38th Annual Report

OF THE CANADIAN PLANT DISEASE SURVEY 1958

Compiled by
D.W. CREELMAN
PLANT RESEARCH INSTITUTE
RESEARCH BRANCH
CANADA DEPARTMENT OF AGRICULTURE

FOREWORD

The 38th Annual Report of the Canadian Plant Disease Survey contains forty-one special reports. The titles of the reports and authors' names are included in the general index. Without mentioning them individually, I would like to thank these workers for their contributions.

The individual records of diseases are compiled in the usual manner with credit given to the reporter. Each record helps to create a complete picture of the disease situation when compiled with the other records. The file of these disease records from each Annual Report is maintained for study. A number of people use this file for research, and attention is drawn to it so that more workers can make use of it in the future.

Cereal rust investigators will wish to refer to Report No. 14, Plant Pathology Section, Canada Dept. Agriculture, Research Laboratory, Winnipeg, Manitoba. Only parts of this report were included in the present Annual Report. The Annual Report of the Forest Insect and Disease Survey should be consulted in conjunction with section V which deals chiefly with ornamental trees and shrubs. Workers interested in sections III-V will find the Annual Report of the Committee on Horticultural Research 1958 (1959) of interest.

Many members of the Research Branch contributed to this report. Their material and information contributed by a number of other workers is gratefully acknowledged, particularly the numerous reports supplied by District Potato Inspectors through J. W. Scannell, Plant Protection Division, and reports by W. G. Benedict, L. V. Busch, S. R. Colpitts, R. H. Estey, S. G. Fushtey, J. Ringuet, D. Leblond, B. H. MacNeill, and T. C. Vanterpool.

D. W. Creelman prepared a considerable portion of this report. He will undertake the compilation of the 39th report for the crop year 1959. I hope that he will have the same friendly co-operation that I enjoyed while working on the past three Annual Reports.

1 February 1960
Plant Research Institute
Research Branch
Ottawa, Ontario, Canada

R. A. Shoemaker,
Mycologist.

GENERAL INDEX

New and Noteworthy Diseases

The development of cereal rusts in the Prairie Provinces was impeded by several factors. Only a small amount of inoculum moved north into Man., Sask., and Alta., The local infections that developed were held in check by dry weather in the early summer and by nearly normal temperatures in July and August when precipitation reached or surpassed normal levels. The plantings of resistant Selkirk wheat and Rodney and Garry oats in the southeast portion of the Prairies also helped restrict the development of rusts and impeded the subsequent spread to susceptible plantings further north and west. Wheat leaf rust was the most common cereal rust in the Prairies but it caused only small losses. The heaviest infections were east of Killarney and Gladstone in Man., on susceptible varieties and on late developing fields of Selkirk.

A new race of oat stem rust, 6A, was found frequently at Appleton, Ont., where the usually resistant varieties Garry and Rodney were as seriously damaged as the susceptible variety Bond. Single isolates of race 6A were recorded from Kemptville, Ont., Ste. Amne de la Pocatiere, and Ste. Anne de Bellevue, Que. Races 8A and 13A which also attack Garry and Rodney oats were recorded again from some of these Ont. and Que. stations. Race 7A which will attack Rodney oats was found frequently in Man. Speckled leaf blotch caused considerable damage to oat crops in Ont. and Que.

Net blotch was the most conspicuous disease of barley. Damage was slight to moderate in the Prairies and in Ont. and Que.

New records of diseases of wheat were: Cephalosporium stripe in Ont. and New Brunswick, and Agropyron streak mosaic in Ont.

Alfalfa yield in southern Alta. was reduced about 15% by bacterial wilt. Damage to common clover caused by powdery mildew was moderate in Sask.

Dry weather reduced the incidence of flax diseases in Man. and Sask. Rust was evident only on the susceptible variety Redwing. Rapeseed was affected by Albugo candida in several areas of Sask., but no other diseases caused appreciable damage to this crop. Sunflowers were affected by rust in Man., especially in the central part of the province. The variety Mennonite is susceptible to rust, but the demand for large seed for confectionery use has resulted in increased plantings of Mennonite and a consequent increase in rust. Leaf mottle affected sunflowers in central Man. but was destructive in only a few fields. Soybeans in

southern Ont. were damaged by manganese deficiency as a consequence of dry weather early in the season. However, fungus diseases of soybeans were less severe than in the two previous years.

Tobacco brown rot occurred in all major crop areas. The disease was most severe in crops grown in light, sandy soils after rye in the rotation. Large populations of the root-lesion nematode (Pratylenchus sp.) were found in many of the fields.

The incidence of ring rot of potato (Corynebacterium sepedonicum) in Que. was much lower than in 1957. This seems to be a reflection of greater care by growers and a more general use of quaternary ammonium compounds for disinfecting machinery. Late blight (Phytophthora infestans) caused heavy losses to potato crops in Eastern Canada through reduction in yields and subsequent tuber rot. In Nfld., wart (Synchytrium endobioticum) has spread to land not previously infested. Yield reductions of 75% were reported. A disorder of potato, called little leaf, has increased in prevalence in P.E.I., mostly in the variety Sebago.

Club root of crucifers (Plasmodiophora brassicae) continues to be a serious problem in the Maritime Provinces. Cercospora blight of carrots (C. carotae) was prevalent and caused appreciable losses in Eastern Canada. Cylindrocarpon radicicola was reported for the first time as causing a storage rot of carrots in N.S. Scab (Cladosporium cucumerinum) and a storage rot caused by Colletotrichum atramentarium constituted new disease reports on squash, also from N.S.

Aster yellows was generally less serious in 1958 than in 1957. Cucumber mosaic caused heavy losses in the Harrow-Leamington district of Ont. and most pepper crops in S.-W. Ont. were infected with one or more viruses.

Anjou pit, a disease of unknown origin affecting certain pear varieties, was more common and severe than in any previous season in B.C. Powdery mildew of apple (Podosphaera leucotricha) has become a problem in Ont. in orchards where organic fungicides are regularly used. Considerable late season scab (Venturia inaequalis) developed in commercial apple orchards in N.S., particularly on the variety McIntosh. Twig and blossom blight (Botrytis cinerea and Monilinia vaccinii-corymbosi) was more severe than usual on low-bush blueberries in N.S.

The Weather and its Influence on Plant Disease

The 1957-58 winter on the lower mainland of B.C. was remarkable for its mildness despite killing frosts early in Oct. In the Vancouver area there was only one-half inch of snow and tender plants in sheltered gardens survived. Jan. and Feb. were unusually mild with above average rainfall. March and April were warm with more sunshine and less rain than usual. The month of May was the sunniest in 30 years and the rainfall was abnormally low. Rust appeared on fall-sown cereals in the middle of May in plots at the University.

Sunshine was average for June and above average for July. Gray mold rot caused by Botrytis cinerea was not a problem in strawberries and raspberries. Drought became general in July and continued into Aug. and much of the raspberry crop dried on the vines. Grains and pastures suffered from the summer drought but the pastures recovered following Sept. rains.

The first general frost occurred during the last week in Sept. but severe frosts did not occur until 15 Nov. A light snowfall followed on 17 Nov. Because of the severe water shortage during the summer in urban areas it is expected that many of the dried-out perennials and flowering shrubs may suffer considerable damage in the winter of 1958-59 (H.N.W. Toms).

In the B.C. Interior the winter was one of the mildest on record. Fruit trees and other perennial plants began to emerge from dormancy in early March and were, therefore, especially vulnerable to cold injury for a period of two months before the end of the normal spring frost season. Temperatures during this period, however, did not fall below 30°F and no serious frost injury was recorded.

By mid-spring the threat from parasitic diseases was serious. Ascospores of the apple scab fungus were mature in some districts by 1 April. Frequent light showers in April provided minimum apple scab infection periods and sparse foliage infections were found in several districts. Brown rot blossom and twig blight caused by Monilinia laxa was reported in apricot and chokecherry in some areas in early May.

From late April until early Sept. the weather throughout the B.C. Interior was steadily hot and dry. There were no additional apple scab infection periods in the Okanagan and Creston Valleys. However, in the moister area bordering the west arm of Kootenay Lake unsprayed trees had 100% fruit infection. Powdery mildew of apple was relatively severe for the first time

since the severe winter of 1955-56. Mild winters characteristically favor powdery mildew outbreaks in succeeding summers. Fire blight remained severe in scattered orchards in most districts, but the most serious spread again occurred in mid-summer rather than at blossom time (M. F. Welsh).

In the Creston Valley of B.C. there was some rainfall early in the season but the above average temperatures and low rainfall during the summer and fall eliminated the threat of any serious fungus disease problems (J. M. Wilks).

Severe drought conditions prevailed in 1958 in the northern and eastern portions of the Peace River area and c. Alta. The incidence of leaf diseases on barley, the major crop, closely followed the rainfall pattern and were therefore important only in the south and west portions of the area surveyed. Barley was the major crop, and scald the most prevalent disease. Scald incidence in most fields rated light to moderate, the degree of infection apparently being influenced by the intensity of barley cropping in the particular fields. Net blotch was present in trace to light amounts but it seemed likely that some of the late crops would be more severely affected before they matured. Bacterial blight was also important in some of the later crops. Septoria leaf blotch was practically absent. Loose smut was noticeably less prevalent than in 1957, probably reflecting unfavorable conditions for infection in 1958. Rootrots were prevalent in wheat fields but damage was less than in most years. Oats and flax were relatively free of diseases in 1958 (W. P. Campbell, W. P. Skoropad).

In s. Alta. the winter of 1957-58 was mild and winter wheat and herbaceous perennials had a higher than normal rate of survival. High temperatures in May favored the development of damping-off diseases in cereals and special crops. There was sufficient moisture throughout the growing season to provide conditions for the development of foliage diseases on all crops. (J. B. Lebeau).

The spring and early summer seasons were very dry in most of Sask. Rainfall was about 50% of normal over a large part of the province. Fortunately the temperature was also below normal. The effect of the cool dry conditions was evident in the slow development of leaf and stem diseases, rust and ergot. These diseases were much less severe and appeared later than in other years. On the other hand, blossom end rot of tomato was more prevalent than usual. Frequent rains during Sept. encouraged rapid and heavy development of mildews on various crops and leaf spots of legumes (H. W. Mead).

In Man. the weather in April was warm with average rainfall and some seedling of cereal crops was done. The temperature at Winnipeg on 1 May was 12°F, the coldest on record, and the wind velocity was 24 m.p.h. On 12 May, in contrast, the temperature has risen to 90.5°F, the hottest on record, and the wind velocity was 30 m.p.h. The very low rainfall in May, the strong winds and the extremes of temperature resulted in patchy germination. Temperatures of 30-31°F were recorded at many places on 5 June and during the period 10-13 June. Many complaints of seedling blight, especially of barley, were received but due to the distribution patterns of the injury frost damage was usually not suspected. However, an accumulation of evidence indicated that it was always in the early-sown fields and fields where there were slight depressions that the most damage occurred. Presumably more rapid germination had occurred in these fields and because they were more advanced they were hardest hit by frost. At Brandon varietial differences in susceptibility to frost were noted. Damage to barley varied from the appearance of white band across the uppermost leaf to death of all above ground parts. Further frost damage occurrred near the United States border on 23 June, on which date Winnipeg had a record low of 33.8°F. The drought continued through to 27 June. Between 28 June and 4 July there were 4.73 inches of rain at Winnipeg and rain was fairly widespread in the province. The fields of frost-damaged barley, which had made little growth since the first frost, now showed a rapid recovery. After 4 July the weather was about normal with a tendency to become drier than usual as the season advanced.

The patchy germination was a factor leading to other troubles later in the season. For example, several reports from Sask. noted that 10 per cent or more of the oat plants were leaning badly or were flat on the ground though they showed no signs of wilting. These plants were characterized by very short crown roots and it was suggested that they were living on their seminal roots. Shallow seeding, soil drifting, and drought were probably responsible.

Another condition in which the stem was bent 1-2 inches above the second node was fairly common, usually in wheat. The condition, known as "knuckle joint", is said to be due to wind or heavy rain 1-10 days after heading (H.A.H. Wallace).

In s.w. Ont. the general weather picture was similar to that of 1957. Comparatively dry and warm weather in early April was followed by much cooler weather at the end of that month and during mucy of May. The average monthly temperatures were below normal for the entire summer. Frequent rain showers in the fruit and vegetable growing areas produced lush growth for most of the growing season.

Favorable conditions permitted the early planting and successful establishment of early vegetable crops. Big vein of lettuce was observed for the first time in the district. The comparatively cool spring growing season favored the expression of symptoms.

Several crops, particularly in Essex Co., suffered from one of the most severe and prolonged aphid infestations on record. The potato, melon and green peach aphids were among those most prevalent on vegetable crops. The prevailing low temperatures markedly reduced the effectiveness of aphicides. As a result of the high aphid activity tobacco and horticultural crops such as tomato, pepper, cucurbits, potato and lettuce became infected with one or more viruses. The damage resulting depended on the number and type of viruses involved and the time of infection.

Late blight appeared in a few unsprayed potato and tomato fields lying close to Lake Erie during Aug. and Sept. Although weather conditions were conducive to the spread and development of late blight, it was held in check by an adequate spray program. It was obvious from the location of the initial infections that spores were being blown in from diseased fields in Ohio (C.D. McKeen).

Weather conditions in s.w. Que. were extremely favorable for plant diseases in 1957. The spring was cool and humid and the humid conditions prevailed throughout the summer favoring the development of such diseases as late blight of potatoes and pea root rot.

Hailstorms in different areas caused varying amounts of damage to fruit, cereal and vegetable crops. An intense 30-minute storm with hailstones up to one inch in diameter occurred in the Rougemont apple growing district and caused losses of 75 per cent in one orchard and an average 50 per cent loss over a square-mile area. Apples were not only bruised but were cracked and torn and trees were partially defoliated. Corn and tomato fields also suffered severe damage.

Conditions were extremely favorable for apple scab in the spring. Mature ascospores were observed in 10 per cent of the perithecia examined on 10 April. Delayed development of the trees permitted them to escape possible infection periods of 21-22 and 28-29 April. A light infection occurred 3 May and the first heavy one 7-9 May. Nine infection periods occurred between 3 May and 25-26 June (L. Cinq-Mars).

In e. Que. precipitation was high and temperatures relatively low in June. These conditions retarded the development of fruit trees, small fruits and vegetables. During July and Aug. weather conditions worsened; temperatures remained below normal and rainfall was double the normal precipitation, amounting to 13.44 inches for the two months at Ste. Anne de la Pocatiere. This abnormal weather resulted in poor growing conditions

and favored disease development. Delayed flowering of apple trees, strawberries and raspberries was recorded in Bellechasse, Montmorency and Quebec counties. In the same counties ripening of strawberries was uneven and a high percentage of water in the fruits rendered them susceptible to Botrytis and Rhizopus rots. The development of gangrene of strawberries seemed also to be favored in the Charlesbourg and Orleans Island regions. Fusarium wilt of raspberry was severe in fields where drainage was poor, and spur blight was prevalent. Apple scab was extremely severe in unsprayed orchards on both the north and south shores of the St. Lawrence. Soft rot, caused by Erwinia carotovora, caused losses in Aug. in lettuce and early cabbage. Late blight was severe on tomatoes from mid-Aug. to mid-Sept. After mid-Sept. weather conditions returned to normal and the harvesting of fruits and vegetables was satisfactorily accomplished (L.J. Coulombe).

Late blight made its first appearance in Que. on 21 July in Chateauguay Co. This was 10 days later than in 1957. Between this date and the end of July scattered traces of the disease were found in the lower St. Lawrence district and in Portneuf, Chicoutimi, l'Assomption, Nicolet and Bonaventure counties. Weather conditions in Que. during July were favorable for the spread of blight. Temperatures were generally below normal in the northern and above normal in the southern parts of the province. Rainfall was much in excess of normal throughout the province, being 20-50 per cent more in the Saguenay and Gatineau regions and from 25-100 per cent more in the St. Lawrence Valley and s.e. Que.

Conditions remained favorable for the spread and development of late blight throughout Aug. It was generally cool, cloudy and wet. Rainfall, as in July, was far above normal and east of Quebec City it was more than double the normal amount for Aug. Later blight progressed rapidly and by 23 Aug. many fields in Isle Jesus were 75-90 per cent infected and tuber rot was also observed. All fields in the Eastern Townships were infected and farmers had great difficulty in keeping the disease in check. Similar conditions prevailed in several other districts.

Spread of blight continued in Sept. and by the end of the month unsprayed fields at Ste. Anne de la Pocatiere were practically defoliated. The variety Keswick was severely attached in Matapedia and Portneuf counties. Reports from potato insectors indicated that tuber rot was slight in comparison to foliage infection. Tuber rot was more severe in Matane and Rimouski where the disease appeared later. The greater use of vine killers in the lower St. Lawrence and Lake St. John districts probably reduced the incidence of tuber rot.

The abnormally high rainfall during the summer of 1958 favored potato diseases such as leak, common scab and black leg. Leak was particularly severe in loamy soil at Ste. Anne de la Pocatiere and common scab was severe in many portions of the same soil. Rhizoctonia and black leg were prevalent on stalks. Ring rot symptoms were much less prevalent in loamy than in sandy soil. The variety Teton, which was apparently free of leak on sandy soil at digging time, was severely affected after a week in storage. Black dot was not observed in 1958 (H. Genereux).

Nearly six inches of rain and six feet of snow fell during Jan., Feb. and March at Fredericton, N.B. A light snow cover persisted all winter and no extremes of cold were experienced. Consequently, most plants wintered well. Seeding operations began the first week in May which is about average for that locality. Approximately ten inches of rain fell during the latter part of May and June and July. During this period the weather was cool and most plants were retarded in growth.

Ascospores of the apple scab fungus formed early and abundantly and were partially ready for discharge the last week in April. The first spore discharge occurred 5 May and after that date only three more slight to moderate discharges occurred. Scab was severe in the St. John River valley except in adequately sprayed orchards. A series of frosty nights occurred during early June partially or completely destroying many ten ornamentals, tomatoes and strawberries. Continued cool and rainy weather during Aug. and Sept. delayed the ripening and harvesting of all crops by as much as two weeks. The prevailing weather favored the development of cucumber scab and late blight of tomatoes and potatoes resulting, in some instances, in considerable losses. The season was favorable for the development of bacterial ring rot of potatoes and its identification in the field. A relatively dry, frost-free period during the early weeks of Oct. permitted the harvesting of an average potato and a small apple crop (J.L. Howatt).

The July-Sept. period in 1958 was one of the wettest in 37 years on P.E.I. The rainfall for the period was 14.23 inches and was 3.77 inches greater than the 1922-1958 mean.

Late blight appeared earlier than usual. The mean relative humidity for the week beginning 8 July was 84.7, and 1.70 inches of rain fell. An additional inch fell the following week. Infected cull piles were found at Albany, Freetown and Milton on 15 July, and on 16 July the disease was observed in two fields at Uigg, its earliest field appearance in many

years. Thereafter it appeared throughout the province and an epiphytotic developed. Some inadequately sprayed fields were destroyed while the tubers were still below grade size and were consequently not harvested. Ohter fields were severely defoliated. The defoliation was reflected in reduced yields and further reductions were caused by late blight tuber rot. On the other hand, a well-planned spray program followed by the application of a top killer resulted in high yields of healthy tubers. The weather that favored the disease was also favorable for potato production (L.C. Callbeck).

