in the two tobacco growing districts of Quebec, it was nevertheless unimportant in 1937.

BROWN ROOT ROT (Non-parasitic) though present in most seasons in the tobacco growing districts of Quebec, and in the new flue cured districts of Ontario, is nevertheless unimportant in these sections. In Essex and Kent counties in Ontario where it has become a general practice to precede tobacco with corn, brown root rot has become of considerable importance. It was quite widespread in its distribution again this year. Our observations coincide with those reported from certain states of the U.S.A., namely that crops of corn, timothy, etc. preceding tobacco favour brown root rot. In Ontario corn is the most important crop in this connection. It has also been observed that brown root rot is more severe on the high spots of an infected field, and that certain varieties are more susceptible to this disease than others.

FRENCHING (Non-parasitic) was observed in Quebec and Ontario both in the field and in the plant bed. Although frenching is by no means general in distribution and is considered a minor trouble, yet several fields were observed this year in which there was a high percentage of a severe type. Frenching was also observed in a mild form occurring on tip leaves or suckers only, the rest of the plant giving no indication of its presence. Several cases of this type were noticed both in Quebec and Ontario on soil that had not previously grown tobacco.

ANGULAR LEAF SPOT (Phytomonas angulata) was scarce in Quebec, only one or two cases being reported, while in Ontario it was encountered on several occasions both in the old and new belts, though its distribution was quite limited.

WILDFIRE (Phytomonas Tabacum) was not encountered in either Quebec or Ontario.

PHYSIOLOGICAL BLACKFIRE (Possibly angular leaf spot). A large blackfire type of spotting was found in a section of the new flue cured belt in Ontario. The spots were large, angular, black and with concentric target-like lines suggesting blackfire, particularly since the spotting occurred late in the season following topping. This disease was reponsible for severe loss on several farms. However along with the blackfire type of spotting, smaller more typical angular leaf spots occurred on the same plant, but more especially on the sucker growth. Whether or not both types of spots have been caused by the angular leaf spot organism, or whether the larger, black, concentric spot may be of physiological origin has not as yet been determined.

PHYSIOLOGICAL LEAF SPOT. A small, brown, leaf spotting of flue cured and burley varieties was again common this year in both Quebec and Ontario. The spots are at first dark brown in colour but later may turn white. This disease has been especially severe in certain fields of flue cured tobacco, and its distribution in 1937 was quite widespread. Certain observations suggest that this trouble may be associated with a nitrogen, potassium balance.

JOHN WILLIAMS LEAF SPOT (Cause unknown) was observed in Quebec on cerain broadleaf varieties, but more particularly on John Williams.

A somewhat similar type of white spotting, often occurring as rings or partial rings, was also observed on White Stem Orinoco, Yellow Mammoth and Bonzana varieties at St. Catharines.

LIGHTNING INJURY was brought to our attention a few times.

HOLLOW STALK (Erwinia carotovora) was observed both in Quebec and in Ontario, though only in a few fields. It was of no importance.

HAIL INJURY. A hail storm on July 2 caused considerable damage in the Delhi district, while hail just previous to harvest time almost completely destroyed the crop in a few fields in the L'Assomption district in Quebec.

NEMATODES (Heterodera marioni). Mr. Stinson of the Delhi Tobacco Station reports finding the root knot nematode present on tobacco in the Delhi district.

SEED BED TROUBLES. With the exception of flooding and a 'yellow patch' condition in certain seed beds little trouble was encountered with seed beds in 1937. In the flue cured belt many seed beds were seriously affected with a 'yellow patch' condition that in some cases caused complete loss of the bed. Microscopic examination of the roots of dwarfed and yellowed seedlings in an early stage of growth suggested that in some cases the roots had been attacked by parasitic organisms, while in others the roots appeared to be free from organisms. A preliminary investigation has suggested that certain cases of the 'yellow patch' may be associated with the type of muck used in the seed bed (acidity too high), or with too heavy applications of manures and incorrect plant bed management. In other cases, however, there appears to be a definite brown root rot condition apparently caused by parasitic organisms which as yet have not been identified.

Also a few beds were found in which damping-off was a factor. A few cases of blackleg and black root rot in the seed bed were brought to our attention.

MINERAL DEFICIENCIES. Potash and magnesium deficiencies were noticed in many fields particularly in the new belt of Ontario.

A few cases of sand drown were observed, and the effects of leaching were apparent on 'high spots' in certain light types of soil.

TOMATO

BLOSSOM END ROT (Non-parasitic) affected less than 1% of the fruit in greenhouses about Victoria, B.C. It was worse in the field; in one small area it caused a 20% loss on Best of All variety. A slight amount of blossom end rot was present on Grand Rapids tomatoes in a greenhouse in Lincoln county, Ont., in April. The disease caused less damage than usual in the Montreal district, Que. The damage was slight to moderate in several gardens in York county, N.B. It was quite severe in a garden at Kentville, N.S. Blossom end rot caused considerable damage to staked tomatoes at Charlottetown, P.E.I., while most unstaked plants were free. The weather was hot and dry during the summer in the Maritime Provinces.

MOSAIC (virus) was not so general as in 1936 in B.C., because growers now exercise more care. It is still fairly prevalent in the oriental greenhouses in the Vancouver district. In one greenhouse on Vancouver island 98% of 26,000 plants were affected (W.R. Foster and W. Jones). A trace of mosaic was present at Morden, Man. It

affected 60-70% of the plants in a greenhouse in Lincoln county, Ont., but the plants did not become infected until late and the damage was not extensive. In the Leamington district where tomatoes are sometimes grown continually on the same soil the disease is severe although mosaic was found frequently in Essex and Kent counties (L.W. Koch). A small amount of mosaic was noticed in garden plots and in one commercial planting in York county, N.B.

AUCUBA MOSAIC (virus). A few plants showing pronounced symptoms of aucuba mosaic were seen in a greenhouse at Falmouth, N.S.

LEAF MOULD (Cladosporium fulvum) was general in the majority of greenhouses on Vancouver and Lulu islands, B.C.; damage varied from a trace to 30%. Some of the greenhouses are poorly located and constructed and thus the development of the disease is favoured by poor ventilation. On Vancouver island, greenhouse operators have obtained good control if they fumigate with sulphur frequently before the disease appeared. If fumigation is not begun until after the disease appears, control is not very effective (W. Jones and W.R. Foster). It was also noted on fruit received in Toronto from B.C. Leaf mould was general in a greenhouse in Lincoln county, Ont. in April, after a period of dull, cool weather. It was also quite general on staked tomatoes on July 31 in the same county. Leaf mould affected 75% of the foliage in a greenhouse at Falmouth, N.S. in August. The disease was general in the experimental plots at Charlottetown, P.E.I.

EARLY BLIGHT (Alternaria Solani) was general in the Fraser valley, B.C. and caused much damage; it was not nearly so prevalent on Vancouver island. Spraying with Bordeaux has not proven effective. The addition of a good spreader apparently will be necessary. Cutting off and removal of infected lower leaves is considered an important control measure (W. Jones). Early blight moderately to severely infected tomato seedlings grown in sand culture in the greenhouse at Morden, Man. The disease was widespread and prevalent in large acreages of staked and field tomatoes in Lincoln county, Ont.; it caused considerable loss of leaf (G.C. Chamberlain). Early blight was present in several fields in the Montreal district, Que., but it caused much less damage than usual. It was severe in York and Sunbury counties, N.B. The plants were diseased in the seedling stage, before they were transplanted to the field. Spraying with Bordeaux after the plants were transplanted kept the disease from spreading (J.L. Howatt and S.F. Clarkson). The disease caused 25% defoliation in a

garden at Kentville, N.S. Early blight was general, but not severe, on all varieties in Queens county, P.E.I.

LATE BLIGHT (Phytophthora infestans) caused 10% loss in a garden at Vancouver, B.C.; the disease was not general.

SEPTORIA LEAF SPOT (S. Lycopersici) was unusually severe during 1937 in south-western Ont. In many fields the plants were completely defoliated resulting in total loss of crop. Early varieties were affected more severely than later ones (L.W. Koch).

VERTICILLIUM WILT (Verticillium sp.) is not very common in the Victoria district, B.C. Growers are gradually adopting methods of steam sterilizing the soil. Where the soil is sterilized and soil temperature is raised to above 60°F. before planting, the disease seems to be effectively controlled (W. Newton). It appeared in scattered areas in plantings in two greenhouses near St. Catharines, Ont., in late April; it affected up to 5% of the plants.

FUSARIUM WILT (Fusarium sp.) affected 1% of the plants in a field near Colborne, Ont. and a trace in another field in Northumberland county. The plants were imported from Georgia, U.S.A. and Fusarium sp. was isolated from diseased plants in both instances (G.C. Chamberlain). Fusarium wilt was observed 3 times in fields of late varieties in Essex and Kent counties causing moderate damage. Isolations were not made, but Fusarium spores were abundant on the surface of affected stems and mycelium was present in the tracheae. (L.W. Koch).

STEM ROT (Sclerotinia sclerotiorum) affected a few plants in a greenhouse on Lulu Island, B.C. About 8% of the plants were killed in a greenhouse at Medicine Hat, Alta.

DAMPING OFF (Pythium sp.) caused a loss of 10,000 plants in a planting of 900,000 plants at Fonthill, Ont. The soil was not sterilized; the seed was treated with Bordeaux (G.C. Chamberlain).

ROOT KNOT (Heterodera marioni) was found in 2 greenhouses in the Victoria district, B.C., but it is not of general occurrence.

SOFT ROT (Erwinia caratovora) became serious toward the end of the early tomato season in Essex county, Ontario.

Fruit both in the field and in transit was affected. Several carloads shipped to Western Canada were rendered useless by this disease (L.W. Koch).

GREY MOULD (Botrytis sp.) was fairly common in greenhouses in the Victoria and Vancouver districts, B.C., but damage was slight. It usually follows bruising during pruning operations. A number of affected fruits were forwarded to St. Catharines by the Fruit Branch at Toronto from a shipment from B.C.