The winter of 1957-58 in N.S. was one with little snow cover. Precipitation remained average and temperatures were above average. Soil moisture was favorable in the spring but was in deficit in July. Spring rains were favorable for fungus infections. Apple scab and diseases caused by Botrytic built up heavy infections in untreated crops. Late blight appeared early in July and, favored by weather conditions in Aug. and Sept., did much damage in poorly sprayed fields. Pin-point scab was more prevalent than usual by autumn. It was best controlled by a late Bordeaux spray (J. F. Hockey).

Phenological Data, 1958

First anthesis dates for plants recorded at Ottawa in 1958 were somewhat earlier than average for the first part of the year but from mid-May to the end of the season the majority of plants flowered later than usual. This change in the earlier trend in time of flowering was probably due to the cool and wet weather which persisted during the latter part of the growing season. Table 1 shows the number of years of observation on each plant, the dates of first anthesis in 1958 and the departure in days from the average date of previous years (I.J. Bassett).

On the whole, the 1958 season at Winnipeg, Saskatoon and Edmonton was somewhat early. An exception to this general pattern may have been the latter part of the season at Winnipeg where the wheat matured eleven days later than the average date. This may be attributed to relatively cool conditions during the month of July at Winnipeg (R.C. Russell).

Table 1. Phenological Data at Ottawa, Ontario - 1958

Species	No. of Years of Observation	First Dates of Anthesis 1958	No. of Days Departure from Average
Alnus rugosa	7	29/3	7E
Acer saccharinum	23	2/4	8E
Populus tremuloides	18	11/4	6E
Corylus cornuta	6	12/4	3E
Populus grandidentata	7	16/4	6E
Ulmus americana	23	18/4	7E
Acer rubrum	7	18/4	7E
Poa annua	7	21/4	4E
Acer negundo	18	23/4	12E
Betula papyrifera	7	23/4	8E
Prunus pensylvanica	17	13/5	1E
Fagus grandiflora	6	13/5	3E
Fraxinus americana	6	15/5	2L
Celtis occidentalis	6	17/5	5L
* Acer saccharum	23	No flowering on the marker trees this year	
Alopercurus pratensis	7	18/5	4L
Smilacina stellata	17	21/5	1L
Quercus macrocarpa	7	21/5	2E
Pinus sylvestris	23	22/5	5E

Species	No. of Years of Observation	First Dates of Anthesis 1958	No. of Days Departure from Average
Poa pratensis	7	30/5	5E
Anemone canadensis	17	30/5	2L
Rumex acetosella	7	3/6	N
Juglans nigra	7	12/6	4L
Dactylis glomerata	7	17/6	5L
Carya cordiformis	14	18/6	5L
Sambucus nigra	7	19/6	3L
Bromus inermis	17	24/6	5L
Agropyron repens	5	24/6	1E
Phleum pratense	17	30/6	5L
Rhus typhina	12	1/7	5L
Tilia americana	17	7/7	1L
Catalpa ovata	15	17/7	14L
Ambrosia trifida	7	26/7	14L
Cephalanthus occidentalis	13	27/7	8L
Artemisia vulgaris	5	4/8	7L
Ambrosia artemisiifolia	6	7/8	1L
Cassia hebecarpa	11	12/8	8L
Hamamelis virginiana	15	11/9	9E

* No specimens of Acer saccharum flowered in the Arboretum, Canada Experimental Farm, Ottawa in 1958 or in 1957. (I.J. Bassett)

Table 2. Phenological Data at Winnipeg, Saskatoon and Edmonton - 1958

Species	Winnipeg		Saskatoon		Edmonton	
Pulsatilla ludoviciana	--	--	13/4	6E	17/4	12E
Populus tremuloides	5/4	20E	16/4	9E	20/4	6E
Corylus rostrata	--	--	--	--	25/4	6E
Shepherdia canadensis	--	--	--	--	25/4	11E
Phlox hoodii	--	--	30/4	1L	--	--
Acer negundo	14/4	7L	6/5	1E	5/5	2L
Salix petiolaris	--	--	5/5	2E	1/5	4E
Betula papyrifera	--	--	8/5	3E	1/5	6E
Thermopsis rhombifolia	--	--	8/5	3E	--	--
Prunus americana	9/5	5E	--	--	--	--
Amelanchier alnifolia	11/5	7E	11/5	3E	12/5	5E
Prunus pensylvanica	--	--	14/5	5E	13/5	5E
Viola rugulosa	--	--	11/5	10E	23/5	1L
Smilacina stellata	20/5	3E	19/5	5E	26/5	N
Crataegus chrysocarpa	21/5	2E	23/5	5E	21/5	9E
Prunus melanocarpa	22/5	3E	19/5	9E	22/5	6E
Cornus stolonifera	31/5	1E	25/5	5E	26/5	7E
Viburnum lentago	31/5	3E	--	--	--	--
Elaeagnus commutata	--	--	26/5	9E	28/5	8E
Lonicera glaucescens	--	--	26/5	11E	28/5	11E
Hedysarum americanum	--	--	29/5	9E	--	--
Thalictrum turneri	--	--	--	--	29/5	6E
Maianthemum canadense	--	--	--	--	7/6	2L
Achillea lanulosa	--	--	5/6	5E	--	--
Anemone canadensis	3/6	3E	9/6	2E	13/6	10E

Species		Winnipeg		Saskatoon		Edmonton	
Viburnum pubescens		8/6	2E	--	--	--	--
Galium boreale		--	--	5/6	9E	13/6	8E
Rosa alcea		--	--	18/6	2E	2/6	7E
Campanula petiolata		--	--	15/6	7E	9/7	1E
Bromus inermis		21/6	N	12/6	12E	25/6	2E
Gaillardia aristata		--	--	15/6	9E	--	--
Zizia aurea		9/6	2E	--	--	--	--
Spiraea alba		--	--	3/7	2L	--	--
Chrysopsis hirsutissima		--	--	3/7	2L	--	--
Symphoricarpos occidentalis		30/6	2L	3/7	N	7/7	2L
Chamaenerion spicatum		--	--	6/7	3L	10/7	2L
Lactuca pulchella		--	--	12/7	3L	--	--
Phleum pratense		--	--	--	--	10/7	3L
Apocynum androsaemifolium		--	--	--	--	14/7	1L
Solidago missouriensis		--	--	10/7	5E	--	--
Solidago canadensis		--	--	--	--	20/7	1E
Grindelia perennis		--	--	16/7	7E	--	--
Oligoneuron canescens		--	--	19/7	7E	--	--
Aster conspicuus		--	--	--	--	25/7	1L
Aster ericoides		--	--	27/7	2E	--	--
Aster laevis		--	--	29/7	N	25/7	5E
Wheat:	sown	25/4	3E	8/5	7L	29/4	2E
	emerged	11/5	1L	20/5	7L	9/5	2E
	headed	28/6	3E	30/6	2E	12/7	10L
	mature	19/8	11L	9/8	1E	18/8	1E

Some Records of Plant-parasitic Nematodes Encountered in Canada in 1958

A.D. Baker
Nematode Section, Entomology Laboratory, Ottawa

Root-knot Nematodes

The northern root-knot nematode, Meloidogyne hapla Chitwood, 1949, was found attacking roses from London, Ont., and Montreal, Que., and was intercepted on this host on three importations from Denmark, five from Holland, and three from Texas, U.S.A. This species was also found on carrot and lettuce from Chateauguay, Que., on peony from Clarkson, Ont., and twice on peonies from Holland. It was found on multiflora rose bush from Oakville, Ont., and on vetch from the Fraser Valley, B.C. It was intercepted on importations from the United States on tomato from Virginia, twice on strawberry from Maryland, once on strawberry from Indiana, on Lonicera ligustrum from Tennessee, on Viburnum opulus and V. trilobum from Michigan, on Forsythia from New York, and on Japanese barberry from Pennsylvania. The peanut root-knot nematode, Meloidogyne arenaria (Neal, 1890) Chitwood, 1949, was found attacking a shrub, Deutzia gracilis, from Toronto, Ont., on tomato from the Chatham area, Ont., on Japanese barberry from Pickering, Ont., and on Lysimachia sp. from L'Abord à Plouffe, Que. This species was intercepted on catalpa and rose from Holland, on weigelia from New York and Michigan, U.S.A., on rose from Denmark, and on chrysanthemum from Connecticut, U.S.A. The southern root-knot nematode, Meloidogyne incognita (Kofoid & White, 1919) Chitwood, 1949, was found on African violet from Toronto, Ont. (greenhouse), and from British Columbia, on cyclamen from Montreal, Que., and on red clover from Ottawa, Ont. (greenhouse). This species was intercepted on Lonicera ligustrum and on pink weigelia from Tennessee, U.S.A. The cotton root-knot nematode, Meloidogyne incognita var. acrita Chitwood, 1949, was found on tomato from the Chatham area, Ont., and intercepted on sansevieria from Florida, U.S.A. The Javanese root-knot nematode, Meloidogyne javanica (Treub, 1885) Chitwood, 1949, was intercepted on eight occasions on tomato from Georgia, U.S.A., and later was found on this host in the Chatham area, Ont. It is not yet known whether this species can over-winter in Canada.

Root-lesion Nematodes

Pratylenchus penetrans (Cobb, 1917) Filipjev & Stekhoven, 1941, was found on African violet at Ottawa, Ont., on strawberry from Bristol and Charlottetown, P.E.I., and on vetch from the Fraser Valley, B.C. It was intercepted on rose from Holland and in spruce soil from Denmark.

Pratylenchus pratensis (de Man, 1880) Filipjev, 1936, was found on red clover from Renfrew, Pakenham, and Braeside, Ont., and on alfalfa from Gillies Corners, Ont. This species was intercepted on rose roots from Denmark, on pine and other nursery trees from Denmark, in heather root soil from Scotland, and in dahlia packing material from Germany. Pratylenchus minyus Sher & Allen, 1953, was found on red clover from Pakenham, Ont., on alfalfa from Fallowfield, Ont., and on sumac from Stittsville, Ont. Pratylenchus coffeae (Zimmermann, 1898) Filipjev & Stekhoven, 1941, was found in large numbers on an importation of chrysanthemum from Connecticut, U.S.A.

Tylenchids

Tylenchus sachsi Hirschmann, 1952, was intercepted on two occasions on peony from Holland, and Ditylenchus destructor Thorne, 1945, was intercepted on dahlia from Oregon, U.S.A. The latter species was also found on potato from Covehead, P.E.I. Tylenchorhynchus maximus Allen, 1955, was found in pasture sod from Stittsville, Ont., on wild strawberry near Cumberland and Sand Point, Ont., on red clover from South March, Ont., in apple soil from Stittsville, Ont., on flax from Pierce's Corners, Ont., in pasture sod from Tennyson, Ont., and on oats from Laurencetown, N.S. Tylenchorhynchus dubius (Buetschli, 1873) Filipjev, 1936, was found on red clover from Cumberland, Ont., and on strawberry from Bristol, P.E.I. It was intercepted on spruce from Denmark, in strawberry soil from Germany, in wallflower and carnation soil from England, and on Scots pine from Holland, Tylenchorhynchus parvus Allen, 1955, was intercepted in dablia packing material and in soil from Germany, and in chrysanthemum soil from Connecticut, U.S.A. Tylenchorhynchus brevidens Allen, 1955, was found in peony roots and soil at Ottawa, Ont., and was intercepted in dahlia soil from Germany. Tylenchorhynchus macrurus (Goodey, 1932) Filipjev, 1936, was intercepted in raspberry soil from Germany. Psilenchus gracilis Thorne, 1949, was found attacking strawberry from Bristol and Charlottetown, P.E.I., and was intercepted in heather soil from Scotland and in raspberry soil from Germany. Psilenchus hilarulus de Man, 1921, was intercepted in raspberry soil from Germany. Heavy infestations of a grass seed nematode, Anguina agrostis (Steinbuch, 1799) Filipjev, 1936, were found in Agrostis gigantia seed heads from Ottawa.

Hoplolaimids

Rotylenchus robustus (de Man, 1876) Filipjev, 1936, was intercepted on Scots pine from Holland, on spruce from Denmark, and on holly from England. Gottholdsteineria goodeyi (Loof & Oostenbrink, 1958) Andrassy, 1958, was numerous on wild strawberry from Cumberland, Ont., in primrose soil and poplar from North Gower, Ont., and in truck garden soil

from Chateauguay, Que. It was intercepted on fig from Switzerland. Helicotylenchus erythrinae (Zimmermann, 1904) Golden, 1956, was found on oats from Laurencetown, N.S.

Ring Nematodes

Criconemoides lobatum Raski, 1952, was recorded from onion sets from Thetford Marsh, Ont. Hemicycliophora similis Thorne, 1955, was found on peony from Ottawa, Ont.

Aphelenchids

Records of Aphelenchus avenae Bastian, 1865, included red clover from South March, Ont., strawberry from Charlottetown, P.E.I., oat from Laurencetown, N.S., truck garden soil from Chateauguay, Que., and interceptions on strawberry from Germany, on peony roots from Holland, and on chrysanthemum from Connecticut, U.S.A. Records of Aphelenchoides parietinus (Bastian, 1865) Steiner, 1932, included hyacinths from Ottawa and interceptions in spruce soil from Denmark and on heather roots from Scotland.

Dorylaimids

Xiphinema americanum Cobb, 1913, and Longidorus sylphus Thorne, 1939, were found on strawberry from British Columbia. Xiphinema diversicaudatum (Micoletzky, 1927) Thorne, 1939, was intercepted in rose soil and on rose roots from Holland.

Some Nematodes Observed in British Columbia in 1958

J.E. Bosher

Criconemoides annulifer (de Man, 1921) Taylor, 1936, from Ilex aquifolium at Brentwood and Victoria.

Criconemoides spp. Small populations from 20/21 sites in the pole blight areas of the Kootenay Forest Region and from strawberry soil and wild bush land near Bradner.

Ditylenchus dipsaci (Kühn, 1857) Filipjev, 1936. Light infections in two Fraser Valley plantings of the narcissus variety King Alfred and in greenhouse plantings of King Alfred and Sir Watkin at Victoria.

Heterodera trifolii (Goffart, 1932) Oostenbrink, 1949 in soil samples from Ladner and Agassiz.

Longidorus sylphus Thorne, 1939. Trace populations in soil samples from the Experimental Farm, Agassiz.

Meloidogyne incognita (Kofoid & White, 1919) Chitwood, 1949. From imported plants of Saintpaulia ionantha at Cowichan Station.

Meloidogyne hapla Chitwood, 1949 from Shasta daisy, variety Esther Reed, at Saanichton.

Paratylenchus spp. from 5/12 soil samples from strawberry fields at Keating; from raspberry soil at Agassiz; and from Ilex aquifolium at Brentwood and Victoria.

Pratylenchus penetrans (Cobb, 1917) Filipjev & Stekhoven, 1941 was found in 24/48 samples of strawberry from the Fraser Valley and in 8/12 samples from Vancouver Island; in 11/11 samples of apple stock from Vancouver Island and in 2/3 samples imported from Holland. Trace infections were seen in cherry, plum, rose and sea-buckthorn (Hippophaë rhamnoides) imports from Holland. Significant populations encountered in 24/ and light infections in 36/64 samples of raspberry from the Fraser Valley. Trace infections in peony at Saanichton, hyacinth at Bradner and English holly at Nanaimo. It caused severe root injury and early decline in sweet pea at Victoria and Cladastris lutea at Saanichton.

Pratylenchus pratensis (de Man, 1880) Filipjev, 1936 was associated with root rot in two samples of strawberry and was found in raspberry in the Fraser Valley.

Pratylenchus spp. occurred in 5/48 samples of strawberry from the Fraser Valley; in raspberry from the Fraser Valley and Vancouver Island and from English Holly at Brentwood and Victoria.

Nematode Diseases in Southwestern Ontario, 1958

W. B. Mountain

During 1958, perhaps as a result of lower than average soil temperatures in the spring, Pratylenchus penetrans was more active on a wide range of crops than has ever been observed before in southwestern Ontario.

Large acreages of flue tobacco in Norfolk County were affected by P. penetrans and root samples from more than 70 tobacco farms were highly infested. However, the acreage of flue tobacco affected by P. penetrans was much greater than the number of samples would indicate.

P. penetrans was recovered from onion roots from the first time in the Leamington area. Affected plants were stunted, the leaf tips were brown, the leaf was generally chlorotic and the roots were necrotic and occasionally somewhat pink in color. Affected areas in the onion fields occurred as discrete patches of stunted plants, a condition also typical for tobacco.

At least two fields of early tomato plants were affected by P. penetrans. Stunting in one field of celery could also be attributed to this nematode. All three fields were in the Leamington area.

Stunted wheat from fields at Aylmer and Orangeville contained high root populations of P. penetrans as did stunted potato plants from two fields at Aylmer and strawberry plants from one field at Byron. Two apple orchards in the Clarkson area were found to be infested with high root populations of P. penetrans. Leaves of affected apple trees were chlorotic. The trees have practically ceased growing and apple production has declined consistently for several years. One recently planted peach orchard near Blenheim which exhibited poor growth was found to be heavily infested with P. penetrans.

Pratylenchus minyus, a species which requires a much higher soil temperature, was not particularly active in 1958 and was only recovered from one field of stunted wheat near Port Lambton.

Pin nematode (Paratylenchus sp.) adversely affected celery production in the Thedford marsh and in several fields around London. The soil from a wheat field near Orangeville in which growth was very poor contained large numbers of pin nematodes.

The bulb and stem nematode (Ditylenchus dipsaci) has not yet been found in any onion growing area except the Leamington area. In the Leamington marsh the area of infestation appears to have spread only on those farms where growers have disregarded the rotation recommendations and have replanted onions.

I. DISEASES OF CEREAL CROPS

WHEAT

CEPHALOSPORIUM STRIPE (Cephalosporium gramineum) was found in several fields near Perth and Colborne in e. Ont., but not in w. Ont. Symptoms matched G.W. Bruehl's description (Phytopathology 46, 178-180. 1956) (R.J. Baylis). The fungus, DAOM 58856, was the same as isolates from Wash. (R.A. Shoemaker). A similar stripe was observed on Rideau wheat at Perth in 1956 (R.J.B.). Variety G.C. 543 was nearly all striped, heads were small and 10% of plants were dwarfed in plots at Fredericton, N.B. Other varieties had 1% stripe but no dwarfing (T.C. Chiasson).

EYE SPOT (Cercosporella herpotrichoides) which was abundant in 1956 was not of any consequence this year in Simcoe Co., Ont. (R.J.B.).

ERGOT (Claviceps purpurea). Traces were found in 9/139 spring wheat and 1/57 winter wheat fields in s. Alta. (J.S. Horricks). One field/252 had trace infection in Sask. (H.W. Mead). In Man. 6/19 fields examined had trace infection (W. Popp).