ANTHRACNOSE (Colletotrichum phomoides (Sacc.) Chester). Fruits apparently affected with anthracnose were obtained from Essex, Ont. The spores were present, but no isolations were made (L.W. Koch). It was found on fruit received from the southern part of Essex county (G.H. Berkeley). Anthracnose was present on fruit from a garden at Westboro, and affected fruits were seen on the local market at Ottawa (4923). It was reported to have occurred at the Experimental Station, Fredericton, N.B. previous to 1922 (P.D.S. 3:59), but it has not been noted since except on imported fruits (I.L. Conners).

NAILHEAD SPOT (Macrosporium tomato) reached epidemic proportions on early varieties in Essex and Kent counties, Ont.; practically all fields of these varieties were affected to some extent. (L.W. Koch).

BACTERIAL SPOT (Phytomonas vesicatoria) was observed once causing slight damage in Essex county, Ont. The symptoms agreed with those described for bacterial spot and an abundance of bacteria were present in incipient lesions (L.W. Koch).

BUCK EYE ROT (Phytophthora terrestria) affected less than 1% of the fruits in the Victoria and Vancouver districts, B.C.

RIPE FRUIT ROT (Oospora lactis). A moderate infection was observed at Steinbach, Man. (W.F. Hanna).

VIRUS DISEASES continue to lower tomato yields under glass in B.C. by at least 25%. The losses are particularly heavy in houses operated by Chinese, probably because they handle their plants more than other growers. The necessity of washing the hands before touching the plants is not fully appreciated.

The losses in the main are due to a double virus disease, tomato streak and potato X virus. Tomato streak alone is also widespread, although it is less virulent than

the double virus disease. Tomato aucuba mosaic was rare, but exceedingly virulent when present. Likewise a very virulent form of tomato ring mosaic streak (tomato streak X Newton) was found in several greenhouses affecting over 50% of the plants. (W. Newton).

SPOTTED WILT (virus). Some 20 to 30% of the plants were affected in a greenhouse at Medicine Hat, Alta. The determination of the disease was verified by Prof. T.C. Vanterpool.

STREAK (Single virus). Five per cent of the plants were affected in a greenhouse in Lincoln county, Ont., in April.

STEM GIRDLE (Phytophthora ?parasitica) killed fully 10% of the plants before they were more than 18" to 24" high in a greenhouse near Grimsby, Ont., in September. The fungus was still active in late September, though chiefly on replacements of earlier casualties. It answered perfectly the disease described by Reddick (Phytopathology 10:528-534. 1920). It was apparently brought in with the plants in soil from a rather poorly prepared compost. In the early part of the outbreak most of the lesions were a half to two-thirds of the way up the stem, but on the older plants in late September, the lesions were usually located at the crown. (D.L. Bailey). This is the first report of stem girdle to the Survey, and is apparently new to Canada.

TURNIP

BROWN HEART (Non-parasitic) was found in several fields of Swede turnips at Pemberton Meadows, B.C., but the use of borax is becoming more general and the disease less common (W. Newton). Brown heart is found on all turnip varieties growing in boron-deficient areas in N.B. Excellent control is being obtained by the use of boron (J.L. Howatt). The disease was prevalent throughout P.E.I. on land not treated with borax. There were no complaints where borax had been applied at the rate of 15 to 20 lbs. per acre. It appeared, however, that dry weather did reduce the effectiveness of the borax in 1937. (R.R. Hurst).

SCLEROTIAL ROT (Sclerotinia sclerotiorum) was found on several farms at Pemberton Meadows, B.C., causing damage in storage.

CLUB ROOT (Plasmodiophora Brassicae) is a widespread disease in N.B.; it varies in intensity according to

conditions. In many sections the so-called resistant variety, Wilhelmsburger is little better than the susceptible variety, Ditmars (J.L. Howatt). It destroyed two small rows of a white garden variety at Kentville, N.S. Club root is widespread in P.E.I. and sometimes the crop is a total loss. In plot experiments and in the greenhouse, many crucifers have contracted club root. Barbarea vulgaris was affected, although it is reported to be immune. Among the other plants affected were: kohl rabi, marrow-stem kale, Camelina microcarpa, Lepidium sativum, L. virginicum, Thlaspi arvense and Brassica arvensis (R.R. Hurst).

BLACK ROT (Phytomonas campestris) affected a single plant in 300 in a planting in Queens county, P.E.I.

BLACK LEG (Phoma lingam) affected a trace to 75% of the plants in 12 fields in P.E.I., causing considerable damage in some fields. (R.R. Hurst).

SCAB (Actinomyces scabies) was present on 4% of the roots in 10 rows examined in Queens county, P.E.I.; the damage was nil.

SOFT ROT (Erwinia carotovora) infected 50% of the roots on some varieties in the University gardens, Edmonton, Alta.

STORAGE ROT (Corticium Solani) affected a trace to one per cent of the roots in storage in April. It was causing a destructive rot. (R.R. Hurst).

IV. DISEASES OF FRUIT CROPS

APPLE

SCAB (Venturia inaequalis) was fairly general in the Fraser valley and on Vancouver island, B.C.; the damage was slight (W. Jones). In the Okanagan valley scab was unusually light this year and caused only light losses even in poorly sprayed orchards (G.E. Woolliams). A trace was present at Morden, Man.

Scab varied greatly in severity in Ont. in 1937; in some areas it was very severe. It was noticeable that scab was very late in developing in all areas. This fact was probably due to the scarcity of inoculum for primary infection, since the previous summer was extremely hot and dry. Little scab was observed until after the pink spray. From then on in unsprayed orchards scab increased in severity until trees showed 100% scab on leaves and fruit in many instances. It was also observed that even on sprayed trees a large percentage of the leaves showed scab late in the season (J. E. Howitt and R. E. Stone). Scab infection was light in the Niagara peninsula. In an experimental plot of McIntosh 12% of the apples harvested were scabby; the scab lesions were light and took place late in the season. Unsprayed McIntosh trees bore 50-65% scabbed apples, with infection more extensive and serious. Unsprayed Melba and Cortland had 60-65% scab; sprayed trees a trace to 3%. Primary ascospore discharge occurred on April 15, final discharge on May 27. Scattered primary lesions of a very limited extent were noted on June 8. Late season infection was common. (G.C. Chamberlain)

Apple scab was very destructive in south-western Quebec in 1937, as a result mostly of early infection. The spring was very wet, so wet that in many orchards it was impossible for the spraying machines to get through them before blossoming. On the other hand, quite a few orchards, which are always very thoroughly sprayed were surprisingly clean. (F. Godbout)

Scab was slight to severe on leaves and fruit in the Saint John River valley, N.B. Scab was severe in one orchard at Georgetown, which had been sprayed with Qua-Sul. Ascospore discharge began on May 10; scab was common on the leaves on June 23 (S.F. Clarkson).

Ascospores were mature before the buds opened as in 1936 at Kentville, N.S. Ascospore discharge began on April 12 and was completed on June 26. First infections were found on May 22. Scab was severe on the foliage of unsprayed trees by the end of June, and was causing some defoliation. Good control was obtained in well-sprayed orchards. Very little late scab developed on the fruit in the fall except on unsprayed trees. (J.F. Hockey)

Scab was not uncommon in 1937 even in sprayed orchards in P.E.I. Where the early sprays were well timed, scab was controlled, but in unsprayed orchards scab was severe. (R.R. Hurst)

FIRE BLIGHT (Erwinia amylovora). A trace was observed at Saskatoon, Sask. in July. A 30% infection was reported on all trees at Brandon, Man. In Ont. a scattered infection was noted on Greening in Lincoln county; moderate blossom infection with a few old cankers killing some limbs on Montreal Beauty at Dunrobin; severe on Tolman Sweet at Newmarket; 95% of the fruit spurs were affected on 14 small potted trees of Joyce and Melba at the Horticultural Division, Ottawa.

Fire blight caused little damage in south-western Que. in 1937; the disease occurred in a few orchards and in them it was localized to a few trees (F. Godbout). It was also noted on 2 trees of Pyrus baccata at the Farnham Station.

No fire blight was found in cared-for orchards, but it was plentiful in some abandoned orchards, in P.E.I.

BLACK ROT (Physalospora obtusa). Apple leaves infected with the fungus were found at French Lake, N.B. on May 21, and about 80% of the early leaves were affected in one orchard at Springhill on June 3. The disease was severe in area I at the Fredericton Station on July 14; it caused moderate damage to Crimson Beauty (S.F. Clarkson).

RUST (Gymnosporangium clavipes) caused some damage in the district about Ste. Anne de la Pocatiere, Que. It affected a few Gravenstein in the spray plots at Kentville, N.S. (J.A. Boyle)

POWDERY MILDEW (Podosphaera leucotricha) slightly to moderately affected Duchess of Oldenburg, Cox's Orange Pippan, Ribston Pippin, King David, Amlo, Ostosh and Thurso varieties at the Sidney Station, B.C. (W. Jones). It was observed on a Fameuse tree in Lincoln county, Ont., and on seedling trees at Rougemont, Que.

ANTHRACNOSE (Neofabraea malicorticis) was not so serious as in 1936 in B.C. As a bull's-eye rot it affected 10% of the fruit of McIntosh, Salome, Grimes Golden in an orchard at Salmon Arm, B.C.

EUROPEAN CANKER (Nectria galligena) was observed near Quebec, Que. Specimens of the canker were received at Kentville, N.S. from Lunenburg county, N.S.; the disease is also present throughout the Annapolis valley, but it is in general on the decrease. (J.F. Hockey)

DROUGHT SPOT and CORKY CORE (Non-parasitic). Up until 1937 drought spot and corky core of apple have occurred each year in British Columbia with increasing severity. In the fall of 1936 large acreages were treated with boric acid and as a result there was relatively little of these diseases this past season. It has been estimated that these treatments will mean an annual saving of 500,000 boxes to the fruit growers of British Columbia.

Other physiological disorders noted this season were: drought spot of pear, gum spot of prune, die back of apple, pear, plum, cherry, and peach. The die back has been satisfactorily controlled in our experiments with boric acid. The so-called drought spot of apricot was quite severe this past season. It has not been controlled with boron; consequently its cause is not yet established. (H.R. McLarty)

BITTER PIT (Non-parasitic) caused moderate damage to apples in the Saint John River valley, N.B., in 1937; it affected 10-50% of the fruit on the varieties Baxter, Wealthy, and Baldwin (S.F. Clarkson).

Bitter pit did not cause serious losses in the Annapolis and Cornwallis valleys, N.S. The average percentage of affected fruit was 3.5% in 12 orchards studied as compared with 40-50% in 1936. The highest percentage in an individual orchard was 10.7% as against 83% in 1936.

WATER CORE (Non-parasitic). A trace of water core was present in September in Alexander and McIntosh apples in York county, N.B.

TWIG BLIGHT (Nectria cinnabarina). A trace was found in N.B.

Gonatobotrys simplex Corda was found fruiting on twigs of McIntosh in York county, N.B. It was associated with pustules similar to Cytospora and Valsa (John Dearness, J.L. Howatt and S.F. Clarkson). Cytospora sp. is commonly associated with twig blight following winter injury in 1933-34. (J.L. Howatt & S.F. Clarkson)

TWIG BLIGHT (Phomopsis sp.). A Phomopsis sp., possibly P. Mali, was found associated with many cankers due to winter injury (J.L. Howatt & S.F. Clarkson).

WOOD ROT (Schizophyllum commune) is present throughout N.B. on apple trees, which were badly injured in the winter 1933-34. The fungus is most abundant on Fameuse. (S.F. Clarkson)

SILVER LEAF (Stereum purpureum). About 1% of the apple seedlings at the Fredericton Station, N.B. were affected (S.F. Clarkson). Silver leaf symptoms are on the increase in N.S. Fruit bodies of the Stereum were observed on only a few trees. The disease is more prevalent on weak trees (J.F. Hockey). Only a few trees were affected in a large block of seedlings at the Kentville Station (J. A. Boyle). Silver leaf was less in evidence in 1937 than in the previous years. It would appear that fruit trees are regaining their vigour, which was greatly lowered due to severe winter injury in 1933-34, in P.E.I. (R.R. Hurst)

The fungus was found at the base of a large Delicious tree growing in the Station orchard, Summerland, B.C. (G.E. Woolliams)

APPLE ROTS. An apple rot (Fusarium sp.) slightly affected 15% of apples on a few Crimson Beauty trees at Gagetown, N.B. Botrytis sp. severely affected 15% of apples on Alexander trees in an orchard in York county. A trace of Botrytis was common in N.B. on several varieties in September, before the apples were picked. (S.F. Clarkson)

BITTER ROT (Glomerella cingulata (Gloeosporium fructigenum) affected a small number of apples in a barrel from Gagetown, N.B. (J.L. Howatt)

STORAGE ROTS. Of the organisms causing rot in apples in storage at the Experimental Station, Fredericton, N.B. Dasycarpoma allantoideum was responsible for 77% of the rot. Gloeosporium album Osterw. is the more commonly accepted name for this pathogen. Penicillium sp. accounted for 12.8%, Botrytis sp. for 8.5%, and Fusarium sp. and Alternaria Mali for traces during the period Jan. to April 1937 (J.L. Howatt). Of 193 cultures of fungi causing rot in apples in cold storage at the Kentville Station, N.S. Penicillium expansum accounted for 44%, Botrytis cinerea 27%, Rhizopus nigricans 23%, and Alternaria sp., Mucor sp., and a few unidentified fungi the remaining 6%. (J.A. Boyle and K.A. Harrison)

CONIOSPORIUM SCAB (Coniosporium Mali Dearness & Foster) was found in the Sooke, Victoria, Sidney, and Duncan districts on Vancouver island, B.C., and at Armstrong in the Interior. Infection was fairly general, but the damage was slight (W.R. Foster). This is a new disease, an account of which has not yet been published.

HAIL INJURY occurred in some orchards near Summerland, B.C. in 1937.

SUN SCALD affected a few apples on the trees and some windfalls in York county, N.B.

LEAF SPOT (Cause unknown) caused slight to moderate damage on a number of varieties in York county, N.B.

BALDWIN SPOT (Non-parasitic) was seen on some apples from storage in March in Lincoln county, Ont. It was also noted on scattered fruit in September (G.C. Chamberlain).

RUSSETING (Effect of spray) was severe on McIntosh and Fameuse apples in one orchard at Douglas, N.B., Bordeaux 3-10-40 was applied as a calyx spray. (S.F. Clarkson)

SPRAY INJURIES. A variety of spray injuries were induced on the foliage by the different spray schedules in use on the spray plots at the Experimental Station, Kentville, N.S. Some mixtures containing copper produced a flecking on the leaves. A spray containing cryolite resulted in severe tip burn. Severe russetting of the fruit took place where copper-containing sprays were used for the "pink application" (J.A. Boyle). Severe calyx-end arsenical injury was noted on Cox Orange apples. The injury was probably due to the excessive use of arsenates in post-blossom applications. (J.F. Hockey)

FERTILIZER INJURY. A cyanamid application during the growing season caused 50% of the foliage to burn and to fall off by September 15 in a sandy orchard at Nictaux, N.S. Very little injury occurred in another orchard on heavier soil at Middleton, although treated at the same time. (K.A. Harrison)

NITRE BURN (Excess nitrogen) caused severe damage to a number of small trees in one orchard in York county, N.B. (S.F. Clarkson)

LEAF SCORCH (Potash deficiency). In an orchard of mixed varieties in Lincoln county, Ont., Baldwin showed most leaf scorch and was rather severely affected. McIntosh and Wealthy were in poor foliage indicating lack of fertility. In addition there was considerable spray injury on McIntosh as a marginal burn. (G.C. Chamberlain)

The trouble affected slightly, a few trees at Springfield, N.B.

APRICOT

BLIGHT (*Coryneum Beijerinckii*). The disease was observed at Boswell, B.C.

BLACKBERRY

ORANGE RUST (Gymnoconia Peckiana) was noted in several plantings in Lincoln county, Ont.; in one of Eldorado it affected 30% of the young growth. (G.C. Chamberlain)

CHERRY

SHOT HOLE (Higginsia hiemalis (Cylindrosporium hiemalis) was general and caused moderate damage on Vancouver island, B.C. (W.R. Foster). Shot-hole was very prevalent in Ont. on sour cherries late in the season. Many unsprayed trees were almost completely defoliated (J.E. Howitt and R.E. Stone). Yellow leaf and shot hole, a disease or diseases, caused in some cases almost complete defoliation of sour cherries in Essex and Kent counties (L.W. Koch). It was very prevalent on an unsprayed row of sour cherries in Lincoln county, while rows receiving spray according to the regular schedule showed very little disease. The disease was first noted on May 27. While it was very destructive to sour cherries it also occurred to some extent on sweet cherries (G.C. Chamberlain). Shot hole caused severe defoliation of seedlings at the Kentville Station, N.S. It also caused considerable defoliation in an orchard in Queens county, P.E.I., although the trees had been sprayed.

BLACK KNOT (Dibotryon morbosum) was reported from L'Islet and Sillery, Que.

BROWN ROT (Sclerotinia americana). A serious outbreak of brown rot developed on sour cherries in Lincoln county, Ont. following several days of rain and foggy weather in the latter half of May. It was most prevalent on Montmorency and Morillo. Infection occurred mostly at the base of the corolla and spread into the pedicel. Where the corolla had broken away, as in Early Richmond, there was less disease. Very little brown rot appeared in sweet cherries due to the advanced stage of the fruit (G.C. Chamberlain). Brown rot was severe on unsprayed sweet cherry trees at Charlottetown, P.E.I. (G.W. Ayers)

BLOSSOM BLIGHT (Sclerotinia cinerea) was serious in some unsprayed orchards on Vancouver island and in the Fraser valley, B.C. (W.C. Foster)

WITCHES' BROOM (Taphrina Cerasi) affected several trees at Point Grey, B.C. (J.W. Eastham)

VERTICILLIUM WILT (Verticillium sp.) infected 10% of the trees planted on ground previously in tomatoes in a 2-year-old sweet cherry orchard in Lincoln county, Ont. (G.C. Chamberlain)

LEAF SPOT and DROP. Two-year-old sweet cherry trees in a wet location in Lincoln county, Ont. were heavily defoliated. The leaves became red and spotted before falling. (G.C. Chamberlain)

DIE BACK (Non-parasitic) affected a few trees at the Summerland Station, B.C. See also Drought Spot and Corky Core of Apple.

CRANBERRY

RED LEAF SPOT (Exobasidium Vaccinii). Traces were found at Dalney, Brackley Beach, and Mermaid Lake, P.E.I. (R.R. Hurst)

RED GALL (Synchytrium Vaccinii) severe infections were reported in a bog at Port Mouton, N.S. The disease has been increasing in recent years (P.D.S. 16:55). (J.F. Hockey)

Gibbera compacta (Pk.) Shear (Venturia compacta Pk.) was found on several cranberry plants from Baie du Vin, N.B. It caused no apparent damage (J.L. Howatt). Specimens are in the Herbarium from Merigomish, N.S. (P.D.S. 14:111).

FROST INJURY. Frost injured 50% of the fruit on a large bog at Rusagonis, N.B. (S.F. Clarkson)

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) slightly affected black currants at the Summerland Station and Harrop, B.C. It was prevalent in garden plantings on Lulu island.

The currant and gooseberry plot of the Horticultural Division, Ottawa, Ont., was again inspected for rust. All the well recognized varieties of black currants were susceptible to very susceptible. Most of the red currant varieties were susceptible, while the gooseberries were at the most only slightly affected. For the past three years Franco German, Viking, Ribes manchurica, and one plant (19/11) of Ribes nigrum from Siberian Horticultural Station have remained free from disease. (H.J. Read)

A few bushes of black currants in a garden at West Bathurst, N.B. were heavily rusted. The rust was heavy and caused severe defoliation in P.E.I.

POWDERY MILDEW (Sphaerotheca mors-uvae) was found as follows on black currant: slight infection at the Summerland Station, B.C.; trace to slight infection at Edmonton and Lacombe, Alta.; severe on the younger leaves in September in the University plots, Saskatoon, Sask.

SEPTORIA LEAF SPOT (S. Ribis) was slight in the University plots, Saskatoon, Sask., and a trace to moderate at Morden, Man., on black currants at both places.

CORAL SPOT (Nectria cinnabarina). A single branch was affected in a few bushes of black currant at Kentville, N.S.

GOOSEBERRY

POWDERY MILDEW (Sphaerotheca mors-uvae) affected most of the fruit at the Summerland Station, B.C. It was very destructive on English gooseberries in Ont. In two cases the entire crop was destroyed. (J.E. Howitt and R.E. Stone). Traces were present in P.E.I.