ANTHRACNOSE (Colletotrichum graminicola). A culm rot caused lodging in a 1-acre field in Kings Co., N.S. Anthracnose affected 10% of the lodged culms. Gibberella sp. (KP 2365) was present on 5% of the lodged culms (C.O. Gourley).

POWDERY MILDEW (Erysiphe graminis) affected 17/139 spring wheat wheat fields in s. Alta.: 9-tr. 7-sl. 1-sev. Winter wheat was rated 5-tr. 2-sl. 2-mod./57 (J.S.H.). Powdery mildew was quite plentiful and caused some damage to winter and spring wheat at Ottawa, Ont. (R.V. Clark). Several varieties were affected moderately at Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

COMMON ROOT ROT (Helminthosporium sorokinianum and Fusarium spp.) caused about 7% loss in s. Alta. spring wheat. Ratings were 67-tr. 18-sl. 8-mod. 13-sev./139 fields surveyed. Winter wheat loss was about 5% with ratings of 45-tr. 11-sl. 1-mod/ 57 (J.S.H.). See p10 for Sask.

SPOT BLOTCH (Helminthosporium sorokinianum) was tr-sl. on most winter and spring wheat varieties at Ottawa, Ont. (R.V.C.).

LEAF BLIGHT (Helminthosporium tritici-repentis) affected 4/57 winter wheat fields in trace amounts in s. Alta. (J.S.H.).

TAKE-ALL (Ophiobolus graminis) was much less common than usual in s. Alta. A trace was found in 1/139 spring wheat fields (J.S.H.). In Sask. 1/250 fields had a trace. The low incidence of the disease is related to the low rainfall in May and June (B.J. Sallans). Take-all was more severe than usual

and accounted for considerable lodging in some fields in Simcoe Co., Ont. In thin stands which were associated mostly with late planting, considerable head blight was evident (R.J.B.).

STEM RUST (Puccinia graminis) ratings were 36-tr. 5-sl./139 spring wheat fields and 18-tr. 3-sl./57 winter wheat fields in s. Alta. (J.S.H.). In Sask. 4/252 fields had trace amounts. First pustules were observed 29 July (R.C. Russell).

LEAF RUST (Puccinia triticina) was the least serious in s. Alta. since before 1948. Ratings for spring wheat were 21-tr. 3-sl./139 and for winter wheat 13-tr. 1-sl./57 (J.S.H.). Only 25/252 fields were found infected in Sask., and the infections were tr.-sl. The first pustules were found at Saskatoon on 6 Aug. (B.J.S.). Rust was plentiful on some varieties at Ottawa, Ont. (R.V.C.). Infection was late and rust only appeared in minor amounts in most fields in Simcoe Co., Ont. (R.J.B.). Resistant varieties of winter wheat at Fredericton, N.B. had less than 1% leaf rust. The variety Fairfield had a 60% infection (T.C. Chiasson).

SPECKLED LEAF BLOTCH (Septoria spp.) was present as 42-tr. 9-sl./139 spring wheat fields and 13-tr. 1-sl. 1-mod./57 winter wheat fields in s. Alta. (J.S.H.). In Sask. 55/252 fields examined were affected in tr.-sl. amounts. Over-all damage was sl. (H.W.M.). S. nodorum caused sl. infection of Ramsey wheat leaves at Brunkild, Man. A light infection on leaves of durum wheat at Morden, Man. was caused by Septoria avenae f. sp. triticea (T. Johnson). The same fungus caused considerably damage to winter and spring wheat at Ottawa, Ont. (R.V.C.).

GLUME BLOTCH (Septoria nodorum) was sl. in 5/252 fields surveyed in Sask. (H.W.M.).

DWARF BUNT - see special report.

COMMON BUNT (Tilletia caries and T. foetida) was present as tr. in 11/57 winter wheat fields in s. Alta. One field of Jones Fife near Beaver Mines had 25% of the plants affected (J.S.H.). Only 2/267 fields surveyed in Sask. had bunt, and then only in trace amounts (R.C.R.). Only 3/34 fields in Simcoe Co., Ont. showed any evidence of common bunt (R.J.B.).

LOOSE SMUT (Ustilago tritici) ratings for s. Alta. were 4-tr./139 spring wheat fields (J.S.H.). Traces were seen in 9 fields in Sask. and sl. (1-2%)infections were seen in 6/267 surveyed. The affected fields were mostly durum wheats (R.C.R.). Some varieties, Huron in particular, had considerable smut at Ottawa, Ont. (R.V.C.). The incidence of loose smut in Simcoe Co., Ont. was less than the normal trace amounts observed in this area which has been surveyed annually since 1953. (R.J.B.).

BRITTLE DWARF (virus) was observed in tr. amounts in 1/252 fields surveyed in Sask. (H.W.M.).

SEED STAINING resulted from oxidation of sap from green Russian thistle that got on the seed when the wheat was combined. The grower at Pilot Butte, Sask., would probably lose a grade for the dark seed (T.C. Vanterpool).

LEAF SPOT (? Ascochyta sorghi) affected 41/139 spring wheat fields in s. Alta. Ratings were 12-tr. 9-sl. 4-mod. 16-sev. The winter wheat rating was 2-tr./57 (J.S.H.). In C.P.D.S. Ann. Rept. 37:4. 1957 (1958) this or a similar disease was recorded on Chinook wheat in Sask. Specimens sent from Alta. in 1958 had the same yellow leaf spots as the Sask. specimens but the fungus was not mature. The structures present resembled initials of pycnidia. It is hoped that mature material will be found and the fungus identified because the disease caused considerable damage in a year when most other fungus diseases were less serious than usual (R.A.S.).

OATS

ANTHRACNOSE (Colletotrichum graminicola). Some plants in a 2-acre field lodged prematurely in Kings Co., N.S. C. graminicola was present on 10% of the lodged culms. Specimens preserved as KP 2367 (C.O. Gourley).

POWDERY MILDEW (Erysiphe graminis). Traces were found in 2/27 s. Alta. fields surveyed (J.S. Horricks).

COMMON ROOT ROT (Fusarium spp.) was found in trace amounts in 6/27 s. Alta. fields (J.S.H.).

CULM ROT (Gibberella sp.). Gibberella was present on lodged oat culms at Black Rock, N.S. (C.O.G.). The specimen KP 2364 may be significant in relation to common root rot caused by Fusarium (R.A.S.).

LEAF BLOTCH (Helminthosporium avenae) was present as tr. in 6/27 s. Alta. fields surveyed (J.S.H.). In Quebec Seed Board plots ratings were tr.-sl. except for mod. amounts in Ferme Neuve and Bon Conseille (D. Leblond). Fundy oats in plots at St. John's West, Nfld. had blotches on 100% of leaves but damage was not assessed (O.A. Olsen).

CROWN RUST (Puccinia coronata) was sev. at Merrickville, Kemptville and Richmond, Ont. Garry and Rodney were susceptible. Other areas had tr.-sl. infection (R.V.C.). Only traces were present in Quebec Seed Board plots except at Riviere Ouelle where infection was sl.-mod. (D.L.).

STEM RUST (Puccinia graminis f. sp. avenae) was sev. at Appleton, and late in the season, at Ottawa, Ont. Infection was slight in other areas. Clintland and Garry were very susceptible. Race 13A was prevalent (R.V.C.).

SPECKLED LEAF BLOTCH (Septoria avenae) affected 10/27 s. Alta. fields surveyed but in trace amounts (J.S.H.). In Sask. a trace was found in 1/21 fields surveyed (H.W. Mead). Out of 16 fields examined in Man. 5 had a trace of infection and 11 were free from it (G.J. Green, T. Johnson). Plots at Ont. Agr. Coll., Guelph were severely infected by mid-July and many leaves were completely diseased long before harvest. The culms were severely blackened about 6 in. above the ground. Considerable lodging occurred. Some of the panicles were discolored. The grain was light in weight but yield was not taken. A grain sample from Simcoe Co., had 1-2% badly discolored kernels which were found to contain Septoria (S.G. Fushtey). At Ottawa this disease was commonly found and caused considerable damage to nearly all commercial varieties (R.V.C.). Quebec Seed Board plots all had moderate infection except at Ste. Victoire and Notre Dame du Lac where it was severe and Caplan where damage was particularly heavy (D.L.). A 30% infection caused sl. damage in Roberval Co., Que. (L.J. Coulombe). Perithecia were abundant on over-wintered Abegweit stubble at Charlottetown, P.E.I. and were starting to discharge ascospores on 20 June (J.E. Campbell).

LOOSE SMUT (Ustilago avenae) was not found in any of the 25 fields surveyed in Sask. where this disease is usually scarce (R.C. Russell). One field at St. Jean, Que. had 2-5% infection (R. Crete).

COVERED SMUT (Ustilago kolleri) was found as tr. in 1/27 fields surveyed in s. Alta. (J.S.H.). Covered smut was recorded in relatively few (4/25) fields surveyed in Sask. but these all showed from 10 to 50% of the heads smutted. The average damage was unusually high, 3%, which is 3 times the amount for 1957 (R.C.R.).

HALO BLIGHT (Pseudomonas coronafaciens) was present as tr. in 1/21 fields surveyed in Sask. (H.W. Mead). A slight infection of Abegweit caused very slight damage at Charlottetown, P.E.I. (J.E.C.).

STRIPE BLIGHT (Pseudomonas striafaciens) severely affected Rodney seedlings at Morden, Man. The organism was isolated and found to be pathogenic (H.A.H. Wallace, W.A.F. Hagborg).

RED LEAF (Cereal yellow dwarf virus). A trace was found in 1/27 fields surveyed in s. Alta. (J.S.H.). Red leaf was especially troublesome in experimental plots and affected all plants in some areas near Ottawa, Ont. Anaverage of 20% of plants were affected (R.V.C.). A sample from Fredericton, N.B. had 80% infection (T. Chiasson, R.A.S.). In Annapolis Co., N.S., 5-10% of leaves in a 20-acre field were colored red (K.A. Harrison).

BLAST (Non-parasitic) ratings for s. Alta. were: 14-tr., 1-sl./27 fields surveyed (J.S.H.). In n. Alta., ratings were 6-sl./10 (W.P. Skoropad). In Quebec Seed Board plots ratings were sl. to mod. (D.L.). Damage was moderate in a field in Queens Co., P.E.I. Several acres were severely affected. Late seeding may have contributed to the blast development (D.B. Robinson).

LATE HEAT CANKER. Chlorotic banding of cereals is caused by temperatures of 80°-95°F. on clear days in late May (Vanterpool, T.C. Sci. Agr. 29. 334-339. 1949). Unlike this disorder the sample of oats received 7 July, had constrictions at ground level which were like those formed in late heat canker of flax. The damage probably occurred on 26, 27 June when temperatures were 87-95°F. and the sky was cloudless. Thin, late-seeded stands were more susceptible to damage. Damage was sev. at Biggar, and sl. at Indian Head and Weyburn, Sask. (T.C. Vanterpool).

LODGING (Wind and drought) occurred at Indian Head, Weyburn and Carruthers, Sask. The wind caused some soil erosion shortly after germination and dried out the remaining soil. Crown roots were weakened and did not reach sub-soil moisture. Many crown roots died and the lack of support made the plants susceptible to lodging. One field would not mature and was cut for fodder (T.C.V.).

BARLEY

ERGOT (Claviceps purpurea). Two fields were rated tr./62 in s. Alta. (J.S. Horricks). Trace occurred in 1/62 Sask. fields (H.W. Mead). Traces were found in 1 field at Pipestone and 1 at Rapid City, Man./10 examined (W. Popp).

POWDERY MILDEW (Erysiphe graminis) was rated 2-tr. 1-sl./62 in s. Alta. (J.S.H.). Some varieties, including Montcalm and Parkland, were heavily infected at Ottawa, Ont. (R.V. Clark). Quebec Seed Board plots had only trace amounts except at Lennoxville where mildew was moderate (D. Leblond).

STRIPE (Helminthosporium gramineum) was found in trace amounts in 1/62 s. Alta. fields examined (J.S.H.).

SPOT BLOTCH (Helminthosporium sorokinianum) was rated 3-tr. 2-sl./62 fields in s. Alta. (J.S.H.). In Sask. ratings were 3-sl. 4-mod./45 (H.W.M.). Infection was tr. in 1/5 fields examined in Man. (G.J. Green). Some varieties were affected at Ottawa (R.V.C.). Moderate damage was observed at Notre Dame du Lac, Que. (D.L.). Fort barley had tr. infection in Roberval Co., Que. (L.J. Coulombe). Parkland and Montcalm had sl. infection in plots at Charlottetown, P.E.I. (J.E. Campbell). Several varieties at St. John's West, Nfld. had sl. infection (O.A. Olsen).

COMMON ROOT ROT (Helminthosporium sorokinianum and Fusarium spp.). In s. Alta. ratings were 29-tr. 11-sl. 1-sev./62 fields (J.S.H.). Detailed ratings ranged from 0 to 28.3 in Sask. The average rating for the 43 fields examined was 12.9 and the average damage was slight. (B.J. Sallans).

NET BLOTCH (Helminthosporium teres) in s. Alta. affected 40/62 fields. Ratings were 17-tr. 21-sl. 2-mod. (J.S.H.). The average damage in Sask. was moderate. Ratings were 4-sl. 3-mod. 2-sev./45 (H.W.M.). Moderate infection was seen near Fort Whyte and tr.-10% of the leaf area was affected in fields examined between Portage la Prairie and Gladstone, Man. (W.A.F. Hagborg). Net blotch was quite common at Ottawa, Ont. (R.V.C.). Quebec Seed Board plots had sl. infection except at Caplan where disease was mod.-sev. (D.L.).

LEAF RUST (Puccinia hordei) was tr. in the Quebec Seed Board plots except at Maskinonge where it was mod.-sev. (D.L.).

STEM RUST (Puccinia graminis). A trace was found in only 1/62 fields examined in s. Alta. (J.S.H.). Only found on very late plants in plots at Ottawa, Ont. It caused no appreciable damage to the crop (R.V.C.).

SCALD (Rhynchosporium secalis) affected 38/62 s. Alta. fields. Infections were 21-tr. 17-sl. (J.S.H.). In n. Alta. ratings were 4-tr. 20-sl. 15-mod. 5-sev./50 fields surveyed (W.P. Skoropad). In Sask. damage was only a trace. Ratings were 2-tr. 2-sl./45 (H.W.M.). Only winter barley varieties were affected at Ottawa, Ont. and damage was tr.-sl. (R.V.C.).

SPECKLED LEAF BLOTCH (Septoria passerinii) was rated 3-tr. 1-sl./62 fields in s. Alta. (J.S.H.). In Sask. the average infection was tr. Five fields/45 surveyed had tr.-sl. infection (H.W.M.). Seven/9 Man. fields examined were infected; 5-tr. 1-sl. 1-mod. (G.J. Green). All varieties grown at Ottawa, Ont. had tr.-sl. amounts of infection (R.V.C.).

COVERED SMUT (Ustilago hordei) was found in 2/62 s. Alta. fields and then only in tr. amounts (J.S.H.). In Sask. 47 fields were surveyed. Average damage was 0.6%. Ratings were 7-tr. 3-1%, 1-8%, 1-14% which was about the same amount as observed in 1957 (R.C. Russell).

LOOSE SMUT (Ustilago nuda) was tr. on 7/50 n. Alta. fields (W.P.S.) and 6-tr. 1-sl./62 s. Alta. fields (J.S.H.). Combined data including false loose smut (U. nigra) gave average damage of 1% for Sask.; 31/47 fields were infected. Ratings were 16-tr. 15 from 1-6%. In addition one field at Nippawin which was not included in the systematic survey had 20% of the heads smutted with U. nuda (R.C.R.).

BACTERIAL STREAK (Xanthomonas translucens). Two/62 Alta. fields had tr. infections (J.S.H.). A trace was found in 1/45 Sask. fields (H.W. Mead). Mod.-sev. infection was observed on some varieties at Ste. Anne de la Pocatiere, Que. (D.L.).

BARLEY STRIPE MOSIAC (virus) was recorded as tr. in 1/62 s. Alta. fields (J.S.H.). It was also observed on 1% to 5% of the plants of several varieties of barley including Freja, Heines-Hanna and Opal B grown in plots at the Central Experimental Farm, Ottawa. Compana, a two-rowed variety, was more heavily infected, with about 75% of the plants in one plot showing symptoms (J.T. Slykhuis).

STERILITY (Drought). Montcalm barley from Rosetown and Saskatoon, Sask. exhibited bleached, sterile spikelets on the lower half inch of the spike. The disorder was evident just after emergence and caused some loss when the heads broke off in the wind. Drought and severe heat prior to emergence were the probable causes (T.C. Vanterpool).

RYE

ERGOT (Claviceps purpurea). A trace was found in 1/21 fields surveyed in Sask. (H.W. Mead). Four fields were examined in Man. Ratings were tr.-1% at Carman, tr. and 0-10% of heads affected at Swan River and no infection at Roblin (W. Popp). Traces were observed in plots at Ottawa, Ont. (R.V. Clark). A 5% infection occurred in a rust nursery at Ste. Anne de la Pocatiere, Que. (R.O. Lachance). Plots at Charlottetown, P.E.I had trace infection (J.E. Campbell). In York Co., N.B. a 2-acre field that was cleared from forest in 1957 and is isolated from the nearest crop by trees for at least 1/2 mile had 10% of the heads infected with from 1 to 6 sclerotia (R.H. Bagnall).

POWDERY MILDEW (Erysiphe graminis) was observed in sl.-mod. amounts in plots in Ottawa, Ont. (R.V.C.).

COMMON ROOT ROT (Fusarium spp. and Helminthosporium sorokinianum was found in trace amounts in 3/5 s. Alta. fields examined (J.S. Horricks).

STEM RUST (Puccinia graminis). A trace was found in 1/5 s. Alta. fields (J.S.H.).

LEAF RUST (Puccinia secalina). In variety tests at Fredericton, N.B. Imperial rye had the most severe infection, 30%, other varieties had 5% infection but no variety was immune (T.C. Chiasson).

SCALD (Rhynchosporium secalis) was found as tr. in 1/5 fields examined in s. Alta. (J.S.H.).

SPECKLED LEAF BLOTCH (Septoria secalis) was present in slight amounts in 1/5 s. Alta. fields (J.S.H.).

Cereal Diseases in Central Alberta

W.P. Campbell and W.P. Skoropad

Some interesting data were recorded from plots containing several varieties of barley, wheat and oats at 17 locations in northern and central Alberta. At most locations the same varieties were grown, but deletions and additions account for the differences at some stations. Where some pattern of disease severity seemed evident a comment was added. In addition, when the data indicated a severe infection a comparison was made between the varietal reaction.

Seven varieties of barley were grown at most stations. Some had six and some had eight or nine.

Scald (Rhynchosporium secalis) ratings at the various locations were Athabasca, 1-tr./7; Barrhead, 2-tr./7; Edmonton, 1-tr. 1-sl./8; Vegreville 1-tr./8; Wainwright, 0/8; Forestburg, 1-tr./8; Castor, 3-tr./6; Metiskow, 0/6; Acme, 5-tr. 3-sl./8; Evansburg, 1-sl. 2-mod. 4-sev./7; Fallis, 3-sl. 2-mod. 2-sev.7/; Bluffton, 2-sl. 3-mod. 3-sev./8; Bently, 1-mod. 7-sev./8; Cheddarville 7-sev./7; Leslieville, 3-sl. 1-mod. 3-sev./7; Olds 1-tr. 2-sl. 2-mod. 4-sev./9; Airdrie, 1-mod. 7-sev./8.