WHITE PINE BLISTER RUST (Cronartium ribicola) See under currant.

ANTHRACNOSE (Gloeosporium Ribis) caused moderate damage in the Fraser valley, B.C.

GRAPE

DEAD ARM (Fusicoccum viticola) affected 10% of the arms of Concord in a vineyard in Lincoln county, Ont.; the disease was in an advanced stage. It also caused some damage in a Concord vineyard in Essex county. (G.C. Chamberlain)

DOWNY MILDEW (Plasmopora viticola) was general and heavy in yearling cuttings of Agawan in Lincoln county, Ont. In general Agawan appears to be very susceptible, Niagara moderately susceptible, and Concord quite resistant. (G.C. Chamberlain)

LEAF SCORCH (Potash deficiency) was general in a Concord vineyard in Lincoln county, Ont.

LOGANBERRY

ANTHER and STIGMA BLIGHT (Haplosphaeria deformans) caused a 20% crop loss in the Elk Lake district, B.C.;

elsewhere the loss was less than 1%. The disease is not increasing; it appears to be worse where air drainage is poor. (W.R. Foster)

LEAF SPOT (Mycosphaerella Rubi) was general and caused moderate damage on Vancouver island and the lower Mainland, B.C.

PEACH

LEAF CURL (Taphrina deformans) was prevalent in unsprayed orchards in Ont., the trees being often completely defoliated (J.E. Howitt and R.E. Stone). Several serious infections were seen in the Niagara district, especially on the Elberta variety and where spraying was not thorough or timely (G.C. Chamberlain). Fall and winter spraying with lime-sulphur as well as spraying in early April gave excellent control. There was some evidence that a complete schedule of sprays has a residual effect, but the problem needs to be tested further (R.S. Willison). Leaf curl was present in some young trees planted at Kentville, N.S., this spring.(K.A. Harrison)

POWDERY MILDEW (Sphaerotheca pannosa). A few twigs were infected at the Summerland Station, B.C. Powdery mildew was severe in one orchard and slight in another in Lincoln county, Ont. on fruit and young growth. It also affected scattered fruit in Essex county.

LITTLE PEACH and YELLOWS (Virus) were about as prevalent in the Niagara peninsula, Ont., as in 1936. They have been on the increase for the last two or three years. In late August Essex, Kent, and Norfolk counties were visited by Mr. G.G. Dustan and myself, but a careful search of peach plantations in the three counties failed to reveal any definite cases of these diseases. (R. S. Willison)

SUN SCALD was present in some orchards in Lincoln county, Ont. in April, but the damage was not extensive. The injury was thought to have taken place during the extreme heat in July 1936. Lesions appeared on the upper side of large branches extending in a north-easterly direction. Thus they were exposed to the direct rays of the sun in early afternoon. In the Laboratory orchard the damage was confined to that part of the orchard where the trees were not thriving, probably because of low fertility levels. Injury ranged from the death of outer layers of bark to the killing of the tissues at least as deep as the cambium. This condition was also observed in late August 1936, on a few trees. Some lesions were subsequently infected by canker organisms. (R.S. Willison)

VERTICILLIUM WILT (Verticillium sp.) severely affected 25 trees in a 2-year-old block of 100 trees in Lincoln county, Ont. The orchard was planted on ground previously in tomatoes, and the young trees were interplanted with tomatoes. It affected 20 trees in a 3-year-old orchard of 300 trees also in Lincoln county. (G. C. Chamberlain)

SCAB (Cladosporium carpophilum) disfigured considerable fruit in varying degrees in one orchard at Ruthven, Ont. On some trees more than half the fruit was affected. (L.W. Koch)

BLIGHT (Coryneum Beijerinckii) was observed in 3 orchards in Ont. In one orchard 5-8% of the fruit of one variety were disfigured by the blight. (J.E. Howitt and R.E. Stone)

SILVER LEAF (Non-parasitic) affected one tree at the Summerland Station, B.C.

ARSENICAL INJURY was general in an orchard in Lincoln county, Ont., causing a shot hole of the leaves and canker of tender twigs (G.C. Chamberlain). Several instances of arsenical burn on peach twigs in Essex county were brought to my attention. The twig laterals were affected and there was an exudate of gum around the nodes. Seasonal conditions probably exaggerated the injury. (L. W. Koch)

BROWN ROT (Sclerotinia americana). The period of bloom was prolonged in 1937 and marked by cool weather and abundant rainfall in Ont. Blossom blight was observed but was not serious in the Laboratory orchard, St. Catharines. Counts were, therefore, not made but the infection was estimated to be 1-2%. There seemed to be less blight where trees were sprayed with lime sulphur 1-50 in early bloom than where they were sprayed with Qua-sul or wettable sulphur. It also caused moderate damage on nursery stock in Lincoln county, partially or completely girdling some trees. Infection was apparently through recent wounds or leaf axils of the current season. (R.S. Willison)

CANKER (Valsa cincta) was present in nursery stock in Lincoln county, Ont. It originated chiefly at small twigs, either broken in packing or poorly matured on stock overwintered out of doors. On similar stock kept indoors no canker appeared according to the owner. (R.S. Willison)

PEAR

FIRE BLIGHT (Erwinia amylovora). Several Barlett trees severely infected were found in the Summerland district, B.C. A single infected tree was seen at Royal Oak.

SCAB (Venturia pyrina) was general and caused slight to severe damage on Vancouver island and the lower mainland of B.C. It was more severe than in 1936, owing to heavy June rains. It was severe in an orchard at Springhill, N.B. It was also heavy on unsprayed trees in P.E.I.

PLUM

BLACK KNOT (Dibotryon morbosum) was seen on a few trees at New Westminster, B.C. (J.E. Eastham). It was observed occasionally in York county, N.B., Kings county, N.S., and in P.E.I. It was also reported in Bonaventure and L'Islet counties and from Sillery and Montreal, Que.

PLUM POCKETS (Taphrina Pruni) was reported on a few trees at Burnaby, B.C.; causing a slight general infection in the University orchard, Winnipeg, Man.; was present in Beauce, Frontenac, Portneuf, and Champlain counties, Que.

BROWN ROT (Sclerotinia americana) was slight to moderate on Vancouver island and the lower mainland of B.C. It was common and destructive to European varieties in Ont. It caused most damage as the plums were ripening; trees were seen with 15-20% of fruit destroyed (J.E. Howitt and R.E. Stone). Brown rot affected up to 10% of the crop in orchards about Kentville, N.S.; it was most severe in trees with high crowns and in sheltered portions of the orchard. (J.F. Hockey)

A twig blight, caused by S. americana, was reported as fairly prevalent on pruned nursery stock in Lincoln county, Ont., by Mr. W.A. Ross. From samples examined it appeared that infection took place in axils of the leaves. The fungus was fruiting profusely on the dead bark and on the leaf blades and petioles. (R.S. Willison)

SHOT HOLE (Higginsia prunophorae (Cylindrosporium prunophorae) caused moderate damage on some varieties at the Sidney Station, B.C. Infection was moderate at Morden and slight at Brandon, Man. At the latter place it was particularly heavy on Prunus opata. It was noted on plums at the Farm, Ottawa, Ont. A number of unsprayed trees in York county, N.B. were severely affected.

BACTERIAL SPOT (Phytomonas Pruni) caused severe loss of marketable fruit in an orchard in Lincoln county, Ont. (G.C. Chamberlain)

VERTICILLIUM WILT (V. sp.) affected 3 trees in a block of 50 in an orchard in Lincoln county, Ont.

GUMMOSIS (Non-parasitic) was general in Yakama, Lincoln, and Italian Prune varieties at the Summerland Station, B.C.

SUN SCALD caused considerable damage to some old Lombard trees in the Laboratory orchard, St. Catharines, Ont. The symptoms were similar to those reported for peaches. It occurred on sides of branches exposed to the sun at the time of maximum heat during the day. Sun scald was not evident in young trees. Here, too, infection by Valsa spp. occurred in some cases. (R.S. Willison)

RASPBERRY

SPUR BLIGHT (Didymella applanata) was fairly general, but not as prevalent as in 1936 in the Fraser valley, B.C.; the damage was slight (W. Jones). It was observed in many plantations in Ont. and in some 5-10% of the canes were markedly affected (J.E. Howitt and R.E. Stone). A very severe outbreak was observed in Cuthbert plantations in Wentworth county, causing considerable damage. The spread had been favoured by heavy rains in September and close planting (G.C. Chamberlain). Spur blight caused moderate damage in several plantations of the Harrow district due to defoliation of lower sections of the cane and weakening of fruit laterals(L.W. Koch). The disease was common causing slight damage in York county, N.B. Traces were present mostly on Viking in P.E.I.

MOSAIC (Virus) was generally light on the varieties at Lacombe, Alta., being most prevalent on Marlboro and Sarah; traces were found at Beaverlodge. Mosaic affected 90% of the plants in a Cuthbert planting in Ontario county, Ont. Mosaic was reported as follows: Viking, 35% and 5%; Newman 15% in three plantations in York county, N.B. Mosaic is troublesome in most plantations in P.E.I., except where roguing is carefully practised.

ANTHRACNOSE (Elsinoe veneta) was severe on Lloyd George at Agassiz, B.C. and slight at Huntington and appears to be spreading in this variety. It also slightly infected Newman, Franconia, Chief, and Latham at Agassiz

(W. Jones). It affected black raspberry slightly on Lulu island. Anthracnose was severe in a plantation in Queens county, P.E.I.

YELLOW RUST (Phragmidium Rubi-idaei) was general on Cuthbert and Viking and caused moderate damage on Vancouver island and the lower mainland of B.C. It was first observed on the lower foliage about mid-May, but was probably prevalent prior to that time and it continued to spread to the end of the season. The varieties, Cuthbert and Viking, which were badly rusted in 1936 were the ones to suffer most from winter killing last winter. Rust was also present on Herbert at Agassiz (W. Jones). It was also severe in a neglected patch at Summerland.

LATE YELLOW RUST (Pucciniastrum americanum) caused severe damage to the fruits of Viking and Newman 23 in N.B., stunting the development of the green fruit and rendering the ripe berries unsightly (J.L. Howatt). Rust affected 30% fruits in a Viking planting at Kentville, N.S. Many fruits were deformed and hard. (K.A. Harrison)

POWDERY MILDEW (Sphaerotheca Humuli) affected fruits of Latham in a planting in Lincoln county, Ont. The druplets were white and shrunken.

VERTICILLIUM WILT (V. sp.) was severe on Lloyd George at Burnaby, B.C. and in a garden planting near Vancouver. It caused moderate damage to a Latham planting at Chilliwack, in a low poorly-drained area (W. Jones). It infected 20% of the Black Perfection plants in a plantation in Essex county, Ont. (G.C. Chamberlain)

CROWN GALL (Phytomonas tumefaciens) affected 2 Herbert plants in 50 in a planting in Queens county, P.E.I.

CANE BLIGHT (Leptosphaeria Coniothyrium (Coniothyrium Fuckelii) was found in a few plantations in the Fraser valley, B.C., but the disease was not serious. The disease was present on one cane received at Ottawa from Picton, Ont.

LEAF ROLL (Virus) affected 1% of the plants in an old plantation of Viking in York county, N.B.

DIE BACK (Armillaria mellea) was found in 5 plantations of Cuthbert, Viking and Lloyd George located in the Mission, Hatzic and Huntington districts, B.C. Many plants were killed, others were weakened with chloratic foliage. (W. Jones).

WINTER INJURY. Winter killing of the buds of the 1937 fruiting canes was very general in the Hatzic, Mission and Abbotsford districts, B.C. on Viking and Cuthbert. Rust was severe on these two varieties in 1936. Viking appeared to be more affected than Cuthbert, when the two were growing side by side. (W. Jones)

STRAWBERRY

LEAF SCORCH (Diplocarpon Earliana (Marssonina Fragariae) was general on British Sovereign, a widely grown and popular variety, on the lower mainland and Vancouver island, B.C. At the Sidney Station none was found on Kentish Favourite, Garibaldi, and Charlie and Dick. (W. Jones)

LEAF SPOT (Mycosphaerella Fragariae (Ramularia Tulasnei) was of general occurrence in most plantations on Vancouver island and the lower mainland, B.C., but the damage was slight. Leaf spot, a most common disease of the foliage of the strawberry in Ont., was especially severe on the varieties Glen Mary, Dunlop, Kellog's Beauty and Parson's Beauty. (A.A. Hildebrand). Leaf spot was common throughout N.B. and was severe in many plantings in York county. The disease was slight to severe in Queens and Kings counties, P.E.I.

POWDERY MILDEW (Sphaerotheca Humuli). The varieties which were most severely attacked by leaf spot in Ont. showed a correspondingly marked susceptibility to powdery mildew. Powdery mildew was general in the Southport and Montague districts, P.E.I., but it suddenly disappeared, a splendid crop being realized. (R.R. Hurst)

BLACK ROOT or ROOT-ROT. A survey of some 50 representative plantations were made between June 17 and July 12 in the more important strawberry growing districts in Central Ontario including Brighton, London, Midland and the Niagara peninsula.

One of the most interesting points in regard to strawberry root-rot this season as revealed by the survey, was the small number of cases encountered where the above-ground parts of plants in affected areas presented the typical root-rot picture. Only in seven of the more than fifty plantations visited, were noted the patches of dead plants characterized by their dried out, brownish-discolored foliage, and these were all in older (second-fruiting) plantations, not a single case being observed in a one-year-old planting. During the cropping season of the four years preceding 1937, the "scorched" areas had been

observed in many plantations, some in their first year of cropping. The explanation of the variation in the incidence and severity of root rot, as manifested by the above-ground symptoms, seems to be associated with the amount and distribution of rainfall. In the accompanying table is shown the amount of precipitation from April 26 until June 30 (which interval may be regarded as the critical period for the strawberry so far as soil moisture is concerned) during the past five years. Unfortunately, this table does not show distribution, which is just as important as amount.

Year	April 26-30	May 1-31	June 1-30	Total
1933	----	1.54	2.36	3.90
1934	.09	.52	2.09	2.70
1935	.87	4.93	3.73	9.53
1936	.34	1.63	1.51	3.48
1937	1.38	3.87	3.47	8.72

From this table it will be noted that the seasons of 1933, 1934 and 1936 were very dry and the drought factor would contribute very materially to the expression of root-rot symptoms. But why should root-rot have shown up in 1935 when there was greater precipitation than in 1937? The answer to this question is to be sought in a comparison of the distribution of rainfall for these two years. In May, 1935 there were 4.93 inches of rain, but for seventeen days, from May 9 until May 27 (during which period adequate soil moisture would be highly necessary for plants just about to produce their fruit), there was no rain at all and the plants suffered lasting ill effects. In May, 1937, there was 3.87 inches of rain which was so well spaced that the soil never had a chance to dry out. The favourable distribution of rainfall continued right through June, during which month there was 3.47 inches. From May 1 until June 30, the longest period without rain was six days and this occurred only once. During these two months the average periodicity of precipitation was 2½ days. Thus, from the standpoint of soil moisture, the early part of the current season approached the "ideal" for strawberries.

But even with an adequate, well-distributed rainfall, and with above-ground symptoms showing up to a markedly lesser degree, examination of a large number of roots in the many plantations visited revealed that root-rot was no less widespread and not very much less severe than in previous years. The incidence and severity of root-rot can be spoken of only in relative terms whether as regards different seasons, different plantations or different parts of the same plantation. Not a single two-year-old plantation was found to be free from the disease, but it was

much more serious in some than in others. With a cessation of rainfall, plants in many plantations, with their depleted root-systems, would soon have exhibited the typical symptoms associated with the disease.

During the current season the disease was found in soils virgin for strawberries at Aylmer and in soils which had received heavy applications of barnyard manure annually. In a plantation of the latter category at Cooksville, of the varieties Glen Mary, Premier and Red Gold, all three of which were affected, the last-mentioned variety apparently was much more susceptible than the other two. This was the only case encountered where there was an indication of a difference in varietal susceptibility to the disease. (A.A. Hildebrand)

Winter Injury. On the occasion of a visit to the St. Catharines Laboratory, Drs. J.B. Demaree and G.M. Darrow of the U.S. Department of Agriculture when shown the trouble that has been regarded as root-rot, inclined to the view that this condition rather than being due to the attack of parasitic organisms, was the result of winter injury to the crown (see Plant Disease Reporter 21:397). These investigators postulated that injury in the region of the cambium within the crown interferes with translocatory and other processes with consequent death of the roots. During the survey, the crowns of many hundreds of plants were examined. Internal discoloration of the crown of plants that have overwintered must be spoken of in relative terms as in the case of root-rot, because very few such plants had crowns free from discoloration. The great majority of overwintered plants showed crowns with internal discoloration varying from slight to severe. But root-rot is not necessarily correlated with internal crown discoloration. Recently some hundreds of current-season runner plants have been examined. In scarcely a single instance was discoloration of the crown noted, yet in some cases over 50 per cent of the plants examined showed typical root-rot.

There was some slight indication during the survey that plants in more protected situations showed less internal crown discoloration. As a consequence of the question of winter injury being raised, mulching and other experiments are being included in the St. Catharines program of investigations.

In a survey of the northern and central States, Drs. Darrow and Demaree were able to trace "red core" (Lanarkshire disease in Scotland) from Maryland, north through New Jersey and the Hudson valley, well into New York State. The disease had already been reported from Michigan and Ohio. It was not found in Ontario though a

great many roots of strawberry plants were examined especially in search for it. (A.A. Hildebrand)

Several plantings were moderately affected by root rot in Lulu Island, Hatzic and Mission, B.C. It was worst on Lulu Island, where the area in strawberries is low lying and inclined to be wet during the fall. (W. Jones)

VIRUS DISEASES. Since experimental work at St. Catharines, Ont. had demonstrated that three of the leading commercial varieties, under greenhouse conditions, were symptomless carriers of virus (Yellow Edge), these three varieties, namely, Glen Mary, Premier and Parson's Beauty, were given especially close inspection to see if, under field conditions, they might in any way show symptoms suggestive of virus. Not even in Parson's Beauty, in which variety R.V. Harris in 1933 had selected plants exhibiting in the field symptoms of Yellow Edge, could any suggestion of the presence of virus be noted.

June Yellows. In Fragaria chiloensis in the experimental plots at Vineland and in the varieties Blakemore, Brandywine, Olga Petrova, Premier and Kellogg's Premier in commercial plantations variously situated throughout Ontario, June Yellows, the real cause of which has never definitely been determined, was prevalent. (A.A. Hildebrand).

V. DISEASES OF FOREST AND SHADE TREES

BALSAM FIR (Abies balsamea)

Witches' Broom (Melampsorella Caryophyllacearum). From counts made in 12 locations in P.E.I. it was found that 2% of the trees showed brooms. (R.R. Hurst)

ELM (Ulmus)

Black Spot (Gnomonia Ulmi). A detailed study of this organism has been made by Dr. Rene Pomerleau, and is now being published in parts (Le Naturaliste Canadien Vols. 40-41).

A few young trees were heavily infected, but the damage was slight in Fredericton, N.B.

Twig Blight (Thyrostroma compactum (Sacc.) v. Höhn). This fungus was fruiting on diseased twigs said to be of Chinese elm (Ulmus pumila) collected at Trinity College School, Port Hope, Ont., and communicated by Prof. J.E. Howitt (4524). The same fungus was found by J.W. Groves on twigs of Ulmus sp. (3827) from Levis, Que. in 1936. These are the first records from Canada, but it has been found in Illinois (J.G. Carter, Phytopathology 26:801-806. 1936). Dr. Dearness also examined some of the Port Hope material and referred it to Exosporium Ulmi Erikss. as well as a specimen he received from Martinsdale, Ind. on Ulmus americana. (I.L. Conners)

Cephalosporium Wilt or Die Back. Dothiorella Ulmi the pycnidial form of the fungus known formerly as Cephalosporium sp. was recently described (A.F. Verrall and Curtis May, Mycologia 29:321-324. 1937). Its occurrence in N.S. was noted last year (P.D.S. 16:67).

HAWTHORN (Crataegus)

Rusts. (Gymnosporangium clavipes was present on a few fruits of a Crataegus oxyacantha hedge at Bridgeport, N.S. (I.L. Conners). G. clavariaeforme was severe on C. oxyacantha rosea at Charlottetown, P.E.I. (G.W. Ayers)

Powdery Mildew (Podosphaera oxyacanthae). Slight infection was found at Edmonton, Alta. and a moderate one at Charlottetown, P.E.I.