Scald was severe at the stations west of a line joining Calgary and Edmonton. East of this line scald was not serious in the test plots. Vantage was the least affected by scald and Traill was the second least affected (R.A.S.).

Net Blotch (Helminthosporium teres) ratings were Edmonton, 2-tr. 2-sl. 2-mod. 2-sev./8; Evansburg 2-tr. 4-sl. 1-mod./7; Fallis, 5-tr. 2-sl./7; Bluffton, 4-tr. 3-sl. 1-mod./8; Leslieville 2-tr. 1-sl. 1-mod./7.; Olds, 3-tr. 4-sl. 1-mod./9; Acme, 2-tr. 4-sl. 1-mod./8; other locations had only trace amounts.

The disease distribution was not so clear-cut as with scald but the stations in the western section had more net blotch than the plots in the eastern section (R.A.S.).

Speckled Leaf Blotch (Septoria passerinii) ratings were Edmonton, 7-mod. 1-sev./8; Fallis, 2-tr. 5-sl./7; Vegreville, 7-sl. 1-mod./8; Wainwright, 3-tr. 3-sl./7; Bentley, 2-tr. 4-sl. 2-mod./8; Olds, 5-sl. 1-mod./9; Acme, 2-tr. 3-sl. 3-mod./8. The other stations had 0 to trace amounts.

Root Rot (Helminthosporium sorokinianum and Fusarium spp.) ratings were Barrhead, 3-tr. 1-sl./7; Vegreville 6-tr. 2-sl./8; Wainwright 2-tr. 5-sl./7; Bluffton, 5-tr./8; Forestburg, 4-tr. 1-sl./7; Castor, 3-tr. 2-sl./6; Athabaska, 2-tr. 4-sl. 1-mod./7; Metiskow, 6-sl./6. Root rot was not recorded at the other stations except Bentley, 3-tr./8.

The stations that had the diseased plants were chiefly in the eastern section. This is in contrast to the other barley diseases which were more severe in the western section (R.A.S.).

Bacterial Blight (Xanthomonas translucens) ratings were Evansburg, 2-tr. 4-sl./7; Cheddarville, 1-tr. 3-sl. 1-mod./7; Leslieville, 4-tr. 1-sl. 1-sev./7; Olds, 1-tr. 5-sl. 3-mod./9; Acme, 4-tr. 1-sl./8; Airdrie, 1-tr. 4-sl./8. No bacterial blight was recorded from the other plots. The disease appeared to be confined to the western section.

Diseases were recorded on 3 or more wheat varieties, usually including Selkirk, Saunders and Thatcher, at the 17 stations.

Root Rot (Helminthosporium sorokinianum and Fusarium spp.) ratings were chiefly as traces. Most of the affected plots were east of a line between Calgary and Edmonton as was the case with barley root rot.

Speckled Leaf Blotch (Septoria spp.) ratings were 0 at 3 stations, 0-tr. at 8 stations and tr.-sl. at 6 stations of which 4 were in the eastern section.

Four to seven varieties of oats were tested at each of the 17 stations. Blast and halo blight were found at most stations.

Blast (non-parasitic) was the chief disease. Ratings were 0 at one station, tr. at 2 stations, tr.-sl. at 5 stations and tr.-mod. at 9 stations, 7 of which were in the western section.

Halo Blight (Pseudomonas coronafaciens) was not observed at 2 stations, was 0-tr. at 7 stations and tr.-sl. at 8 stations, 7 of which were in the western section.

Cereal Diseases at Lacombe, Alberta in 1958

W.P. Campbell and W. P. Skoropad

Thirty-seven plots of 6-rowed varieties of barley were surveyed for disease. The diseases, in order of severity, were rated as follows: scald, 2-tr. 6-sl. 16-mod. 8-sev.; net blotch, 6-tr. 14-sl. 11-mod. 5-sev.; speckled leaf blotch, 6-tr. 12-sl. 10-mod. 1-sev.; root rot, 18-tr. 14-sl. 4-mod.; bacterial blight, 3-tr. 6-sl. 3-mod.; loose smut, 11-tr.

Only halo blight and blast were recorded in the25 oat plots examined. Ratings were as follows: halo blight, 11-tr. 9-sl. 4-mod.; blast, 14-tr. 3-sl. 2-mod. 1-sev.

Twenty-five wheat plots were rated as follows: speckled leaf blotch, 7-tr. 14-sl. 3-mod.; powdery mildew, 1-tr. 4-sl. 1-mod.; loose smut, 3-tr. 1 at 2%, and 1 at 5%.

Common Root Rot (Helminthosporium sorokinianum and and Fusarium spp.)

B.J. Sallans

The mean disease rating for 238 fields in Saskatchewan was 9.7 in 1958 compared with 10.7 in 1957. Disease ratings by crop districts 1 to 9 were respectively 8.8, 8.6, 11.3, 10.7, 8.8, 10.3, 11.4, 6.8 and 9.4. In general, the disease was most severe in the brown and dark brown soil zones and less severe in the black soils, particularly those of the eastern and northeastern crop districts.

A survey of the three Prairie Provinces was made on the occurrence of common root rot in wheat. The data were taken in the way described in C.P.D.S. Ann. Rept. 32:1-3. 1952 (1953). Table 1 contains the data classified as to province and as to soil type. The average disease rating (9.2) is 28% higher than the 7.2 rating of 1952, when crop conditions were excellent in virtually all parts of the Prairie Provinces. Manitoba with an excellent wheat crop had a much lower incidence of common root rot (6.4) than did Saskatchewan (9.8) or Alberta (10.4). The difference is partly the result of higher ratings on the brown and dark brown soils of the latter two provinces, but within the black soil zone the Manitoba disease rating is still low in comparison.

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

		Soil Zones			Provincial totals or means
		Brown	Dark brown	Black	
Alberta	No. of fields	8	18	38	64
	Disease rating	16.1	9.9	9.4	10.4
	Crown lesions	39	29	28	29
Saskatchewan	No. of fields	15	61	49	125
	Disease rating	11.2	9.9	9.4	9.8
	Crown lesions	34	33	32	33
Manitoba	No. of fields	--	--	53	53
	Disease rating	--	--	6.4	6.4
	Crown lesions	--	--	31	31
All Provinces	No. of fields	23	79	140	242
	Disease rating	12.9	9.9	8.2	9.2
	Crown lesions	37	32	31	32

As in 1952, wheat in the brown soil zone of Saskatchewan and Alberta was more severely infected than in the other zones. Table 2 bears out the finding of 1952 that disease ratings tend to be higher in wheat in stubble land than in wheat after summerfallow. The data on crown lesions, i.e., lesions at or near the surface of the soil, are similar to those of 1952. This suggests that infections in leaf sheaths and other tissues at the surface level of the soil were about equal in the two years. There is some tendency evident in Tables 1 and 2 for crown lesions and disease ratings to be correlated. Table 3 shows significant correlations between the two sets of data within certain groupings of the fields of wheat surveyed in 1958.

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

		Soil Zones			Total or Means
		Brown	Dark brown	Black	
Fallow	No. of fields	13	55	122	190
	Disease rating	11.6	10.3	8.1	9.0
	Crown lesions	25	32	31	31
Stubble	No. of fields	10	24	18	52
	Disease rating	14.6	9.0	8.9	10.1
	Crown lesions	43	31	29	33

The correlations of Table 3 are significant at the 1% level. Similar correlations were obtained for barley in another survey. These correlations are consistent with the hypothesis that infections at the soil surface (crown lesions) are primary and serve as sources of inoculum for part of the infections which occur on the subcrown internodes.

Table 3. Correlation coefficients between crown lesions and disease ratings in wheat by provinces and by place in the rotation.

		Place in rotation		
		On fallow	On stubble	Fallow and stubble
Alberta	No. of fields	45	16	61
	Correlation coefficient	0.39	0.70	0.51
Saskatchewan	No. of fields	81	26	107
	Correlation coefficient	0.45	0.64	0.50
Manitoba	No. of fields	49	4	53
	Correlation coefficient	0.59	--	0.53
All Provinces	No. of fields	175	46	221
	Correlation coefficient	0.44	0.51	0.46

Manitoba Barley Disease Survey in 1958

H.A.H. Wallace

Forty-six fields in s. Man. were examined. Spot blotch (Helminthosporium sorokinianum) was very light and seen only occasionally. Net blotch (H. teres) was very prevalent in southwest Man. It caused severe leaf damage to the barley plots at Melita. Herta was highly resistant and Garton's partially resistant. Leth. 4362 - 3 and Br. 5746 - 45 appeared to have partial resistance. The prevalence of net blotch in farmers' fields was severe (2), moderate (6), slight (11), trace (10), none (17). In contrast to net blotch, speckled leaf blotch (Septoria passerinii) was mostly confined to southeast Man. Its prevalence in farmers' fields was severe (2), moderate (7), slight (13), trace (7), none (17). Several hybrids in experimental plots appear to have fairly good resistance. Scald (Rhynchosporium secalis) was not seen. Loose smut (Ustilago nuda) infected 10-20% of the heads in 5 fields, 1-9% in 9 fields and was present in trace amounts in 14 fields. Stem rust (Puccinia graminis) and powdery mildew (Erysiphe graminis) were not seen in farmers' fields but were present in slight amounts in the plots at Winnipeg.

The Kelvington Project for the Production of Smut-free Barley Seed

R. C. Russell

In the early months of 1950, machines for applying the hot water treatment to cereal seed and for drying it after treatment were placed at Kelvington, Saskatchewan. They were to be used by local seed growers for the control of loose smut of barley. Seed was treated on a fairly large scale and it was found that smut-free stands of barley could be grown from the treated seed. However, the new crop of grain produced by these clean stands became reinfected to a greater or lesser extent, and it was necessary to use the embryo test to determine how much loose smut, if any, the new crop of seed carried.

In April 1952 a "Seed Control Area", two hundred square miles in extent was created by provincial statute in the Kelvington district. A supervisory committee of three local seed growers was selected to direct the project. According to the terms of the Act, no one within this area was allowed to sow barley carrying more than 0.5% infected embryos, as determined by the embryo test.

This project is still in operation. It is interesting to compare the figures for the average amount of loose smut found in the barley seed samples from this special area, with the figures for those from the remainder of the province. We are indebted to the Plant Products Laboratory in Saskatoon for permission to study the records on which the following figures are based.

Table 4. Average percentage of seed infected with loose smut

Year	Kelvington area	Remainder of Saskatchewan
1953	1.3	1.9
1954	1.8	3.5
1955	0.6	2.0
1956	0.5	1.7
1957	1.7	2.3

In most of these years the difference in the level of infection was quite noticeable but it is evident that the reinfection of smut-free stands by wind-blown spores interferes to some extent with the production of smut-free seed.

Bunt of Winter Wheat in South Alberta

J. S. Horricks and J. E. Moffatt

A form of dwarf bunt was first found in the field in south Alberta in 1955. This form appears atypical and does not produce excessive tillering or stunting of the host plant. The sheath on the spore is not as thick, or the germination period as long, as it is in the form that occurs in Ontario.

In 1957, 296 samples of winter wheat representing the crop years 1951-1957 were obtained from grain elevators. Microscopic examination revealed that 104 of the 296 samples contained bunt spores. Thirty-one % contained spores of Tilletia foetida, 16% spores of T. caries and 5% spores of T. contraversa. The oldest record of T. contraversa found was from a 1954 sample of Jones Fife winter wheat from Glenwood.

Host varietal differences were evident. Fifty-eight % of the Jones Fife samples, 38% of the Kharkov, and 18% of the Yogo samples were infested with various bunt spores. Spores of T. contraversa occurred in 29% of the Jones Fife samples, 3% of the Kharkov and none of the Yogo samples. Jones Fife comprises only about 10% of the winter wheat grown in Alberta.

Field surveys revealed common bunt in four, and dwarf bunt in four, of 99 fields examined in 1957. In 1958, 57 fields were examined. Twelve fields contained some common bunt and 10 fields had some dwarf bunt present.

Cereal Smuts in Western Canada in 1958

W. Popp

Data obtained in the 1958 survey for smut in cereal crops in Manitoba are presented in Table 5. Yield losses based on the percentage of smutted heads in different fields ranged and averaged 0-12 and 1% in wheat, 0-20 and 2.3% in barley, and 0-1 and 0-.03% in oats.

Table 5. Cereal smuts in Manitoba - 1958

Cereal	Smut	Percent smut	
		Range	Mean
Wheat	Loose	0-12	1.0
	Bunt	-	0
Barley	Loose	0-20	1.9
	Covered	0-5	0.25
	False loose	0-10	0.14
Oats	Loose and Covered	0-1	0.06

Loose smut of wheat was found frequently and abundantly in Lee, infrequently and only in trace amounts in durum varieties, and not at all in Selkirk and Thatcher. This smut is largely under control in the province because of the wide distribution of the highly resistant Selkirk wheat.

Smut in barley was mainly of the floral infecting type (loose smut) and occurred in all varieties. This smut is of particular concern because of the lack of resistance in currently grown varieties and the impracticability of large-scale seed treatment by existing methods.

Oat smut was negligible in amount apparently as a result of the wide distribution of the highly resistant Rodney and Garry oats.

Records of cars of wheat graded "Smutty" by the Western Inspections Branch of the Board of Grain Commissioners indicate that the incidence of bunt of wheat in the 1958 crop is below the average of the past 10-year period (Table 6).

Table 6. Bunt of Wheat in Western Canada

Class of Wheat	Aug. 1, 1957 to July 31, 1958			Aug. 1, 1958 to Oct. 31, 1958		
	Cars inspected	Cars graded "Smutty"	Percentage graded "Smutty"	Cars inspected	Cars graded "Smutty"	Percentage graded "Smutty"
Hard Red Spring	187,842	133	0.07	39,007	18	0.05
Amber Durum	11,616	9	0.08	952	0	0.00
White Spring	210	0	0.00	55	0	0.00
Alta. Red Winter	216	24	11.11	108	1	0.92
Garnet	23	0	0.00	1	0	0.00
Mixed Wheat	123	1	0.81	19	0	0.00
All Classes	200,030	167	0.08	40,142	19	0.05

Dwarf Bunt in Simcoe County, Ontario in 1958

R. J. Baylis

Five townships in Simcoe County were surveyed in mid-July for incidence of dwarf bunt in winter wheat. Dwarf bunt was found in 10/34 fields representing a total of 500 acres surveyed. In general, infestations were in trace amounts at the edges of fields. Two instances of severe (1.0%) rating were found on farms that had a previous record of dwarf bunt, and in the same area near Stayner, as previously noted (C.P.D.S. Ann. Rept. 37:27. 1957 (1958)). In one of the fields rated severe, dwarf bunt was observed throughout the 6-acre stand of a heavily awned type of wheat which possibly was Dawson's Golden Chaff or Dawbul. Dwarf bunt was not observed in the Ottawa Valley.

Bacterial Black Chaff of Wheat

W.A.F. Hagborg

An outbreak of bacterial black chaff caused by Xanthomonas translucens, occurred in demonstration plots of wheat grown by the Plant Science Department, University of Manitoba, for the First International Wheat Genetics Symposium. These plots contained commercially important varieties from all the major wheat producing countries. In an examination of the plots on 2 August, infection which was chiefly on the leaves and less prevalent on the peduncles and glumes ranged from severe to light. Some plots were without infection. Infection was recorded in 110 varieties from 25 countries and absent in the wheats from 15 countries. As disease escape probably occurred among the uninfected plots, the data are of value only to indicate varieties that should be avoided because of high susceptibility. Among the most severely attacked were the following varieties from the countries indicated in parenthesis: Insignia B (Australia), Alfy I (Belgium), 7 G6 x Me k (Bolivia), S2 (Cyprus), Runkers Ehrli (Germany), Koga II (Great Britain) and Restauracao (Portugal).

Agropyron Streak Mosaic on Wheat in Ontario

J.T. Slykhuis and R. J. Baylis

During the summer of 1958, Agropyron streak mosaic (ASM) was common on Agropyron repens in the Ottawa valley, and was also observed near Brighton, Port Hope, Whitby, Guelph, Stratford, and Listowel, Ontario. The same disease was found on a few winter wheat plants in fields near Ottawa, Brighton, and Port Hope.

Natural spread of the virus to wheat was demonstrated. Pots of healthy wheat seedlings were placed in patches of diseased A. repens, or beside naturally diseased wheat for 1 or 2 weeks, then the plants were returned to the greenhouse. Symptoms of the disease developed on the wheat, and the presence of the virus was proved by artificial sap transmission to healthy plants. Although the results of transmission experiments have indicated that the vector is an eriophyid mite, it is still not known which of several species is involved.

In a replicated ro d-row field experiment, Selkirk and Acadia spring wheats were manually inoculated with ASMV. The yield of Selkirk was reduced 25%, and of Acadia 75%. The height of both varieties was reduced about 30%. It therefore appears that ASMV could cause serious damage in wheat if the virus became prevalent.

In many characteristics, including method of spread, the Agropyron streak mosaic virus resembles the wheat streak mosaic virus (WSMV). The spread and continuity of WSMV in Alberta occurs primarily by the migration of infective eriophyid mites from diseased spring wheat stubble to fall-sown

wheat, when wheat fields are planted sufficiently close together. It is, therefore, possible that the ASM disease could become serious in wheat if similar conditions were to occur in Ontario.

In Ontario, the low acreage of spring wheat precludes it as an important source of infective mites. However, an indication of what might happen was found in a field at the Central Experimental Farm, Ottawa. Winter wheat was sown in May 1958 to provide a ground cover in some experimental plots. Many of the plants survived when the plots were cultivated in September. In October, all the surviving plants were found diseased with ASM. If winter wheat had been sown early in the fall adjacent to, or within these plots, it is likely that the disease would have been spread much as WSM spreads under similar conditions in Alberta.

The spread of ASM from Agropyron to fall wheat does occur in Ontario but further study is needed to assess the seriousness of Agropyron streak mosaic in wheat.

Barley Yellow Dwarf and Oat Red Leaf in the Ottawa Area

J.T. Slykhuis, F.J. Zillinsky and A.E. Hannah

Barley yellow dwarf and oat red leaf occurred generally in the Ottawa area in 1958, and affected up to 15% of the plants in some fields. Late-sown crops were usually more heavily infected than earlier crops. In a date of seeding experiment, at least 50% of the oats sown in late June showed symptoms by heading time.

A highly virulent isolate of the virus obtained from timothy was included in an experiment in which Rhopalosiphum padi was used as the vector to infect Clintland and Garry oats, and Montcalm and York barley in field plots The yields of both varieties of oats were reduced by about 75% when infected in the one-leaf stage, 50% when infected in the 4-to 5-leaf stage, and 25% when infected in the shot-blade stage. Similar results were obtained with Montcalm barley, but York was affected less by the isolate of virus used. No reduction in yield resulted from the feeding of non-viruliferous aphids in these experiments.