HORSE CHESTNUT (Aesculus)

Leaf Blotch (Guignardia Aesculi) was common on roadside trees and in parks in Ont. Frequently the beauty of the

trees was ruined by this blotch (J.E. Howitt). The disease was particularly heavy around Smithville (G.C. Chamberlain). All trees in P.E.I. were severely damaged and many thus affected show considerable winter injury.

JUNIPER (Juniperus)

Rust (Gymnosporangium clavariaeforme) was found on two shipments of Juniperus communis var. suecica from Holland upon inspection. In one 3 out of 530 were affected in the other 3 out of 10. (I.L. Conners)

Winter Injury was considerable on some species of Juniper at the Summerland Station, B.C.

MAPLE (Acer)

Leaf Blister (Taphrina sp.). Two leaves of the red maple (A. rubrum) bearing spots brown to black above and dark ashy beneath were collected at Portland, Ont. on June 16, and sent by Mr. Edward Trevor to Ottawa and were communicated by Mr. deGryse. Upon examination a Taphrina was found on the spots. The fungus is very similar to Taphrina polyspora (Sorok.) Johans. (Exoascus Aceris Link) in Sacc. Syll. 8:813. The asci are borne on the under surface of the leaf, but are plainly provided with a short broad stalk cell. The asci are filled with conidia when mature. No noticeable puckering or thickening of the leaf tissue was revealed, even when examined under the microscope.

In all, Mr. Trevor found four red maples affected with the blister, although other evidently healthy trees stood in the same row and across the street from one heavily infected tree. The leaves were noticeably spotty half-way up, mostly in the centre of the tree. He was told this tree had been intensively blackened two years ago and to have been spotted every year. The disease was first noticed 6 or 7 years ago. The worst affected tree was three blocks away. Here the leaves on the lower half of the tree were curled and appeared ready to fall, but the top-most branches seemed clean. On the other two trees the spotting was not conspicuous. Since the disease was confined to the interior of the tree or to trees heavily shaded by a house or other buildings, Mr. Trevor concluded that shading favours the development of the disease. The affected trees were from 20' to 50' high. The lower leaves of one sugar maple (A. saccharum) were also found bearing spots "similar to those on the red, but they were a lighter brown and hardly noticeable, except on inspection". These spots were examined microscopically but the Taphrina was not seen. While leaves of red maple in this later sending examined at

the same time still bore the Taphrina, the fungus was nearly past. What is probably the same fungus is reported as Taphrina sp. on Acer rubrum from N.Y. and N.C., on A. saccharum from Me., N.H., N.Y., Pa., Ga., Ind., Mich., Mo., and on A. nigrum from Ohio (Check List of Diseases of Economic Plants in the United States. U.S.D.A. Dept. Bull. 1366, p. 14, 1926. (I.L. Conners)

Wilt (Verticillium sp.) was seen affecting a single silver maple at St. Catharines, Ont.

MOUNTAIN ASH (Sorbus)

Canker (Cytospora sp.) caused severe injury at Edmonton, Alta.

Fire Blight (Erwinia amylovora). Twenty-five badly diseased trees were seen near Charlottetown, P.E.I., some at Montague and also in other parts of the province. (R.R. Hurst)

Wood Rot (Armillaria mellea). One tree on the grounds of a private house at Mission, B.C. was partially dead from this fungus. (W. Jones)

PINE (Pinus)

White Pine Blister Rust (Cronartium ribicola) is general throughout N.B. As no large white pine stocks occur in the province damage is confined to individual trees or small stands (J.L. Howatt). Thirty trees at Mermaid, P.E.I. were found severely infected. (R.R. Hurst)

Comandra Rust (Cronartium Comandrae). A few trees were found affected at Summerland Station, B.C. (G.E. Woolliams)

Winter Injury was considerable on white pine and Austrian pine at L'Assomption, Que.

POPLAR (Populus)

Leaf Blight (Sclerotium bifrons) caused considerable defoliation at Prince George, B.C., on Populus tremuloides.

SPRUCE (Picea)

Rust (Chrysomyxa ledicola) was common in York and Sunbury counties, N.B. and caused defoliation of young Picea nigra. (J.L. Howatt)

Winter Injury was considerable on spruce at L'Assomption, Que. It was also rather severe on hedges in York county, N.B.

WALNUT (Juglans)

Bacterial Blight (Phytomonas Juglandis) was heavy on foliage and nuts at the Sidney Station, B.C., and caused 10 to 20% damage. (W. Jones)

WHITE CEDAR (Thuja)

Winter Injury was severe on ornamental white cedars and common cedars used in hedges at Ottawa, Ont. The damage was apparently due to transpiration requirements of the foliage being greater than the amount of water made available by the roots. Lack of snow cover had resulted in the ground becoming frozen to considerable depth. The soil was still very cold when the first warm days arrived (I.L. Conners). The damage was severe on cedar hedges in York county, N.B. (S.F. Clarkson)

WILLOW (Salix)

Scab (Fusicladium saliciperdum). Specimens of the disease were received from Rimouski, Que. (I. Mouce). This disease is everywhere in N.B. and this year appeared to be unusually destructive. Although the Laurel Willow has been reported to be immune, yet an outbreak of what appeared to be scab was found on this species (J.L. Howatt and S.F. Clarkson). Scab was very destructive in 1936 and greatly weakened the few susceptible willows left in N.S. In 1937 the disease appeared to be even more destructive. In spite of the usual control measures at Great Pre, the disease caused some damage to the old willows there. (K.A. Harrison)

Black Canker (Physalospora Miyabeana) was very abundant and easily found on most trees in the Gaspereaux valley, N.S. (K.A. Harrison)

VI. DISEASES OF ORNAMENTAL PLANTS

ALYSSUM

Wilt (Sclerotinia sp.) lightly affected sweet alyssum in one garden at Edmonton, Alta.

ARBUTUS

Leaf Blight (Mycosphaerella arbuticola) is general on Vancouver island, B.C., and causes rather serious damage to the leaves.

ASTER

Rust (Coleosporium Solidaginis) was heavy on 25 seedlings of A. Frikarti imported from Westminister, Md., to Winona, Ont.

Downy Mildew (Basidiophora entospora Roze & Cornu) was collected on A. novae-angliae along the Humber River, near Toronto, Ont., and det. by G.D. Darker (4712)

BARBERRY (Berberis)

Stem Rust (Puccinia graminis) was lightly infecting the bushes at the University, Winnipeg, Man., on June 22. Barberry bushes (B. vulgaris) that had been heavily infected in the spring with rust, were found near Great Village, and at River John, N.S.; near Salisbury, at West Bathurst, Douglastown and Shediac, N.B. and near Charlottetown, P.E.I. In every instance stem rust was severe on oats in the vicinity (I.L. Conners). Rust was very common on B. vulgaris var. purpurea in Grand Pre Memorial Park, N.S.

Wilt (Verticillium sp.) caused the death of B. Thunbergii plants brought from Winona, Ont. to the Laboratory. (G.C. Chamberlain)

BEGONIA

Blight (Botrytis sp.). Four tuberous begonias were diseased in one garden at Charlottetown, P.E.I.

BELLFLOWER (Campanula)

Rust (Coleosporium Campanulae) was collected on C. rapunculoides, roadside, Clementsport, N.S. by Albert Roland (4944) and on the same host at Kleinburg, Ont. by G.D. Darker (4670).

BOX (Buxus sempervirens)

Leaf Blight (Macrophoma Candollei) caused considerable leaf defoliation at Agassiz, B.C. (W. Jones)

BRACHYCOMBE

Yellows (virus). Infection was moderate, but the damage slight in York county, N.B.

BUCKTHORN (Rhamnus)

Crown Rust (Puccinia coronata). The remains of aecia were found on R. cathartica at Fredericton, N.B., Bridgeport, and Wolfeville, N.S. and were apparently centres for crown rust outbreaks on oats. A moderate infection was found in Queens county, P.E.I.

BUTTERFLY FLOWER (Schizanthus)

Yellows (virus) caused severe damage to 10% of the plants at Lincoln, N.B.

CALLA LILY (Zantedeschia)

Basal Rot (Erwinia carotovora) affected 10% of plants in a greenhouse at Haney, B.C. (W. Jones)

CALENDULA

Stem Rot (Sclerotinia sclerotiorum) was severe on a trace of the plants in Queens county, P.E.I.

Yellows (virus) was widespread and sometimes very severe in P.E.I.

CANYON POPPY (Romneya)

Wilt (Sclerotinia sclerotiorum) was found killing the older plants of R. Coulteri in a garden at Whonnock, B.C. Young sucker plants were apparently unaffected.

CARAGANA

Leaf Spot (Septoria Caraganae) was moderate at Saskatoon, Sask. causing defoliation.

CARNATION

Rust (Uromyces caryophyllinus) caused slight damage to 10% of the plants in a greenhouse at Burnaby, B.C. It

caused slight to severe damage in greenhouses in Fredericton, N.B. All plants were lightly infected in the greenhouse at the Nappan Station, N.S. as they were coming into bloom in November and the rust persisted all winter reducing growth and bloom. (K.A. Harrison)

CHINA ASTER (Callistephus)

Yellows (virus) was reported as follows: 10% of the plants were affected at the Summerland Station, B.C.; moderate infection at Morden, Man.; trace at the L'Assomption Station, Que.; throughout N.B., causing usually severe damage; so troublesome in P.E.I. that it was practically impossible to grow them.

Wilt (Fusarium conglutinans var. Callistephi) was found as follows: affected 10% of the plants at the Summerland Station, B.C.; very prevalent in Ont., many growers losing 20% or more of their plants. It affected 50% of the plants at Farnham, Que.; the seed had been bought and the plants home grown. The disease was present 5 years ago and no asters had been grown in the interval. A trace of wilt was present at Lincoln, N.B.

Grey Mould (Botrytis sp.). Botrytis sp. was found associated with a stem blight or wilt in gardens in Charlottetown, P.E.I.

Powdery Mildew (Erysiphe Cichoracearum) slightly affected a few plants at the Summerland Station, B.C.

CHRYSANTHEMUM

Yellows (virus). Almost all clumps were severely affected at the Fredericton Station, N.B. It was severe on Louisa A. Mayo, a greenhouse variety at Charlottetown, P.E.I.

Powdery Mildew (Erysiphe Cichoracearum) was very destructive on several greenhouse sorts at Charlottetown, P.E.I., but it was successfully checked by dusting with sulphur.

CLEMATIS

Septoria Leaf Spot (S. Clematidis) slightly infected C. ligusticifolia at Morden, Man.

CLARKIA

Rust (Pucciniastrum Epilobii) slightly infected C. elegans at the Charlottetown Station, P.E.I.

COCKSCOMB (Celosia)

Yellows (virus) was severe on C. plumosa at the Fredericton Station, N.B. The colour of the blooms were bleached in the affected plants.

COLUMBINE (Aquilegia)

Crown Rot (Sclerotinia sclerotiorum) was rather severe in one garden in Charlottetown, P.E.I.

CONE FLOWER (Rudbeckia)

Yellows (virus). Infection was moderate but affected plants were damaged severely in York county, N.B.

DAHLIA

Virus Diseases. Stunt affected 10% of the plants at the Summerland Station, B.C. Mosaic and Stunt were general in a commercial planting in Welland county, Ont. Plants were severely dwarfed with mottling, the symptoms varying with the variety. In a planting of mixed varieties in Queen Victoria Park, Niagara Falls, several plants of Jersey's Beacon showed mosaic and ring spot. Stunt was prevalent in Pompons and affected also Jane Cowl, Maude Adams, Jersey's Beauty, Kathleen Norris and Satan at Charlottetown, P.E.I.

EVERLASTING (Helichrysum)

Yellows (virus). Almost all clumps were severely affected at the Fredericton Station, N.B.

Leaf Spot (Phyllosticta sp.) slightly affected H. bracteatum at the Charlottetown Station, P.E.I.

FLOWERING ALMOND (Amygdalus)

Leaf Curl (Taphrina deformans). Diseased specimens were received from Bolton, Ont. (H.N. Racicot)

FLOWERING CRAB (Pyrus glaucescens)

Scab (Fusicladium dendriticum) was collected on the Humber River near Toronto, Ont., and det. by G.D. Darker.

GAILLARDIA

Yellows (virus) moderately affected and slightly damaged gaillardia at the Fredericton Station, N.B.

GERANIUM

Leaf Spot (Phytomonas Geranii Burkh.) severely infected G. sanguineum at Winnipeg, Man. (W.A.F. Hagborg). This is the first record of its occurrence in Canada.

GERANIUM (Pelargonium)

Leaf Curl (virus) was found in a greenhouse at Fonthill, Ont. The disease has been reproduced by grafting (G.C. Chamberlain). "According to the Dominion Botanist, the disease has been found in Ontario for the past 10 years at least" (G.H. Berkeley, Can. Hort. & Home Magazine, p. 108, April, 1938).

GLADIOLUS

Scab (Phytomonas marginata) affected less than 1% of the corms in 5 plantings in the Saanich peninsula, B.C. It was also present in P.E.I.

Bacterial Blight (Phytomonas gummisudans). A trace to a light infection was present at Lacombe and Edmonton, Alta.

Hard Rot (Septoria Gladioli) infected a trace to 4% of the corms at Charlottetown, P.E.I.

Root Rot (cause unknown) was widespread in Sask. and did much damage to some varieties. At Winnipeg, Man., infection was general in gardens where gladioli are grown extensively. It was especially evident following a wet spring.

Basal Rot (Fusarium sp.) infected up to 8% of the plants of Pfetzers Triumph in a small area in a planting in the Saanich peninsula, B.C.

Penicillium Rot (P. sp.) was found affecting injured corms at Charlottetown, P.E.I. in May.

GOLDEN GLOW (Rudbeckia)

Root or Crown Rot (cause unknown) caused slight damage at the University, Saskatoon, Sask.

GODETIA

Rust (Pucciniastrum Epilobii) slightly infected a species of Godetia at the Charlottetown Station, P.E.I.

HOLLYHOCK (Althaea rosea)

Rust (Puccinia Malvacearum) was general at the Summerland Station, B.C. being moderate on the cut-leaf varieties and severe on the others. It infected heavily 90% of the plants at Winnipeg, Man. by Sept. 30. Rust was general throughout N.B. causing severe damage in many cases. At Kentville, N.S. it was causing severe defoliation in a garden on May 24; it was severe at Kingsport in July. Infection was very late this year in P.E.I. not showing up until August and September. All 1936 plants died from winter injury, thus it was not until the seedlings had made some growth that infection could take place.

HONEYSUCKLE (Lonicera)

Blight (Glomerularia Lonicerae) was slight to moderate at the L'Assomption Station, Que. It occurred mostly on L. tatarica, but it was also present on other species (H.N. Racicot). Specimens of the disease were received from Kings and Albert counties, N.B. In each case the owner claimed that the disease caused considerable damage (J.L. Howatt). Blighted L. tatarica leaves were received from Little York, P.E.I. (H.N. Racicot)

Powdery Mildew (Microsphaera Alni) was slight at Saskatoon, Sask. and was recorded once at Charlottetown, P.E.I.

HYDRANGEA

Powdery Mildew (Oidium sp.) was general in a commercial greenhouse at Haney, B.C. and caused slight damage.

IRIS

Leaf Spot (Didymellina macrospora (Heterosporium gracile) was reported as follows: damage severe in undrained low areas in two plantations in Saanich peninsula, B.C.; infection moderate to heavy on Seminole, Gold Imperial, Zua, Albatross, Grachus, Nancy Lee, Prosper Laugier and Monseignor at Morden Station, Man.; trace at L'Assomption Station, Que.; moderate to severe at the Fredericton Station, N.B.; very common on P.E.I.

Rhizome Rot (Erwinia carotovora) was recorded as follows: causing slight damage in one lot of Iris in Sask.; severe in some gardens at Winnipeg, Man., where a Botrytis sp. was also associated with the rot; prevalent in Queens county, P.E.I.

Winter Injury. Iris suffered severely at Ottawa, Ont. in the winter of 1936-37. Iris ordinarily is one of our hardiest plants. (I.L. Conners)

Ink Disease (Mystrosporium adustum Massee) caused moderate damage on Imperator in one small 2-year-old planting at Victoria, B.C. (R.J. Hastings and J.E. Bosher). This is a new disease for Canada.

Nematode (Ditylenchus dipsaci) affected about 1% of the bulbous iris on Vancouver island. It also affected 6.6% of White Excelsior in a half-acre plantation at Langley, B.C. (W. Jones and R.J. Hastings)

LARKSPUR (Delphinium)

Powdery Mildew (Erysiphe Cichoracearum) was severe on some plants at the Summerland Station. A moderate infection was present at Peace River, Alta. It caused slight to severe damage in York county, N.B.

Bacterial Blight (Phytomonas Delphinii) was present on larkspur throughout N.B. and damage was severe in York, Sunbury and Saint John counties. Complaints concerning this disease were received from several gardens in P.E.I.; it was specially severe during the hot weather after the blooming period. (R.R. Hurst)

Crown Rot (cause unknown) was severe in a garden at Winnipeg, Man.

LILAC (Syringa)

Powdery Mildew (Microsphaera Alni) was prevalent in the southern counties of N.B. Traces were noted in P.E.I.

Blight (Phytomonas Syringae). Scattered twigs were affected in Lincoln county, Ont. (G.C. Chamberlain). Blight was severe on several hedges near Fredericton and Saint John, N.B. It was first noted on May 29 at Marysville. (J.L. Howatt & S.F. Clarkson)

Grey Mould (Botrytis cinerea) caused severe damage on lilacs at Charlottetown, P.E.I. It was severe as twig

blight on a hedge at Red Head, N.B.; it was associated with bacterial blight (J.L. Howatt and S.F. Clarkson)

Mosaic (virus). One white lilac at Kentville, N.S., has shown a streaked mottling for several years. (J.F. Hockey)

LILY (Lilium)

Blight (Botrytis elliptica) caused complete defoliation in a small area in a planting of L. candidum near Victoria, B.C. A severe infection was present on L. bulbiferum and L. candidum var. Salonika at Morden, Man. It affected 4 plants of L. candidum out of 15 at Charlottetown, P.E.I.

LOBELIA

Wilt (Sclerotinia sp.). A heavy infection was noted in one garden at Edmonton, Alta.

Root Rot (Fusarium sp.) was also prevalent at the same place.

LUPINE (Lupinus)

Root Rot (Fusarium avenaceum associated). Odd plants of blue lupine were affected at Brandon, Man.

Yellows (virus). Infection was moderate, but the damage was severe on affected plants at the Fredericton Station, N.B.

MEZEREUM or FEBRUARY DAPHNE (Daphne mezereum)

Leaf Spot (Marssonina Daphnes (Desm. & Rob.) P.Magn.) was fairly general in the Point Grey district of Vancouver, B.C.; it caused moderate defoliation (J. Menzies and J.W. Eastham). This fungus was determined as Gloeosporium mezereum Cke. in 1936.

Die Back (Fusarium avenaceum). A Fusarium was fruiting on a dead branch from a garden in Westboro, Ont. The fungus was identified by Dr. W.L. Gordon. (I.L. Conners)

Wilt (Botrytis sp.). Eight to 10% of the plants in a hedge at Kentville, N.S., were damaged. Trichothecium roseum was also found fruiting on the dead branches, but it was believed to be secondary. (J.F. Hockey)

MALTESE CROSS (Lychnis)

Leaf Spot (?Septoria Lychnidis). Slight infection was seen at L'Assomption, Que. on L. chalcedonica. Material not examined (H.N. Racicot).

MARIGOLD (Tagetes)

Yellows (virus). Almost all plants of African marigold were severely affected at the Fredericton Station, N.B.

NARCISSUS

Leaf Scorch (Stagonospora Curtisii) caused slight damage in one plantation at Bradner, B.C.

Nematode (Ditylenchus dipsaci). The average infection is 1% on Vancouver island, B.C.; in a few plantings as high as 50% of the plants were affected. Nematodes were also found at Bradner. (R.J. Hastings and W. Jones)

Grey Disease (virus). Five per cent of the plants were affected at Bradner, B.C.