Ascospore Discharge by Leptosphaeria avenaria f. sp. avenaria in Prince Edward Island in 1958

Carl Willis

Studies on the discharge of ascospores by the speckled leaf blotch pathogen were begun on 28 May 1958, and continued for a 90-day period. Oat stubble from a heavily infected 1957 crop was chosen for the project. Careful observations of the asci were made at frequent intervals to determine the maturity of the ascospores and to detect ascospore discharges. Mature ascospores were first observed on 18 June and discharge took place over the

remainder of the period of examination but with no period of peak discharge being noted. Very little speckled leaf blotch infection was observed in 1958 as compared to 1957.

Cereal Rusts in Canada in 1958

B. Peturson, G.J. Green and D.J. Samborski

The following is a condensation of Report No. 14 issued by the Plant Pathology Section, Canada Dept. of Agriculture Research Laboratory Winnipeg, Man. in January, 1959.

Influence of Weather on Cereal Rust Development

Weather conditions were unfavorable for the development of cereal rusts throughout the Prairie Provinces during most of the summer of 1958. In May, temperatures were slightly above normal but precipitation was from 50 to 100% below normal. Precipitation at Winnipeg for the whole of May was only .42 inches and in many prairie localities even less precipitation was received. During June temperature and precipitation in Sask. and Man. were sub-normal. The deficiencies in temperature ranged from 2 to 6F.° and deficiencies in precipitation ranged from 30 to 70%. In some prairie localities in Sask. and Man. the spring drought came to an end on 28 June, but in many localities the first substantial spring precipitation occurred during the first week in July. June temperatures were generally near normal in Alta. while precipitation was about 30% above normal in the foothills area and about 40" below normal in the eastern parts of the province. The average July temperature in Man. ranged from normal to three degrees below normal; in Sask. the temperatures ranged from 1° above normal to 3° below normal; and in Alta. temperatures were slightly below normal. Above normal pre cipitation across the prairies in July favored the rusts but temperatures were too low for rapid rust development. During the remainder of the crop season temperatures were near normal in Sask. and Man. but much above normal in Alta. Precipitation was from 30 to 50% below normal excepting in a few areas such as Regina, Edmonton and Lethbridge.

Prevalence of Air-borne Rust Inoculum in Western Canada

Northerly winds prevailed over the Great Plains area of the United States and Canada during May, June and early July. As a result of the unfavorable conditions for the northward movement of spores and a smaller than usual amount of cereal rusts in southern areas, the number of air-borne rust spores over Man. and e. Sask. was relatively small. Spore-trap data (Table 7) show that there was much less rust inoculum in the air over the rust area in 1958 than during the two heavy rust years of 1954 and 1955.

Table 7

	May			June			July		
	Winnipeg	Morden	Regina	Winnipeg	Morden	Regina	Winnipeg	Morden	Regina
Stem Rust									
1954	0*	0	0	173	30	436	4,180	44,820	14,590
1955	1	4	1	2	10	4	847	2,929	94
1956	1	1	1	4	4	19	10	37	11
1957	0	0	0	0	0	2	21	53	25
1958	0	0	0	9	3	2	6	104	2
Leaf Rust									
1954	0	2	0	91	19	436	4,865	59,904	114,600
1955	4	12	5	43	70	25	943	4,192	413
1956	0	0	0	1	11	30	57	133	95
1957	0	0	0	5	7	32	99	576	102
1958	0	0	0	0	5	3	12	561	3

* Figures represent the number of rust spores caught on one square inch of vaselined slide exposed in stationary spore traps.

The cereal rusts followed their usual pattern of movement in the Prairie Provinces in 1958, entering first at the s.-e. corner of the region and progressing towards the n.-w. The major spore showers seem to have occurred in a rather small area centering on the Red River Valley in Man. The large acreage of resistant Selkirk wheat and Rodney and Garry oats in that area helped to prevent a significant increase of the rusts and probably provided some protection for the more susceptible varieties grown farther west.

Evidently a secondary rust movement from s.-w. Alta. northwards and eastwards occurred later in the season. Wheat leaf rust race identifications show that the races prevalent in s.-w. Alta. were different than those occurring on the eastern prairies. Similarly the distribution of wheat stem rust races is different in Alta. than in Man. and Sask. The predominance of race 11 in Alta. coincides with the predominance of this race in the Washington-Oregon-Idaho area where a severe stem rust epiphytotic occurred in 1958.

Leaf Rust of Wheat

Wheat leaf rust was the most common cereal rust in Western Canada in 1958 but it caused only small or insignificant over-all losses. Leaf rust was first observed in Man. on 2 July, the same date as last year, and somewhat later than usual. Its development was restricted by the large acreage sown to the moderately resistant Selkirk wheat. Heaviest infections were found in fields east of a north-easterly line running through Killarney and Gladstone in Man. Late in the season susceptible varieties east of this line were severely infected and some late fields of Selkirk showed infections ranging up to 70%, the most severe infections ever observed on that variety. The severity of infection diminished to the north and west. In Sask. little rust development occurred. However, leaf rust was present throughout most of that province in trace to slight amounts. In s. Alta. leaf rust was first observed on 26 June on irrigated soft wheat and by 8 Aug. infection was general. Soft wheats were heavily infected. In c. and n. Alta. only traces of leaf rust occurred.

Stem Rust of Wheat

The distribution of wheat stem rust was similar to that of wheat leaf rust, but infections were much less severe and damage was negligible. Stem rust was first found in Man. on 17 July, five days later than last year, and considerably later than usual. By the end of the season the small amount of susceptible wheat in the area most severely affected by rust had infection ranging up to 60%. However, nearly all the common wheat in Man. was Selkirk and this variety was virtually free from stem rust throughout the season. Most of the durum wheat was Ramsey which had infections ranging up to 10% by the end of the season. Preliminary reports indicate that stem rust was scarce in Sask. It was not found in s. Alta. until Aug. 6 and did not develop in time to cause losses.

Stem Rust of Oats

The distribution of stem rust of oats was the same as that of stem rust of wheat in Man. It extended into the extreme eastern part of Sask., but was not found in other parts of that province or in Alta. Oat stem rust was first observed on 31 July, six days later than last year and much later than usual. Although it was common on susceptible wild oats in s.-e. Man. in early Aug., infections were scarce on cultivated oats. By the end of the season, however, some late fields of cultivated oats had moderate infections.

Crown Rust of Oats

Crown rust of oats was first found in Man. on 24 July, nine days later than last year. It spread very slowly. In the southern and eastern part of the Red River Valley it reached a maximum intensity by the end of August of from 1 to 5% on wild oats, and only trace amounts of Rodney and Garry oats,

which comprised about 90% of the Man. oat acreage. In w. and n. Man. crown rust occurred in trace amounts only and it probably extended as occasional infections into s.-e. Sask. Crown rust was not reported in Sask. and Alta.

Other Cereal Rusts

A trace of leaf rust of barley occurred in the Red River Valley. A light infection of leaf rust of rye, averaging about 10%, was present on rye in late sown rust nurseries at Morden and Brandon in Man. In commercial rye fields only trace amounts were present. Occasional pustules of stem rust were observed on rye in s. Man. These rusts were not found in the other two Prairie Provinces.

Losses from the Cereal Rusts in 1958

Rust losses were unimportant in 1958, although some late fields of Selkirk may have suffered some damage from leaf rust and the few fields of susceptible varieties probably were damaged by stem rust. In Sask. rust losses were negligible. Some losses from leaf rust may have occurred in s. Alta. but rusts caused no damage in central and n. Alta.

Flax Rust

Flax rust was quite scarce in Man. in 1958 and caused little damage. In 1958, about 93% of Manitoba's flax acreage was sown to rust resistant varieties. An intensive survey failed to reveal the presence of rust in fields of resistant varieties. However, in one area in the west central part of the Red River Valley a light infection of rust was found in several fields of Redwing flax. Except for traces of rust in the rust nurseries at Morden, Brandon and Winnipeg this rust was not found elsewhere in the province in 1958. In Sask. much of the flax acreage is sown to rust resistant varieties and flax rust was of little or no importance. A greater percentage of susceptible flax was grown in Alta. than in the other two Prairie Provinces. A slight rust infection occurred in some fields in n. Alta. where Redwing is commonly grown.

Cereal Rusts and Other Diseases in the Rust Nurseries in 1958

The uniform rust nurseries were grown at 33 locations throughout Canada in 1958. The varieties in the nurseries are: Wheat: McMurachy, R.L. 1313; Lee, R.L. 2477; Kenya Farmer, R.L. 2768; Little Club, R.L. 223; Marquis, R.L. 84; Mindum, R.L. 1344; Thatcher, R.L. 1945; Selkirk, R.L. 2769; Redman, R.L. 1834.7; Exchange, R.L. 1803; Frontana, R.L. 2336; Ramsey, Ld. 369; Ld. 368. Oats: Bond, R.L. 1130; Trispernia, R.L. 3; Exeter, R.L. 53; Garry, R.L. 1692.27; Clinton, R.L. 66; Landhafer, R.L. 91; Rodney, R.L. 2123; R.L. 2278. Barley: Montcalm, C.A.N. 1135; Parkland, Br. 3833; Vantage, Br. 1356; Feebar, C.I. 7260. Rye: Prolific. Flax: Bison, Dakota and Raja.

Wheat Stem Rust

In the Prairie Provinces appreciable stem rust developed only in the rust nurseries at Morden and Winnipeg in the Red River Valley of Man. In the eight nurseries grown in the region extending from the western boundary of the Red River Valley to Edmonton in Alta. there was no rust except trace infections at Brandon in s.-w. Man. and at Edmonton. Race identifications show that races 56, 11 and 15 were prevalent at Morden and the severe infections on Little Club, Marquis and Mindum at that location, can be attributed to them. The light infections on Lee, Thatcher, and Redman show that race 15B, although present in the area, was not very prevalent. The varieties Little Club and Marquis were severely attacked at Creston, B.C., mostly by races 11, 10, and 2. The severity of the attack and the presence of race 11 suggest that the source of much of the inoculum at Creston was the destructive stem rust epidemic in n.-e. Oregon, e. Washington, and contiguous sections of Idaho. Stem rust occurred in nearly all the nurseries in Ont. and Que. but the infections were light. The highest reading, 40%, was recorded at Kapuskasing and Kemptville, Ont. The varieties Lee, Thatcher, and Redman were lightly infected indicating that race 15B was uncommon in the east as well as in the west. The 15B resistant variety McMurachy was infected in nearly every nursery in Ont. and Que. These infections were caused mostly by races 48A and 29-1 (Can.). The nurseries in the Maritime Provinces were not infected except for a trace of rust at Kentville, N.S. The common wheat varieties Kenya Farmer and Selkirk and the durum wheat variety Ld 368 were nearly free from rust in all nurseries.

Wheat Leaf Rust

Development of leaf rust in the rust nurseries was similar to that in 1957. The scarcity of leaf rust in the Sask. and Alta. nurseries was due to the dry conditions and a lack of air-borne inoculum. Dry conditions at Brandon resulted in little leaf rust in this nursery.

The varieties Lee and Selkirk illustrate some interesting effects of host selection on the rust population. The increased percentage of rust on Lee in recent years is due to an increased percentage of Lee virulent (Type 4) biotypes in the rust population. Selkirk when first released was highly resistant (0) to most isolates tested and moderately resistant (1+ to 2) to the remainder. At present Selkirk is moderately resistant (1+ to 2) to most isolates and highly resistant to only a small percentage of the isolates tested. That proportion of the rust population capable of even limited sporulation on Selkirk obviously has a selective advantage over that which cannot sporulate

on this variety. A consequence has been an increased percentage of rust on Selkirk without the appearance of highly virulent biotypes. In addition, Selkirk becomes less resistant to leaf rust when the plants are nearly mature and observations on such plants may exaggerate the degree of susceptibility. Exchange and Frontana, which possess mature plant resistance, were highly resistant at all locations.

Oat Stem Rust

Traces of oat stem rust occurred in the nurseries at Morden and Winnipeg in Man. but the other prairie nurseries were free from infection. Infections in eastern Canada were general but light except at Appleton, Ont. The severe infection at Appleton is of great importance because the varieties Garry and Rodney were infected nearly as severely as the very susceptible variety Bond. The severe attack on Garry was caused by the new races 6A and 13A, and on Rodney by races 6A, 7A and 13A. Rust was found on Garry and Rodney at Merrickville, St. Anne de la Pocatiere and L'Assomption. Races 6A and 13A were most frequently isolated from these varieties but race 8A also occurred. The pustules on Garry at Charlottetown were resistant type and resulted from a fairly severe attack which caused 30% infection on other varieties.

Oat Crown Rust

Crown rust infections were quite light or absent at most of the localities in Canada where rust nurseries were located in 1958. No crown rust was found on the oat varieties in the rust nurseries located in B.C., Alta. and Sask. and only trace amounts occurred in the nurseries located in Man. In Ont. heavy crown rust infections averaging from 30 to 50% on susceptible varieties occurred at Ottawa and Merrickville. No crown rust was found on oats at Kapuskasing but trace to slight infections developed at all the other nurseries. In Que., a number of the oat varieties had infections averaging upwards of 60% at L'Assomption and Ste. Anne de la Pocatiere. Crown rust was either very light or did not occur in the other nurseries in Que. No crown rust was found on the rust nursery varieties at three stations, Fredericton, Kentville and Nappan, in the Maritime Provinces. Trace to slight amounts of crown rust occurred in the other nurseries in those provinces. A trace of crown rust occurred on Exeter at Doyles, Newfoundland.

Trispernia, Landhafer and R.L. No. 2278 were the most crown rust resistant oat varieties in nurseries. At the four nurseries where substantial amounts of rust occurred these varieties carried only trace amounts of crown rust.

The Rusts on Barley and Rye

The distribution of stem rust and leaf rust on barley and rye was similar to that of stem rust and leaf rust of wheat. Severe infections of stem rust occurred on all barley varieties including the resistant varieties Parkland, Vantage and Feebar at Creston, B.C., Kemptville, Ont., Merrickville, Ont., and Appleton, Ont. Isolations from barley from these locations demonstrated the presence of rye stem rust. Since rye stem rust is known to be virulent on barley varieties resistant to wheat stem rust much of the infection at these locations can be attributed to it.

Flax Rust

A trace of flax rust occurred on both Bison and Dakota in the nurseries at Brandon, Morden and Winnipeg, in Man. In the Alta. nurseries a trace of rust was found on Bison at Lethbridge; 1% and 5% infections developed on it at Beaverlodge and Lacombe, respectively; but none was found in the nursery at Edmonton. No rust was found on Dakota and Raja in the Alta. nurseries. No rust occurred on any of the varieties at the nurseries in B.C. and in Eastern Canada.

Diseases Other Than Rusts

A summary of the incidence of Erysiphe graminis on wheat and barley, Septoria spp. on wheat, S. passerinii on barley, and the various rusts appears in Table 7. The distribution of mildew on wheat and barley in 1958 was similar to 1957. Wheat was attacked by mildew at Lethbridge, Alta., St. Catharines, Kemptville, and Ottawa in Ont. and Kentville, N.S. Barley was attacked in B.C., Ont. and P.E.I. Septoria spp. were observed on wheat in all provinces except B.C., Sask. and Nfld., but in general infections were light. S. avenae f. sp. avenae occurred on oats in all provinces except the Prairie Provinces. This disease had been reported in the rust nurseries in Man. for the two previous years. The 1958 growing season in Man. was dry and unfavorable to the Septoria diseases and it is not surprising that S. avenae was not present in Man. nurseries. Trace infections by this fungus were observed in farmers fields.

All nurseries were examined also for the incidence of spot blotch (Helminthosporium sorokinianum, net blotch (H. teres) and scald (Rhynchosporium secalis) on barley. Spot blotch was the most common of these diseases in the nurseries; trace infections were observed at Melfort, Sask., Mindemoya and Williamstown, Ont., and Kentville, N.S.; light infections occurred at Merrickville, Ont. and Lennoxville, Que.; an infection of moderate intensity occurred at Kemptville, Ont. Light infection of net blotch occurred at Winnipeg, Man., and Lennoxville, Que. There was a trace of scald at Edmonton and a light infection at Lethbridge.

Table 1. Incidence[1/] of certain pathogenic fungi on wheat, oats, barley and rye at 33 locations in Canada in 1958

Locality	WHEAT				OATS			BARLEY				RYE	
	P. gr. tritici	P. recondita	E. gr. [illegible]s	Septoria spp.	P. gr. avenae	P. cor. avenae	S. avenae	P. graminis	P. hordei	E. graminis	S. passerinii	P. gr. secalis	P. secalina
Saanichton, B.C.	0	2	0	0	2	0	1	0	0	3	0	0	0
Agassiz, B.C.	0	3	0	0	1	0	1	0	3	4	0	1	3
Creston, B.C.	4	4	0	0	0	0	0	4	2	0	0	2	3
Beaverlodge, Alta.	0	0	0	0	0	0	0	0	0	0	0	0	0
Edmonton, Alta.	1	2	0	1	0	0	0	1	0	0	0	0	1
Lethbridge, Alta.	0	1	3	2	0	0	0	0	0	0	0	0	0
Lacombe, Alta.	0	2	0	0	0	0	0	0	0	0	3	0	1
Scott, Sask.	0	0	0	0	0	0	0	0	0	0	0	0	0
Melfort, Sask.	0	t	0	0	0	0	0	0	0	0	1	0	0
Indian Head, Sask.	0	t	0	0	0	0	0	0	0	0	0	0	0
Brandon, Man.	1	2	-	-*	0	1	0	0	0	-	-	1	1
Morden, Man.	4	4	0	2	1	1	0	2	1	0	4	2	4
Winnipeg, Man.	4	4	0	2	1	1	0	1	0	0	4	1	3
Kapuskasing, Ont.	3	3	0	3	2	0	2	0	0	0	4	0	1
St. Catharines, Ont.	1	3	4	0	0	1	1	0	0	4	0	0	3
Kemptville, Ont.	3	4	4	1	2	1	4	2	1	3	0	2	3
Ottawa, Ont.	2	4	2	4	2	3	4	0	2	4	-	1	4
Merrickville, Ont.	2	4	0	0	1	4	2	3	2	1	3	4	4
Mindemoya, Ont.	2	4	0	0	3	3	4	1	2	0	0	1	3
Appleton, Ont.	2	4	0	0	4	2	0	3	2	0	0	2	3
Williamstown, Ont.	1	4	0	3	1	1	4	0	0	1	2	1	3
Macdonald College, Que.	2	4	-	1	1	2	4	1	2	-	-	1	3
Lennoxville, Que.	3	4	0	2	0	0	0	1	0	0	0	3	3
Ste. Anne de la Poc., Que.	1	4	-	3	2	4	4	0	1	-	-	2	2
Normandin, Que.	0	4	0	2	1	0	3	0	0	0	3	0	3
L'Assomption, Que.	1	4	0	3	2	4	-	0	2	0	3	1	4
Fredericton, N.B.	0	2	0	4	1	0	4	1	0	0	2	4	0
Kentville, N.S.	1	2	4	1	0	0	3	1	3	0	0	1	3
Brule, N.S.	0	1	-	1	2	1	2	0	0	0	1	0	0
Knoydart, N.S.	0	0	-	-	0	1	3	0	0	-	-	0	0
Nappan, N.S.	0	3	-	-	0	0	4	0	0	-	-	0	2
Charlottetown, P.E.I.	0	4	0	3	3	2	t	0	2	3	-	1	4
Doyles, Nfld.	0	0	0	0	0	1	-	0	0	0	0	0	0

* A dash signifies that no observation was made.

1/ 1 = trace, 2 = light, 3 = moderate, 4 = heavy.
For the rusts 1 = tr. - 1%, 2 = 2 - 20%, 3 = 25 - 50%, 4 = over 50%

Distribution of Physiologic Races

Puccinia graminis f. sp. tritici

In 1958, 18 races and subraces were identified among 239 isolates of wheat stem rust. These races, with the number of isolates in brackets, are: race 2(2), race 10 (6), race 11 (26); race 11-1 (Can.) (3), race 15 (13), race 15B-1 (Can.) (12), race 15B-1L (Can.) (12), race 15B-4 (Can.) (36), race 29-1 (Can.) (15), race 29-2 (Can.) (1), race 32 (7), race 34 (2), race 36 (1), race 38 (3), race 48A (20), race 56 (77), race 59 (2), and race 87 (1).

The 1958 distribution of physiologic races of wheat stem rust differs little from the 1957 distribution. Race 56 was slightly more prevalent than 15B for the first time since 1949. The most prevalent and important subrace of 15B is 15B-4 (Can.) which was isolated frequently from the durum variety Ramsey in Man. (10 of 27 isolates). Race 11 was about as prevalent as last year but races 29-1 (Can.) and 48A increased slightly. This increase probably was exaggerated by the number of isolates from the selective variety McMurachy. Race 15 was isolated frequently from durum wheat in s. Man. Cultures of race 15 usually produced a completely susceptible reaction on Marquis, but sometines, especially in cool weather, a (2)+ reaction was produced, suggesting a resemblance to race 115. Race 15 has moderate virulence on Yuma.

The widespread cultivation since 1955 of the resistant variety Selkirk seems to have been an important factor contributing to the present stability of the race situation. From 1954 to 1956 the principal feature of the race distribution was the decline in prevalence of race 15B and the increase in prevalence of race 56. Also of interest was the appearance, mostly in 1954 and 1955, of a number of new biotypes or subraces. Some of these subraces such as 15B-3 (Can.) and 29-1 (Can.) appeared, on the basis of greenhouse tests, to threaten Selkirk, but they have not increased in prevalence. Race 15B-3 (Can.), potentially the most important of these races, has not been found in Canada since 1955. Apparently they have little virulence on Selkirk under field conditions usual in Western Canada.

Many isolates (171 of 239) were obtained from susceptible varieties not believed to exert a selective effect on the rust population. These isolates probably provide a more accurate estimate of race distribution (Table 9) than isolates from resistant and hence selective varieties. The data in Table 9 show that race 56 predominated to an even greater extent when only susceptible varieties are considered. A similar result was obtained in 1957 when isolates from susceptible varieties in Man. and Sask. were compared with isolates from all sources. The data from resistant varieties in Table 9 probably exaggerate all prevalence of race 15B-4 (Can.) because a large proportion of the isolates came from the variety Ramsey which is resistant to all other prevalent races. This race probably constituted about nine per cent of the rust population (Table 9). The varieties Kenya Farmer, Mida-McMurachy-Exchange II-47-26, Frontana-K58-Newthatch II-50-17, and Kenya 117A were resistant to all isolates.

Table 9. Number of isolates of different races obtained from resistant varieties, susceptible varieties, and all varieties in Canada in 1958, expressed as per cent

Race	Per cent of isolates from all varieties	Per cent of isolates from susceptible 1/ varieties	Per cent of isolates from resistant 2/ varieties
2	0.8	1.2	-
10	2.5	2.3	3.7
11	10.9	11.1	7.5
11-1	1.2	1.2	1.9
15	5.4	4.7	9.4
15B-1	5.0	4.1	5.7
15B-1L	5.0	5.8	-
15B-4	15.1	9.3	33.9
29-1	6.3	6.4	7.5
29-2	0.4	0.6	-
32	2.9	4.1	1.9
34	0.8	-	1.9
36	0.4	0.6	-
38	1.2	1.7	-
48A	8.4	5.3	18.8
56	32.2	39.8	7.5
59	0.8	1.2	-
87	0.4	0.6	-

1/ Varieties known to be susceptible to most races.
2/ Resistant varieties - Mindum, Ramsey, Golden Ball, unidentified durum wheat varieties, Lee, Thatcher, and McMurachy.

Puccinia recondita

Twelve races of wheat leaf rust were identified in the 1958 physiologic race survey. The races isolated are (number of isolates in brackets): 1(30), 5(10), 9(6), 11(47), 15(94), 28(3), 30(1), 35(12), 58(81), 68(1), 126(15), 140(4). Race 15 was the most prevalent race in Man. but was less abundant e. and w. of this province. Races 1 and 11 were more prevalent to the w. and race 58 was the dominant race in Eastern Canada. This distribution of races is similar to that of 1957.

Puccinia hordei

Twelve collections of barley leaf rust were studied in 1958. The races identified (number of isolations in brackets) are: race 4(8), race 44(4). The collections of race 44 were all made in Man. Race 4 was obtained from P.E.I., N.S. Ont., and B.C. Barley leaf rust is not important in Canada.

Puccinia graminis f. sp. avenae

The 1958 physiologic race survey of oat stem rust yielded 153 isolates which were resolved into 14 races. These races with the number of isolates in brackets are: race 1(8), race 2(14), race 5(4), race 6(13), race 6A(12), race 7(22), race 7A(24), race 8(15), race 8A(2), race 10(10), race 11(5), race 12(1), race 13(6), and race 13A(17).

In 1958, race group 1, 2 and 5, race group 7 and 12, and race group 8, 10 and 11 were about equally prevalent in Canada. In 1958 race 2 was more common and race 7 much less common than in 1957. Race 7A was frequently isolated in Man. where the variety Rodney, which is resistant to all other races found on the prairies, is widely grown. The most important feature of the 1958 survey was the reappearance of races 8A and 13A, first found in 1957, and the occurrence of a new race, 6A. Races 8A and 13A are like other cultures of races 8 and 13 except that they attack Rodney and Garry. Similarly, race 6A differs from other cultures of race 6 because it also attacks Rodney and Garry. It can, therefore, attack all commercial varieties which are dependent on genes, A, B, C, D, and E for their resistance.

Nine of the 12 isolates of race 6A were obtained from different varieties in a naturally infected rust nursery at Appleton, Ont.; the other isolates came from Kemptville, Ont., Ste. Anne de la Pocatiere, Que., and Ste. Anne de Bellevue, Que. Seven cultures of race 13A came from different varieties in the rust nursery at Appleton, Ont., three from different varieties at Merrickville, Ont., one from Kemptville, Ont., five from different varieties at Ste. Anne de la Pocatiere, Que., and one from L'Assomption, Que.

Puccinia coronata f. sp. avenae

In 1958, collections of crown rust were obtained from widely separated localities in Man., Ont., Que. and the Atlantic Provinces. Thirty-three races and subraces of crown rust were isolated from these collections. The races and subraces isolated (with numbers of isolations of each race and subrace given in brackets) were: 201 (1), 201A (3), 201B (2), 202 (1), 202A (3), 203 (4), 205A (1), 209 (6), 209A (6), 209B (1), 210 (1), 210A (10), 211A (11), 212 (2), 212A (2), 213 (1), 216 (9), 228 (1), 231 (1), 235A (1), 237A (1), 239 (3), 239B (1), 240 (2), 240A (2), 264 (4), 274 (21), 275 (1), 279 (5), 280 (4), 284 (1), 284A (1) and 293 (3).

Races pathogenic to Victoria (213, 216, 264, 275 and 279) comprised 35.6% of all isolates. The Landhafer races (264 and 293) comprised 6% of all isolates. These two groups of races were slightly less prevalent than last year but much more prevalent than they were prior to 1957.

Five isolates of races 235A and 280 were identified. These two races are of special interest because they are highly pathogenic to Ceirch du Bach, one of the few sources of resistance to the Victoria and Landhafer races. Sixty % of the isolates from Que. and the Maritime Provinces, 83% from Ont. and 88% from Man. were pathogenic to Garry oats. Thirty-five %, 67% and 75% of the isolates from Que. and the Maritimes, Ont. and Man. respectively, were pathogenic to Rodney.

Melampsora lini

Besides the collections obtained at the Experimental Stations in Man. several collections of flax rust were obtained in the only area in the province where flax rust was found in farm fields in 1958. A few flax rust collections were also received from six localities in Alta. No flax rust was received from B.C., Sask. and Eastern Canada. From the collections obtained the following six physiologic races (number of isolates of each race in brackets) were isolated: 1(6), 166(2), 180(6), 210(3), 238(1) and 242(1). These races have been isolated frequently in Canada in previous years and are of no particular importance as they cannot attack the predominant rust resistant varieties Marine, Redwood, Raja and Sheyenne.

II. DISEASE OF FORAGE AND OTHER FIELD CROPS

A. FORAGE LEGUMES

ALFALFA

Alfalfa Diseases in British Columbia in 1958

E.J. Hawn

Alfalfa stands in the Waldo, Cranbrook, Kootenay, Kamloops, Salmon Arm, and Armstrong districts of British Columbia were examined for disease in September.

Bacterial Wilt (Corynebacterium insidiosum) was moderate to severe in the older stands in the Jaffray, Creston, Kelowna, Falkland, Monte Lake, Kamloops, Chase, and Salmon Arm districts.

Crown Bud Rot (Rhizoctonia solani, Fusarium roseum, Ascochyta imperfecta) was moderate to severe in stands over one year old at Jaffray, Creston, Kelowna, and Kamloops.

Witches' Broom (virus) was present and moderate to severe in intensity at Monte Lake, Chase, and at Kamloops.

Boron deficiency symptoms were observed in the Salmon Arm area in a first year stand of alfalfa at the Experimental Substation at Creston.

Alfalfa Stem Nematode in Southern Alberta

E.J. Hawn

For the first time since 1950 the alfalfa stem nematode (Ditylenchus dipsaci Kühn) has been found in alfalfa test plots at the Lethbridge Experimental Farm. Microscopic examination of infested crown buds and shoots has shown the pest to be present in large numbers and in all stages of development. Patches of severely infested Grimm plants have been found in one- and two-year-old plots. However, spot checks made on stands in the main alfalfa-growing areas in southern Alberta have failed to detect the disease.

Other Observations

BLACK STEM (Ascochyta imperfecta) ratings in s. Alta. were 4-tr., 5-sl., 1-mod./33 fields (E.J. Hawn). In central Alta. 7/12 fields had tr.-sl. infections (N. Colotelo). This disease developed slowly in Sask. during June and July. All 55 fields examined were affected. The average damage was moderate. Severe infections were recorded at Swift Current and Snowden in September (H.W. Mead). Hay fields in s.-w. Man. had tr.-mod. infections (W.C. McDonald).

DOWNY MILDEW (Peronospora aestivalis) occurred in traces in 10/33 s. Alta. fields (E.J.H.). In Sask. 8/55 fields examined were infected and damage was slight. There seemed to be little difference in susceptibility between varieties grown in infected plots at Snowden (H.W.M.). Infection was tr.-sl. in a few hay fields in s.-w. Man. (W.C. McD.).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii). Only traces were found in 2/12 central Alta. fields (N.C.). Average damage was slight, much less than in previous years in Sask. Only 8/55 fields were affected (H.W.M.). Light to severe infections were found in second crop hay fields in s.-w. Man. (W.C. McD.). Severe infection was noted in plots at Riviere Ouelle, Que. (D. Leblond).

COMMON LEAF SPOT (Pseudopeziza medicaginis) ratings were 20-tr. 3-sl./33 s. Alta. fields (E.J. Hawn). Traces occurred in 4/12 fields examined in central Alta. (N.C.). Average damage in Sask. was moderate. This disease developed slowly during dry weather in June and July, but 32/55 fields were affected (H.W.H.). Infection in s.-w. Man. ranged from tr. to mod. (W.C. McD.). Slight infection was observed in Queens County, P.E.I. (J.E. Campbell). Several varieties had slight infections at Colinet, Nfld. (O.A. Olsen).

PSEUDOPLEA LEAF SPOT (Pseudoplea trifolii) infections were general in s.-w. Man. One field near Swan Lake had a severe infection but others were tr.-sl. (W.C. McD.).

CROWN BUD ROT (Rhizoctonia solani, Fusarium roseum and Ascochyta imperfecta) caused an estimated 30% reduction in yield in s. Alta. Ratings were 5-tr. 14-sl. 7-mod. 1-sev./33 (E.J.H.).

STAGONOSPORA LEAF SPOT (Stagonospora meliloti). Slight infections were noted in 2/33 fields in s. Alta. (E.J.H.). One hay field near Swan Lake, Man. had mod. infection (W.C.McD.).

LEAF SPOT (Stemphylium botryosum) caused slight damage. Ten/55 fields were affected in Sask. Variety tests at Indian Head showed little difference in susceptibility between varieties (H.W.M.). Trace amounts were found in a few fields in s.-w. Man. (W.C. McD.). At Colinet, Nfld. several varieties were slightly damaged (O.A.O.).

CROWN ROT (low-temperature basidiomycete). A trace amount was found in 1/12 fields in central Alta. (N.C.). Damage was slight in plots at Snowden, Sask. Some varieties had some resistance and Ladak was the hardiest (H.W.M.).

BACTERIAL WILT (Corynebacterium insidiosum) caused an estimated loss in yield of 15% in s. Alta. Ratings were 2-tr., 1-sl. 5-mod. 6-sev./33 fields (E.J.H.). Damage was slight in Sask. where only 6/55 fields were affected (H.W.M.). Near Dresden, Ont. a 50-acre field of DuPuits alfalfa grown for dehydration had the yield reduced 50% at the fourth cutting. Wet weather following the third cutting contributed to the spread of the disease. An adjacent field of wilt-resistant Vernal alfalfa was not affected by this disease and for the first time since the fields were sown two years ago produced a much greater tonnage per acre at the fourth cutting than DuPuits (R.W. Walsh).

MOSAIC (virus) infections were tr.-sl. in s.-w. Man. (W.C. McD.).

BORON DEFICIENCY was general in young plants at Prince George, B.C. (H.N.W. Toms). It was observed in one plot at Lethbridge, Alta. (E.J.H.).

WINTER KILLING was slight on the average but 40/55 fields in Sask. were affected. Variety tests at Indian Head revealed some differences in hardiness. Provence was severely damaged (H.W.M.).

FROST AND DROUGHT caused severe damage in limited areas. At White Fox, Sask. large areas in fields were badly stunted and discolored on 1 June following about 6 degrees of frost. The fields also suffered from drought. Recovery was good after rains fell about 12 July (H.W.M.).

COMMON CLOVER

BLACK LEAF STREAK (Cercospora zebrina) occurred in trace amounts at Ste. Foy, Que. (D. Leblond).

SOOTY BLOTCH (Cymadothea trifolii) infection was slight in Queens County, P.E.I. (J.E. Campbell).

POWDERY MILDEW (Erysiphe polygoni) was present in from trace to slight amounts in 2 fields at Brooks, Alta. and in plots at Lethbridge (E.J. Hawn). Seven fields were rated sl.-mod. and five were free in central Alta. (N. Colotelo). The average damage was moderate in Sask. Defoliation resulted but seed yield was not much reduced. Fifteen/18 fields were diseased (H.W. Mead). A slight infection was noted at St. Chrysostome, Que. (R. Crete). Only trace amounts were present in all 8 fields examined near Macdonald College, Que. The occasional individual plant had mod-sev. infection (R.H. Estey). In Queens County, P.E.I. a light infection was centered in a low section of a field (J.E.C.).

NORTHERN ANTHRACNOSE (Kabatiella caulivora). Infection was rated sl. in 7/12 fields in central Alta. (N.C.).

LEAF SPOT (Pseudopeziza trifolii) infection was sev. at St. Clement, Que. on alsike clover (D.L.).

LEAF SPOT (Stemphylium sarcinaeforme) caused moderate defoliation and the average damage was moderate although the disease developed much later in the season than in previous years. All 18/18 fields surveyed in Sask. were diseased (H.W.M.). Leaf spot became unusually severe in the dense stands of two red clover fields near Macdonald College, Que. during the latter part of October (R.H.E.). A light infection caused slight damage at Upton, P.E.I. (J.E.C.).

RUST (Uromyces trifolii) infection was general at Upton, P.E.I. but damage was slight (J.E.C.).

BACTERIAL BLIGHT (Pseudomonas syringae). A trace was found at Upton, P.E.I. however the damage was negligible (J.E.C.).

RED CLOVER VEIN MOSAIC (virus) was found on red clover at Upton, P.E.I. Damage was negligible (J.E.C.).

PHYLLODY (? virus). Alsike plants growing close to strawberries affected with greenpetal were severely distorted at Ste. Foy, Que. (D.L.). Alsike and white clover at Kentville, Woodville and Berwick, N.S. were affected by phyllody and did not produce seed (C.O. Gourley).

WINTER INJURY. Some field plots of spaced red clover plants were completely destroyed at Macdonald College, Que. It may be noteworthy that although winter injury was generally more severe this year than it has been for the past several years, very little evidence of the fungus Sclerotinia trifoliorum could be found (R.H.E.).

NEMATODES. Red clover roots, with adhering balls of soil, were obtained from widely separated clover fields representing several soil types in the province of Quebec and examined for the presence of nematodes. Plant parasitic and possible plant parasitic species were isolated from every composite sample of rhizosphere soil examined. Although no correlation between nematode species and soil type or geographic region was found, evidence was obtained to indicate that Paratylenchus spp. may be the dominant plant parasitic forms in clover fields that have been established for more than two years in certain areas (R.H.E.).

ROOT ROT (Fusarium spp.) affected 2/22 fields in Sask. and killed several plants in plots at Saskatoon (H.W. Mead).

ROOT ROT (Phytophthora cactorum) infection killed the main stem but secondary stems developed rapidly after rains in July. Four/22 fields surveyed in Sask. were affected; one of these was severely damaged (H.W.M.).

COMMON LEAF SPOT (Pseudopeziza medicaginis) was present in 12/22 fields in Sask. but the disease developed late in the season, caused slight defoliation and the average damage was slight (H.W.M.).

B. OIL-SEED CROPS

FLAX

Flax Diseases in Saskatchewan in 1958

T.C. Vanterpool

The flax acreage in 1958 was 1,496,000 with an estimated yield of 7.0 bu./ac.; only 1 bushel below the yearly average. This good yield was surprising in view of the prolonged drought for the first two-thirds of the growing season, However, the incidence of infectious diseases was one of the lowest on record and no doubt contributed to the recovery in yield. The absence of damage from early fall frosts and the scarcity of boll infections from Polyspora lini and Alternaria linicola are largely responsible for the good quality of 1958 seed.

Blight (Alternaria linicola) was found only in trace amounts in northern fields toward the end of the season. Flax straw was unusually clean. There should be little carry-over of seed-borne A. linicola on 1958 seed.