NEMESIA

Yellows (virus). A few plants were affected at the Fredericton Station, N.B.

PANSY (Viola)

Powdery Mildew (Sphaerotheca Humuli) was relatively heavy at the Summerland Station, B.C.

PEONY (Paeonia)

Blight (Botrytis Paeoniae) was found as follows: Many plants dying down from blight in a garden at Abbotsford, B.C.; moderate infection on one variety at Morden, Man.; blight caused moderate damage in the University garden, Saskatoon, Sask. being definitely more prevalent on some varieties than others. Blight was very prevalent in Ont. about the time peonies were coming into bud; several plantations were seen in which a high percentage of the buds were destroyed. Conspicuous brown blotches were also present on the buds throughout N.B. The peonies at the Fredericton Station were sprayed on June 2 and June 12 with Copper-Hydro "40", one ounce to one gallon of water. These applications kept the disease in control until the flowering period was over (J.L. Howatt

and S.F. Clarkson). Blight was recorded from Kentville, N.S. It was very common and destructive in P.E.I. (R.R. Hurst)

Leaf Blotch (Cladosporium Paeoniae) was severe at Agassiz, B.C. on Duchesse d'Orleans. (W. Jones)

Leaf Spot (Septoria Paeoniae var. berolinensis) was severe on Modeste Guerin and Asa Gray at the Agassiz Station, B.C. A trace developed at Morden, Man.

Leaf Spot (Cercospora sp.). A few plants were found affected at Vancouver, B.C. (J.W. Eastham). This may be C. variicolor Wint. which was originally described from Missouri and is known from a few other central States. (I.L. Conners)

Root Knot (Heterodera marioni). A number of plants moderately affected in 1936 were severely diseased in 1937 and removed at Charlottetown, P.E.I.

Ring Spot (virus) caused slight damage in the University gardens, Saskatoon, Sask. Infection was moderate to severe on the following varieties at Morden, Man.: Albatre, Avalanche, Atrosanguinea, Eugenie Verdier, Mme Emile Lemoine, Mme de Verneville, Milton Hill, Stanley, Triomphe de l'Exposition de Lille. The disease was confined to the varieties previously reported affected at the Fredericton Station, N.B. No new varieties were found infected although it was noticed in several gardens in York county. (J.L. Howatt)

Mosaic (virus). Two plants have shown symptoms at Kentville, N.S. for 5 years and have never flowered.

PETUNIA

Yellows (virus). What appeared to be typical yellows was common on a pink variety at Saskatoon, Sask. The plants were yellowed and dwarfed; flowering was inhibited. The disease was very suggestive of China aster yellows. It was reported from Regina by Dr. C.F. Patterson. It has not been observed before in Sask. (T.C. Vanterpool)

PHLOX

Powdery Mildew (Erysiphe Cichoracearum) was rather heavy at the Summerland Station, B.C. It was very prevalent on certain varieties of perennial phlox in Ont. Very heavy infections were noted in many gardens in St. Catharines and vicinity.

Leaf Spot (Septoria sp.). Slight to moderate infection was present in a garden at Edmonton, Alta.

Leaf Spot (Cercospora sp.) was heavy on perennial phlox specimens from Lincoln county, Ont.

Yellows (virus) caused severe damage to perennial phlox in the flower border at the Fredericton Station, N.B. While the affected plants are not much distorted, some stalks of bloom suffer a decided loss of colour. Infection was low in P. Drummondii, in the same garden. (S.F. Clarkson)

ROSE (Rosa)

Rust (Phragmidium spp.) was reported as follows: severe in a nursery at West Vancouver, B.C.; severe on some varieties at Summerland Station; slight infection at Morden, Man.; heavy in Carleton, York, and Sunbury counties, N.B.; slight in June, but heavy in August at the Charlottetown Station, P.E.I.

Black Spot (Diplocarpon Rosae (Marssonina Rosae) was general and caused slight to moderate damage on the lower mainland and Vancouver island, B.C.; it was rather severe on Alberic Barbier, Richmond and Max Jules Grauveaux at Agassiz, B.C. The rose beds in Queen Victoria Park, Niagara Falls, Ont. were almost completely defoliated in August, particularly the Teas; the Hybrid Perpetuals were not as seriously defoliated. Black spot was severe in commercial greenhouses at Fredericton, N.B.; in gardens the damage varied from slight to severe. The following varieties were moderately affected on Sept. 1 at Charlottetown, P.E.I.; Duchess of Athol, Margaret McGredy, Frau Karl Druschki, Mrs. John Lang.

Powdery Mildew (Sphaerotheca pannosa). A slight infection was general on Vancouver island and in the Fraser valley, B.C. A slight infection occurred at Saskatoon, Sask. Powdery mildew was moderate to severe at Winnipeg, Man., and caused some defoliation. The disease was very prevalent in many parts of Ontario. It was especially destructive to certain varieties of ramblers; on many plants the blossoms were completely disfigured by the mildew. The disease appeared unusually early in Lincoln county. Powdery mildew affected a few rambler roses at Fredericton, N.B. The disease was severe only late in the season on rambler roses at Charlottetown, P.E.I.

Crown Gall (Phytomonas tumefaciens) was common at the Sidney Station, B.C.; the damage was apparently nil. It was severe on one Dorothy Perkins at Charlottetown, P.E.I.

Brand Canker (Coniothyrium Wernsdorffiae). Practically all the rose plants were infected for a number of years in a garden at Woodroffe, Ont. Over 90% control was effected by thoroughly spraying the plants with Bordeaux at the time they were laid and covered for the winter. All leaves were stripped off before treatment. (F.S. Thatcher)

Coryneum Canker (Coryneum microstictum Berk.) This fungus was collected by Miss Cynthia Wescott in Victoria Park, Niagara Falls, Ont., July 2, 1929; according to Anna E. Jenkins (Mycologia 29:727. 1937)

Grey Mould (Botrytis sp.) caused severe damage to three plants in a garden at Williamsburg, N.B.

Downy Mildew (Peronospora sparsa Berk.) was rather severe on Lord Lonsdale, Margarete Grau, Portadown, McGredy's Peach, and it was also found on Crimson Glory, Lal, Malar Ros, Trigo, Mrs. Henry Morse in West Vancouver, B.C. All the varieties were grown in a sheltered low spot where air drainage was poor and humidity high. A slight infection was also observed on a seedling at Sardis (W. Jones). This is the first report of its occurrence in Canada.

Chlorosis (virus) was found on a few plants of Canary at West Vancouver, B.C.

RUSSIAN OLIVE (Elaeagnus augustifolia)

Rust was general on the hedges at the Summerland Station, B.C. (G.E. Woolliams). The rust is probably Puccinia Caricis-Shepherdiae J.J. Davis, which has been collected on this host at Saskatoon and Rosthern, Sask. (Fraser & Conners, Trans. Royal Soc. Canada series 3, 19:308. 1925 sub. Aecidium arctuum Arth.). (I.L. Conners)

SCABIOSA

Yellows (virus) slightly affected plants in the border at the Fredericton Station, N.B.

SHASTA DAISY (Chrysanthemum maximum)

Leaf Spot (Septoria Chrysanthemi) was fairly general in gardens and borders at Vancouver, B.C.

SNAPDRAGON (Antirrhinum)

Rust (Puccinia Antirrhini) caused a loss of 90% of the crop in unsprayed plots, where the plants were being grown for seed in the Duncan and Victoria district, B.C. It was also general in the Fraser valley and on the lower mainland. Where plants were sprayed with Bordeaux and a good spreader used, production was normal. Two sprays were applied in July. To be effective the lower surface of the leaves should be well covered. Copper containing sprays alone are effective in the coast regions (W.R. Foster and W. Jones). Rust was severe, killing most of the plants at the Summerland Station. Rust was destructive at Charlottetown, P.E.I. during the past season.

Yellows (virus). A few plants were found affected on the campus of the University, Saskatoon, Sask. A few plants only were noticeably affected in the border and beds at the Fredericton Station, N.B.

Wilt (Sclerotinia sp.). Infection was heavy in one garden in Edmonton, Alta.

SPIKE SPEEDWELL (Veronica spicata)

Yellows (virus) affected 80% of the plants and caused considerable distortion of flowers and foliage at the Fredericton Station, N.B.

STATICE

Yellows (virus) slightly but definitely affected Statice at the Fredericton Station, N.B.

STOCK (Matthiola)

Wilt (Sclerotinia sp.) caused a heavy infection in one garden at Edmonton, Alta.

Yellows (virus) affected only a few plants at the Fredericton Station, N.B.

SWEET PEA (Lathyrus)

Streak (Erwinia Lathyri) was very destructive last year in the blooming season at Charlottetown, P.E.I.

Root Rot (Fusarium spp.). A trace to a slight infection was present in several gardens at Edmonton, Alta.

Root Rot (Rhizoctonia sp.) was noticed at Charlottetown, P.E.I.

Powdery Mildew (Microsphaera diffusa) affected practically all varieties in late August at Charlottetown, P.E.I.

Wilt (Verticillium albo-atrum). The fungus was found on the roots of several affected plants at the Kentville Station, N.S.

Damping Off (Pythium sp.) slightly affected in late June, sweet pea plants, which had been hilled up above the roots. The roots were sound, but the basal part of the stem which was buried when the plants were hilled became decayed. Pythium was isolated (G.W. Ayers).

TOAD FLAX (Linaria)

Wilt (Sclerotinia). Moderate infection was found in one garden at Edmonton, Alta.

TULIP (Tulipa)

Blight (Botrytis Tulipae) was first observed on Vancouver island at Sidney, B.C. in mid-March. It was slightly more prevalent than in 1936. On the lower mainland it was general and caused much damage in gardens and some plantings. The disease was rather unimportant this year in P.E.I., but it was present in many gardens.

Break (virus) was slightly on the increase in the Victoria area, B.C. (R.J. Hastings). Traces of break were noted in 3 gardens at Charlottetown, P.E.I.

VERVAIN (Verbena)

Yellows (virus) slightly affected the plants at the Fredericton Station, N.B.

ZINNIA

Wilt (Fusarium sp.) affected 25% of the plants at the Summerland Station, B.C.

Yellows (virus). An occasional plant was found affected in a garden at Saskatoon, Sask. Yellows varied from slight to severe in different groups of plants at the Fredericton Station, N.B.

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