Rust (Melampsora lini) was not found on field surveys. One moderately affected sample of Redwing was received from Maple Creek.

Seedling Blight (Pellicularia praticola) damage was only slight in areas where moderate infestation is usual.

Browning and Stem Break (Polyspora lini) damage was negligible. A trace of infection was found on immature bolls in the Landis-Biggar and Davidson areas. This suggests that a few seed samples from the 1958 flax crop may be carrying traces of P. lini.

Pasmo (Septoria linicola) was not encountered in central and northern Sask.

Aster Yellows (Callistephus virus I) infection was the lightest since yellows was first observed on flax in 1953. About 20 fields were examined in August in north central Sask. Infections were usually trace to slight, with a few fields free of disease. In one field in which no yellows could be found after a long search, stinkweed showed a trace of infection. The highest rating was one of

0.25% in a weedy field 10 miles north of North Battleford. In comparison, most fields examined in central Sask. where conditions were drier showed 0 to trace. Fields in the same areas showed 25-75% yellows in 1957. In flax fields swept for leafhoppers only an occasional one was caught, where last year one to two dozen would be obtained.

Stinkweed plants infected with aster yellows were collected at Melfort in the northeast before any leafhoppers appeared at Saskatoon. This indicates that the virus can overwinter in stinkweed which is frequently a winter annual.

There probably was a high carry-over of virus inoculum in perennial and winter annual weeds following the 1957 epidemic. The scarcity of the disease in 1958 should probably be attributed to the scarcity of the leafhoppers and their late emergence. In addition, the migrating populations of leafhoppers were late, low in number and carried a low inoculum potential. By the time the leafhoppers were plentiful, the flax crop was ripe or almost ripe.

Heat Canker. Early blighting was slight and less than normal. Several late-sown fields were moderately to severely damaged by the late type of heat canker following the hot clear days of 26 and 27 June.

Chlorosis ("lime-induced"). In mid-June chlorosis was conspicuous on over 50% of a crop grown in newly broken, semi-degraded soil north of Humboldt. The crop was a normal green one month later.

Frost late in May probably reduced stands slightly in some northern areas. Flax matured before the first fall frost.

Base Enlargement (Wind Damage) was conspicuous in the plots at Scott. The 'rocking' by strong winds caused irritation and produced slight enlargement of the stem bases in the region of the soil line (C.P.D.S. Ann. Rept. 25: 31. 1945 (1946).

Zinc Deficiency. A trouble previously referred to as 'lime (plaster) injury' (C.P.D.S. Ann. Rept. 35: 41. 1955 (1956), is very similar to the colored photograph of zinc deficiency symptoms published by E.F. Godoy and O. Bruni (Tercera Reunion de Lino (Pergamino, Argentina): 205. 1950), and is tentatively believed to be caused by the unavailability of zinc in areas in an experimental plot where building plaster was scattered several years ago.

Blighted Bolls. The proportion of small empty bolls to mature bolls was unusually high and conspicuous at harvest.

Apical Injuries. Flax appears to be susceptible to non-pathogenic terminal blights of various kinds. Dr. R.I.H. McKenzie reported severe apical blighting on a flax hybrid grown at Indian Head, but the same hybrid was free of apical blighting when grown at Ottawa.

Flax Diseases in Manitoba in 1958

W.E. Sackston and J.W. Martens

Flax was sown on 592,000 acres in Manitoba in 1958. Spring and early summer drought retarded germination and caused stands to be irregular in development; strong winds blew out the seed in many fields and made reseeding necessary. As a result, much of the crop was extremely late, but because of the unusually favorable fall weather, the crop produced remarkably good yields, averaging about 8.1 bushels per acre.

Diseases did relatively little damage to flax in 1958. Chlorosis was conspicuous in some fields, some 2,4-D damage was seen, traces of frost damage were observed, and some seedling blight was found in a few fields in an early survey made 10 July by the junior author, accompanied by A.L.D. Martin, Cereal Crops Section, of the Winnipeg Laboratory.

Aster yellows, which was very widespread and was responsible for a conservatively estimated loss in flax yield of 15% in 1957, was not significant in 1958. Traces of the disease were found in 23 of 35 fields examined in the early survey and in two subsequent short surveys; 2% of the plants were affected in 1 field.

The main survey, made 20 to 22 August, covered 43 fields, including a number in southeast Sask. No rust (Melampsora lini) was seen, and no Fusarium wilt (F. oxysporum f. lini) was found. A very few fields were later located with a light infection of rust in a special trip made by Dr. B. Peturson to the St. Claude area west of Winnipeg. Traces of pasmo (Septoria linicola) were located in 3 fields. Traces of seedling blight (Rhizoctonia solani, Pythium spp., etc.) were found in 3 fields, and traces of root rot, probably caused by the same organisms and possibly Fusarium spp. as well, were found in 4 fields.

Heat Canker (physiologic) affected traces of the plants in 10 fields, from 1 to 2% in 1 field, and 5% in 1 field. Top discoloration, top dieback, and obvious drought injury, all the result of environmental conditions, were seen in 4 fields.

Boll Blight (physiologic) was found in all but 6 fields, which were too green for the condition to be apparent. Traces to 10% of the bolls were affected in 9, from 15 to 25% in 20, and 25 to 30% in 8 fields.

Yellows (Aster yellows virus, California strain) affected traces of the plants in 7 fields, 2% in 1 field, and damaged 5% of the plants in plots at Portage la Prairie. Aster yellows infection was too erratic in plots at Winnipeg for reliable data to be taken on varietal reactions in tests sown for the purpose.

Other Observations

RUST (Melampsora lini). Thirty-eight fields were examined in s. Alta. Traces of rust were found in two fields. One field of Redwing flax was severely infected (J.S. Horricks). Rust was the only disease recorded in flax variety trials at 10 locations in central Alta. Six varieties were included in most tests but Redwing was the only variety affected, and then only at Olds, Airdrie and Forestburg. The infection was in trace amounts. At Lacombe a trace was found on Redwing in one set of trials. In another test both Redwing and Bison had slight amounts of rust (W.P. Campbell, W.P. Skoropad).

SEEDLING BLIGHT (Rhizoctonia solani) ratings were 6-tr. 2-sl. 1-mod. 3-sev./38 in s. Alta. (J.S.H.).

PASMO (Septoria linicola). Slight natural infection was present in plots at Ottawa, Ont., but the disease was not serious (R.V. Clark).

CHEMICAL INJURY was apparent in 2/38 s. Alta. fields. Damage was slight and was caused by 2,4-dichlorophenoxyacetic acid (J.S.H.).

RAPESEED

Rape Diseases in Saskatchewan in 1958

T.C. Vanterpool

The rape acreage for 1958 was 570,000 which is slightly higher than last year's and the highest to date. Despite the low rainfall for the whole province the yield was about average because 85% of the crop was grown in the northern half of the province where rainfall was higher and evaporation rates were lower. The rape crop was virtually free of infectious diseases, except in northern and northeastern areas where the 'white rust - downy mildew' complex was well distributed. Infections were generally slight, and in just under half the fields examined no disease was found.

White Rust - Downy Mildew Complex. (Albugo candida - Peronospora parasitica). The cause of the hypertrophied inflorescences on rape which have previously been reported as caused by Albugo candida or by Peronospora parasitica (C.P.D.S. Ann. Repts. 32:34; 34:43, 35:42; 36:37; 37:38) has been pretty well elucidated. On other cruciferous crops, A. candida and P. parasitica are each capable of causing enlargements on stems and flowers. A. candida produces larger swellings on the flowers than on the stems while with P. parasitica the opposite is true. Interestingly enough both parasites can produce a combined infection on crucifers, in which case the hypertrophies are said to be larger than with either parasite working alone. In Sask., the most common type of hypertrophy contains oospores of Albugo only. Occasionally the conidial or white-rust stage is also present towards the base of the enlargement. Sometimes the enlargements which contain Albugo oospores have conidiophores and conidia of Peronospora growing

on their surfaces. Repeated examination of the oospores from beneath the conidiophores of Peronospora have revealed only the rough brown oospores of A. candida with their characteristic warts and sinuous ridges. Hypertrophies caused by Peronospora alone have not yet been detected on rape. Work is being continued on this interesting complex. It should be emphasized that notes on A. candida and P. parasitica in previous numbers of the C.P.D.S. need careful re-interpretation.

This disease was the only one of any consequence on rape in 1958. Albugo was solely responsible. The disease caused some concern in the areas between Humboldt and Lake Lenore, around Melfort, Tisdale, and Nipawin in the northeast, and Meadow Lake in the northwest. At points in the northeast, the conidial white-rust stage was often conspicuous on leaves and hypertrophies, while at Meadow Lake in the northwest only a trace of conidial pustules was found. Elsewhere conditions were too dry for white rust development. In one field north of Humboldt the first seeding of rape was killed by frost and was re-sown. Over 15% of the second crop contracted the Albugo enlargements with moderate development of the white rust stage. The heavy infections were invariably on second crop rape. Other rape crops were mostly clean.

Stem Rot (Sclerotinia sclerotiorum) was not encountered. This disease is of no consequence in years of low rainfall.

Leaf, Stem and Pod Spot (Alternaria brassicae) did not appear until the crop was nearing maturity and was of no importance.

Ashen Gray Stem Spotting (caused by an undetermined fungus). In many fields in the Lake Lenore district slight to moderate amounts of a hitherto unobserved stem spotting were found. The spots were ashen gray, sometimes shiny, of all sizes up to three or more inches and encircled the stem. The spots were more numerous toward the base of the stem. Fruit bodies that resembled immature pycnidia were present in many spots. A slow-growing fungus that produced dark, septate mycelium was cultured from the lesions, but it has failed to fruit.

Aster Yellows (Callistephus virus I). Only trace amounts of this disease were found.

Frosts in May were especially damaging to early-sown fields in the northeast, some of which were re-sown. Fall frosts were of no consequence.

SAFFLOWER

LEAF SPOT (Alternaria carthami) was present in trace amounts in 5/15 fields examined in s. Alta. (J.S. Horricks).

RUST (Puccinia carthami) only affected 1/15 s. Alta. fields but the one infestation was severe (J.S.H.). Natural infection in plots at Ottawa, Ont. was slight (R.V. Clark).

ROOT ROT (Rhizoctonia solani) ratings in s. Alta. were 3-tr. 1-sl./15 (J.S.H.).

Diseases of Soybeans in Ontario in 1958

A.A. Hildebrand

In 1958, in southern Ontario, there was no flooding of fields or waterlogging of soils such as occurred during the first half of the growing seasons of 1956 and 1957. In fact, for a considerable period of the summer of 1958, soils tended to be too dry rather than too wet in several areas where soybeans are grown intensively. In consequence, less was heard and seen of parasitic diseases than those of a physiological nature.

Manganese Deficiency was more intensive in its effects and widespread in its occurrence this past season than heretofore observed in some 17 years of close observation of soybeans. Due probably to prolonged periods without rain, the disorder was observed in parts of Kent County where it had never been seen before. For the same reason its effects were more severe in areas in Essex County where it has occurred for years. If, as reported, average bushel-per-acre yield is going to show a reduction this year, an important contributing factor undoubtedly has been manganese deficiency.

Phytophthora Root and Stalk Rot (Phytophthora sp.). This disease, although still causing considerable concern in 1958 was less important economically than in the three preceding years.

Pythium Stalk Rot (Pythium sp.). Late in June and early in July attention was attracted by the upward curling of the upper leaves and the general unthrifty appearance of soybean plants in the laboratory experimental plots and in a number of commercial plantings. Closer examination of affected plants showed the presence of grayish-brown lesions which extended down their stems from the first-node. Concurrently, varieties of dry (field) and snap (garden) beans (Phaseolus vulgaris L.) over a wide area were showing comparable symptoms. Pythium isolates which appeared to be the same were obtained from several different varieties of the two hosts. Greenhouse inoculation experiments have shown that the respective isolates are reciprocally pathogenic. The Pythium involved seems to affect only the stalks of soybeans and in this respect is apparently different from Pythium ultimum Trow which was reported by Hildebrand and Koch in 1952 (Sci. Agr. 32: 574-580) as attacking the roots as well as the stems. The disease, which was more economically important on field and garden beans than on soybeans, is being investigated.

Miscellaneous diseases of minor importance encountered this year include: Stem Canker (Diaporthe phaseolorum var. caulivora), a few years ago the most serious threat to the production of soybeans in Ontario, is now relatively unimportant, the reason being that susceptible varieties have been almost wholly replaced by Harosoy, an escape variety. Brown Stem Rot (Cephalosporium gregatum) is a disease which possibly should not be included

among those of minor importance. It is widespread in its occurrence every year and its effect is to induce premature maturity. Downy Mildew (Peronospora manshurica) showed its usual specificity this year by attacking highly susceptible varieties like Blackhawk and Harley but only lightly infecting Lincoln, Chippewa, and Monroe. Mosaic (Soja virus 1); Bud Blight (virus of tobacco ringspot group); Brown Spot Septoria glycines; Bacterial Blight (Pseudomonas glycinea); and Leaf Spot (Phyllosticta soyaecola) were of sporadic occurrence.

Corn-seed Maggot Injury, although of more or less common occurrence in the district in past years, was noted for the first time this year in the laboratory plots. The injury is mentioned here because of the possibility of mistaking it for a root rot. The maggots penetrate the lower hypocotyl and feed on the internal tissues of the young plants. While the maggots are in situ, the trouble can be accurately diagnosed; but after they leave the plant, diagnosis is more difficult. The injured hypocotyl tissues collapse and die, and the root soon dies also. This is the stage at which an incorrect diagnosis may easily be made for the symptoms resemble those of a root rot.

SUNFLOWER

Sunflower Diseases in Manitoba in 1958

W.E. Sackston and J.W. Martens

Sunflowers were sown on 45,000 acres in Manitoba in 1958. Drought, wind-erosion, and severe frosts in June caused growers to abandon 19,000 acres. Adverse conditions early in the season delayed maturity markedly, but favorable weather in the fall allowed even late fields to mature and produce good seed yields. Average yields on the 26,000 acres harvested were estimated to be 650 pounds or more per acre, for both the oilseed varieties (on 13,000 acres) and large-seeded varieties for confectionery use (13,000 acres).

Sixty-seven fields were examined in the main survey, made 8-11 September in both the central and outlying areas. Mr. John Hildebrand, Co-operative Vegetable Oils, Altona, assisted in locating fields in the central area and took part for two days of the survey, and Dr. E.D. Putt, Morden Experimental Farm, assisted for two days in the outlying areas.

Frost Damage. Sunflower seedlings damaged by frosts in late June were submitted by growers and others in late June and early July. Damage was severe and widespread. The lower leaves were not affected in most cases. Leaves higher along the stem showed scattered necrotic spots. Upper leaves were rugose, chlorotic, distorted, in some samples, and in others with the apical portion killed. The growing point was killed in many plants, which later in the season could be recognized by having from two or three up to five or more stems, arising from basal adventitious buds. The central pith near the growing point was necrotic or collapsed in many plants,

and some stem cracking was present. Most of the affected seedlings submitted were about 10 to 12 inches tall. In some fields scattered plants were affected, in others a significant proportion was frozen, but the plants were left to mature. Many fields were so severely affected that the sunflowers were turned under. Traces of frost damage were seen in 21 fields in the survey; 1 field was moderately affected, and in 2 fields all the plants showed frost injury.

Rust (Puccinia helianthi). Rust was present in 49 of the 67 fields. Traces were found in 27 fields, on the resistant variety Beacon, as well as on Advance and on Mennonite, the large seeded variety grown for confectionery use. From 1 to 10% of the surface of the middle leaves was rusted in 11 fields, from 11 to 25% in 7, from 26 to 50% in 2, and from 50 to 80% in 2 fields. Most of the fields with more than traces of rust were in the central area. The source of inoculum for one isolated field in an outlying area where sunflowers had not previously been grown might have been wild Helianthus annuus plants with rust on them, in an adjacent field.

Actual losses caused by rust were not significant in most fields. It is significant, however, that rust is again increasing the prevalence, and that in a few fields infection was extremely heavy. The situation is particularly serious because of the increasing popularity of the rust-susceptible, large-seeded Mennonite variety. Inoculum will be plentiful in 1959, and if weather conditions are favorable for rust development, an extremely serious outbreak might develop. The breeding program was directed entirely at producing rust resistant sunflowers for edible oil production. A start has now been made at incorporating rust resistance into large-seeded varieties grown for the confectionery trade.

Leaf Mottle (Verticillium albo-atrum). Leaf mottle was present in trace amounts in 27 fields. Up to 10% of the plants were affected in 14 fields, from 11 to 25% in 7, 26 to 50% in 3, and 51 to 75% in 3 fields. The disease was found only in the central area. It was destructive only in a few fields, and in plot areas selected because of heavy infestation of the soil by the pathogen.

Stalk Rot and Premature Ripening (Various causes). Conditions varying from light brown to black discoloration of the stems, in the latter case associated with an internal "black jelly rot", were found in 22 fields. Traces were seen in 12 fields, from 1 to 5% in 8 fields, and 6 to 10% in 2 fields. Microscopic examination of the cortical tissues and pith of some of the darkest stems showed a profusion of microsclerotia of V. albo-atrum, which was also isolated from light brown as well as dark brown stems. Although other causes induce both stalk discoloration and premature ripening, for years a close association has been observed between leaf mottle and later stalk and pith discolorations.

In a few fields, an unfamiliar type of stalk discoloration was observed. Elongate, pale brown stem lesions spread from 2 to 4 inches up and down from the base of dead petioles, and extended from 3/4 to 1 inch around the stem. The lesions appeared to be superficial. Plants of the inbred S37-388 were affected

in a crossing block; the lesions were scarce on Sunrise plants. Fungi isolated from lesioned tissues have not yet been tested for pathogenicity.

Wilt and Root Rot (Sclerotinia sclerotiorum). Traces of Sclerotinia wilt, root rot, and basal stem rot were found in 33 fields. From 1 to 5% of the plants were affected in 4 fields, 6 to 10% in 2 fields, and 25% in 1 field. The disease is not confined to the main sunflower areas.

Head Rot (Rhizopus sp.) Traces of Rhizopus head rot were found in the plots at the Melita Reclamation Station; up to 50% of the plants were affected in patches.

Aster Yellows (Callistephus virus 1) Traces of aster yellows infection were seen in 15 fields. Between 5 and 10% of the plants were affected in 1 field near Carberry. Incidence of aster yellows was so low and erratic that no results were obtained from plot experiments on the disease.

Downy Mildew (Plasmopara halstedii). Downy mildew was light in 1958. Traces of the disease were found in 10 fields. From 1 to 2% of the plants were affected in 4 fields. Affected plants were often in patches in low parts of the fields.

Head Drop (Cause unknown; possibly some due to snout beetle attack). Head drop was more conspicuous than in previous years. Traces of the condition were observed in 22 fields, 1% of the plants were affected in 3 fields, and between 5 and 10% of the plants were affected in 1 field. Field infections of this severity have not been observed previously in Manitoba, although as many as 12% of the plants of one selection were affected in Dr. Putt's breeding nurseries some years ago.

Miscellaneous. Symptoms very similar to those of leaf mottle were seen in 3 fields in the outlying areas, and were very conspicuous in plots at Melita. No vascular discoloration was associated with the condition, and no pathogen was isolated from affected tissues. It was presumably caused by drought. Terminal Distortion and Head Sterility affected a few plants in 1 field. It appeared to be an extreme symptom of frost injury. Powdery Mildew (Erysiphe cichoracearum) was present in trace amounts in 1 field.

Other Observations

ROOT ROT (Rhizoctonia solani) in s. Alta. was rated 2-tr. 1-sl./10 fields examined (J.S. Horricks).

LEAF MOTTLE (Verticillium albo-atrum) was present in 4/10 s. Alta. fields in trace amounts (J.S.H.).

SUGAR BEET

DAMPING OFF (Rhizoctonia solani) was slight in several fields at St. Thomas d'Aquin and moderate in one field at La Presentation, Que. (R. Crete). R. solani in conjunction with Phoma betae and Fusarium sp. caused severe damage to seedlings in hot beds at Barnwell, Alta. Loss was estimated as 80% (J.B. Lebeau).

BLACK ROOT (various fungi) was found in trace to slight amounts in 17/27 s. Alta fields. Fungi involved were Phoma betae, Rhizoctonia solani and Fusarium sp. Pythium sp. was isolated from only two fields (J.B.L.). However, Pythium sp. caused severe damage to small patches in one field at Coalhurst, Alta. during mid-summer. Surveys of beet storage piles in the fall revealed little or no damage to mature beets (J.B.L.).

D. MISCELLANEOUS CROPS

FIELD CORN

ROOT AND STALK ROT (Gibberella zeae) was found in trace amounts in several plots at Macdonald College, Que. (R.H. Estey).

KERNEL MOLD (various fungi). Flint corn was not mature in time for fall harvesting. It was gathered in December, but by this time the scutellum of all the seed was dark and rotted (K.A. Harrison).

MUSTARD

WHITE RUST (Albugo candida) was assessed 2-tr. 3-mod./16 fields in s. Alta. (J.S. Horricks).

ROOT ROT (Rhizoctonia solani) was found in 1/16 s. Alta. fields in trace amounts (J.S.H.).

TOBACCO

Tobacco Diseases

Z.A. Patrick and L.W. Koch

Seedbed Diseases

Blue Mold or Downy Mildew (Peronospora tabacina) was not observed in Ontario or Quebec in 1958. The recommended program for blue mold control (C.P.D.S. Ann. Rept. 34: 95. 1954 (1955)) is still carried on by most growers because it has been found to aid considerably in the control of damping-off diseases.

Damping-off or Bed Rot (Pythium spp. and Rhizoctonia solani) was the most common disorder in seedbeds. In most instances, however, it occurred only in small areas of the bed and did not cause much damage.

Yellow Patch (excessive nutrients) was also very common especially in the burley tobacco area where ground beds are still quite commonly used for growing the tobacco seedlings. The seedlings usually start well, then turn yellow and die. This condition is mainly due to over-fertilization but can also occur from poor drainage in the seedbed or from seeding too soon after steaming the soil.

Field Diseases

Blue Mold (Peronospora tabacina). There were a few outbreaks of blue mold in the field in the Delhi area. Fortunately the environmental conditions following the spore showers 20-25 June were not suitable for the fungus and the disease did not become established and damage was confined to a few necrotic areas on the leaves.

Brown Root Rot (Pratylenchus spp.). Brown root rot has become one of the most serious diseases of burley and flue tobacco. The disease was widespread, occurring in all the tobacco growing areas. It was most severe in light sandy soils following a rye rotation. In many fields where large populations of the root-lesion nematodes were found many of the growers are contemplating soil fumigation as a remedial measure.

Black Root Rot (Thielaviopsis basicola). Most of the tobacco varieties used in Canada are moderately resistant and this disease was confined to low lying parts of the field where, due to poor drainage, the growing conditions are unfavorable for tobacco. The damage due to this disease was negligible.

Soft Rot (Pythium spp.) and Sore Shin (Rhizoctonia spp.). In the early part of the season these diseases caused moderate losses in the new transplants. This was especially serious in 1958 because of the widespread occurrence of the seed corn maggot which, through its feedings on the roots and stalk, provided additional infection courts for these two pathogens.

Frenching (? soil toxins). This disorder was confined to fields where the soil type is marginal and unfavorable for growing tobacco. In such instances the losses can amount to as much as 50% of the crop.

Wildfire and Angular Leaf Spot (Pseudomonas tabaci and P. angulata). These two diseases, which cause large irregular brown and black lesions on the leaves, were found in a number of fields at the end of August. Only one or two leaves were affected on each plant and damage was slight.

A number of tobacco leaf samples which were sent from Kentville, N.S. by Dr. J.F. Hockey also appeared to be affected by these diseases. This could not be definitely established, however, because the tobacco was killed by frost before additional leaf samples could be obtained.

Brown Spot (Alternaria longipes) was especially serious on flue-cured tobacco in 1958. Although this disease is usually confined to maturing tobacco, this year it occurred early and persisted throughout the whole growing season. In many areas the leaves were completely covered with large, circular brown spots and yields and quality were greatly reduced.

Frogeye (Cercospora nicotinae) was also widespread in 1958 and damage in terms of quality and value of the leaf, was moderate.

Weather Fleck (non-parasitic). Although this condition was again widespread in most of the tobacco growing areas of Ontario the damage was only slight. The reduction in severity of the disease appears to be mainly due to the widespread use of the variety Delcrest which has a thicker leaf than the varieties White Gold or Hicks both of which are especially susceptible to this disorder.

Mosaic (virus). Injury from TMV was widespread throughout the burley and flue-cured tobacco growing areas of Ontario and Quebec. Only a few plants in each field were affected, however, and the damage was slight.

Etch (virus). Damage from the etch virus was especially severe on burley tobacco in the Leamington-Harrow areas where many crops were a total loss and were disced under. Some etch was also noted on flue-cured tobacco in this area but the symptoms were very mild. In a survey carried out along the north shore of Lake Erie no cases of etch were found east of the Harrow-Leamington areas of Essex County.

Other Virus Diseases. The 1958 season appeared to be especially favorable for the development and spread of many virus diseases. Of these, ring spot, streak, vein banding, cucumber mosaic and the potato viruses were especially prevalent and caused slight to moderate damage.

Other Observations

CHEMICAL INJURY (Chlordane). Chlordane dust was applied to seedlings to control ants. The leaves became puckered, and distorted and the base of the hypocotyl became enlarged. About 20,000 plants were discarded in s. Ont. (R.W. Walsh).

E. CULTIVATED AND OTHER GRASSES

AGROPYRON REPENS

Mildew (Erysiphe graminis) was present in an orchard in Kings County, N.S. (R.G. Ross).

Culm smut (Ustilago spegazzinii was found at Trout Creek Point, B.C. The disease has been noted for several years and is gradually spreading (G.E. Woolliams).

BROMUS INERMIS

Ergot (Claviceps purpurea) damage was much less than in previous years in Sask. Only 3/12 fields examined were affected and the average damage was trace. The weather was very dry during the time of flowering (H.W.Mead). Trace infections were observed in fields at Deloraine, Roblin and McCreary, Man. Two other fields were disease-free (W. Popp).

Leaf Blotch (Helminthosporium bromi) was recorded from Prince Albert, Sask. (T.C. Vanterpool). One field /12 examined had severe spotting of early growth at Rabbit Lake, Sask. The average damage was slight (H.W.M.).

Selenophoma Leaf Spot (Selenophoma bromigena) was found in trace amounts in the four fields examined in s. Alta. (E.J. Hawn). In Sask. the average damage was slight; 10/12 fields were affected. At Saskatoon, a plot that had been sprinkle irrigated was more severely diseased than the adjoining dry plot (H.W.M.).

DACTYLIS GLOMERATA

Brown Stripe (Passalora graminis). Passalora graminis v. Höhnel was proposed in Zentr. Bakt. Parasitenk., Abt. 2, 60(1): 6. 1923 because Scolicotrichum Kunze in Kunze ✝Schm. Myk. Heft. 1:10. 1817 was based on a misconception. Hughes (Can. J. Botany, 36: 831. 1958) confirmed that Scolicotrichum and its type species S. virescens are nomina confusa, based on a mixture of Diplodia conidia and hairs from the Prunus host (R.A.S.). The disease was generally distributed in plots at Lethbridge, Alta. Ratings were trace to slight (E.J.H.).

ELYMUS

Ergot (Claviceps purpurea) was observed on 80% of the E. arenarius heads in a dune area at Kuyoquot Sound, B.C. (W.R. Orchard).

Powdery Mildew (Erysiphe graminis). E. junceus appears to be quite susceptible to powdery mildew. Infections were noted in 5/8 fields examined in Sask. and the average damage was moderate (H.W.M.).

PHLEUM PRATENSE

Eye Spot (Heterosporium phlei). A heavy infection resulted in leaf spots on the majority of leaves in all 7 fields surveyed near St. Johns, Nfld. (O.A. Olsen).

Stripe Smut (Ustilago striiformis) was noted near Ottawa, Ont. (J.T. Slykhuis, D.B.O. Savile). A discussion of the nomenclature of U. striiformis and the earlier synonym, U. salvei, is available in Pl. Disease Rept. 30: 53-59. 1946 (R.A.S.).

POA

Powdery Mildew (Erysiphe graminis) infection ranged from moderate to severe in several lawns in Saskatoon, Sask. (H.W.M.).

Leaf Spot (Helminthosporium vagans). Plots of Merion and Kentucky blue grass were established at Scott, Alta. in August 1956. In April 1958 the Merion blue grass plot was quite yellow from this disease and Kentucky blue grass was only slightly affected. By August the Merion blue grass had recovered and the sward was strikingly thicker and healthier than that of Kentucky blue grass. The Merion blue grass lawns in Scott, Alta. exhibited the same symptoms as found in the plots early in the season (L.W. Crowle, T.C. Vanterpool). Specimen DAOM 59231 was identified by T.C. Vanterpool and confirmed by R.A. Shoemaker. Moderate infection was noted at St. Clement, Que. (D.L.)

Rust (Puccinia graminis) severely infected 5 lawns of Merion blue grass in Lethbridge, Alta. (J.B. Lebeau).

Stripe Smut (Ustilago striiformis) was first reported on Poa from Man. in 1933. In the same year it also occurred on timothy. It has not been reported since. This year a Kentucky blue grass lawn in Fort Garry was so heavily infected that the grass appeared grayish-black in patches. Counts revealed that over 50% of the plants in large patches were infected (W.J. Cherewick).

TURF

Red Thread (Corticium fuciforme) produced an over-all reddish color on a lawn at Burnaby, B.C. (H.N.W. Toms). C. fuciforme was identified on a lawn grass sample from Agassiz, B.C. (J.B. Lebeau).

Snow Mold (low-temperature basidiomycete) was recorded from golf green at Kamloops, B.C. (H.N.W.T.). Golf greens at Calgary and Lethbridge, Alta. suffered moderate to severe damage. Damage to lawns in Lethbridge was moderate (J.B.L.).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

WILT AND ROOT ROT (Fusarium oxysporum). Several areas in an 8-acre field at Colchester South, Ont. had yellow, stunted plants from which Fusarium was isolated. Yield from the affected areas was very small during the 1958 cutting season (R.W. Walsh).

BEANS

Field Bean Diseases in Western Ontario in 1958

R.N. Wensley

Pythium wilt. The first evidence of this disease was found on the Kinghorn variety of wax beans in Essex County during the first week in July. Approximately 1 per cent mortality occurred among plants in several fields visited. This disease was subsequently found to be widespread in Essex and Kent Counties on the Michelite, Sanilac and Clipper varieties of white beans and on Dark and Light Red Kidney beans. Incidence of disease was variable, ranging from 1 per cent to a high of 70 per cent. However, recovery occurred in the more heavily affected fields subsequent to improved climatic conditions.

Root rot was prevalent on field beans throughout western Ontario. Severity of symptoms varied greatly from mild to severe according to field conditions, soil type, the time of planting, and crop sequence. Under the prevailing unfavorable weather conditions during the early spring period Pythium species remained the dominant causal factor. The most severe reductions in stand were found in fields successively cropped to white beans and in fields where drainage was inadequate.

Anthracnose (Colletotrichum lindemutheanum) was most prevalent in Huron County where the incidence of infection ranged from 5-25 per cent on Clipper to a high of 70 per cent on Michelite and Yellow Eye. No evidence of anthracnose was found on the early maturing white bean variety Sanilac.

Bacterial blight (Xanthomonas phaseoli) was prevalent throughout western Ontario on all varieties of white beans. This disease together with bacterial blight was predominant on Sanilac. However, the greatest intensity of infection was found on the varieties Michelite and Clipper.

Virus was not an important factor in 1958 and was rarely found.

Other Observations

GRAY MOLD (Botrytis cinerea) was tr. in all commercial fields seen in York Co., N.B. (S.R. Colpitts), and was tr. in part of a large planting at Weston, N.S. (K.A. Harrison).

ANTHRACNOSE (Colletotrichum lindemuthianum) was mod. in several home gardens at Lacalle, Que. (R. Crête). It was prevalent on the Soldier variety in York and Carleton counties in N.B. Infection appeared early and spread in wet weather and losses were heavy, ranging up to 60%. Lapin was generally free of infection (S.R.C.). Losses of 100% of the crop were sustained by a market gardener at Brackley, P.E.I. Two fields and several varieties were involved (J.E. Campbell). It was not generally troublesome in N.S. in 1958 though a small planting at Kentville was 100% infected (K.A.H.). Tr. infections were seen on Contender at St. John's West, Nfld. (O.A. Olsen).

ROOT ROT (Fusarium solani f. phaseoli). A small garden planting at Inglisville, N.S. was completely infected with this disease (C.O. Gourley).

HALO BLIGHT (Pseudomonas phaseolicola) caused sev. damage in 1 canning crop field at Coaldale, Alta. and tr.-sl. damage in a field at Fincastle (J.E. Moffatt). It was prevalent in early green beans and dry beans in most areas of N.B. Two early bean plantings were a complete loss (S.R.C.). Halo blight was seen at Waterville and caused a 75% loss at New Canaan, N.S. (K.A.H.).

SCLEROTINIA ROT (S. sclerotiorum) was seen in specimens from Kamloops, B.C. (G.E. Woolliams). A 1% infection was recorded in a field at Ste. Anne de la Pocatiere, Que. (L.J. Coulombe), and one-third of a 2-acre field was destroyed at Morristown, N.S. The rows in this field were close and heavy foliage favored the retention of moisture. Sclerotia and apothecia were scattered thickly over the soil (K.A.H.).

COMMON BLIGHT (Xanthomonas phaseoli). A 10% infection caused sl. damage to Sensation Wax at St. Prime, Que. (L.J.C.). A field, sown with seed from a sl. infection 1957 crop, was 100% affected at Charlottetown, P.E.I. (D.B. Robinson). Several acres of Yellow Eye at Grand Pre, N.S. showed a light general infection (K.A.H.).

COMMON MOSAIC (Bean common mosaic virus) occurred in varying degrees of severity throughout the Okanagan Valley, B.C. (G.E.W.). It was sl. in 2 fields and tr. in another at Fincastle, Alta. (J.E.M.). Mosaic was mod. in a 1-acre field at Ste. Clothilde, Que. (R. Crete). A few N.S. fields planted with local seed showed sev. infections. Canning crop fields were generally free of mosaic (K.A.H.).

FROST INJURY. Temperatures of 28-32°F on 10 June completely destroyed some fields in Kings and Annapolis counties in N.S. Many other fields remained yellow and plants had numerous necrotic lesions. Growth was still greatly retarded on 4 July. A loss of 20% in the overall crop is estimated (K.A.H.).

BEET

SCAB (Streptomyces scabies) was mod-sev. at Ste. Foy, Que. (D. Leblond). Infection was 80% in a garden plot at Salisbury, N.B. (S.R. Colpitts).

BROAD BEAN

WILT (Fusarium oxysporum f. fabae) was mod. at Ste. Foy, Que. (D. Leblond). The Windsor variety was 20% infected in a field at St. Felicien, Que. (L.J. Coulombe).

BORON DEFICIENCY. A condition, thought to be boron deficiency was seen in 50% of the plants in a 5-acre field at Salmon Arm, B.C. (G.E. Woolliams).

POD BLACKENING (non-parasitic) was sev. on Grosse de Windsor at Ste. Foy, Que. (D.L.).

BROCCOLI

CLUB ROOT (Plasmodiophora brassicae) was mod.-sev. in plantings in P.E.I. (G.W. Ayers).

HOLLOW STEM (Boron deficiency) was seen in specimens from a 3-acre field at St. Telesphore, Que. (R. Crête).

BRUSSELS SPROUTS

CLUB ROOT (Plasmodiophora brassicae) was sev. in a planting at St. Peters, P.E.I. Infection occurred in the seed bed (J.E. Campbell).

CABBAGE

YELLOWS (Fusarium oxysporum f. conglutinans). At Sandwich West, Ont. 75% of a 1.5-acre field was affected. In a portion of the field where cabbage was grown the previous year infection was 100% (R.W. Walsh).

BOTTOM ROT (Pellicularia filamentosa) affected 10,000 plants in a field at Falmouth, N.S. Growth was poor and many plants showed a dark rot in the midrib and yellowing of lower leaves. Isolations yielded the organism (K.A.H.).

WIRE STEM (Pellicularia filamentosa) was mod. in seed-beds at Ste. Foy, Que. (D. Leblond).

CLUB ROOT (Plasmodiophora brassicae). A 1-acre field at Sandwich West, Ont. was more than 60% infected. Plants were stunted and wilting and most of the clubs on the roots were more than one-half inch in diameter (R.W.W.). Club root was widespread and sev. in N.B. (J.L. Howatt), and was mod.-sev. in P.E.I. (G.W. Ayers). It is widespread in Kings Co., N.S. and the problem of its control is critical. Growers are finding that a 7-8 year rotation is not sufficient. The prevalence of cruciferous weeds is maintaining the organism (K.A. Harrison). Club root was light to mod. in the St. John's and Conception Bay areas of Nfld. (O.A. Olsen).

SCLEROTINIA ROT (S. sclerotiorum). The variety Danish Ball Head was 20% infected in a planting at Waterville, N.S. (K.A.H.).

DAMPING OFF (various organisms) was recorded at Langham, Sask. (T.C. Vanterpool) and at Gagetown and Oromocto, N.B. (S.R. Colpitts).

BLACK ROT (Xanthomonas campestris). A sl. infection was observed at La Gorgendiere, Que. (D.L.).

CARROT

CROWN GALL (Agrobacterium tumefaciens). Galls appeared on the lower portions of carrots stored in dry sand at Vantage, Sask. (T.C. Vanterpool).

LEAF SPOT (Alternaria dauci). Some lesions producing Alternaria spores were found with more numerous Cercospora lesions in a 10-acre field at Berwick, N.S. The combined effect was serious (K.A. Harrison). Walker, (Diseases of Vegetable Crops. McGraw-Hill, 1952), states that the disease occurs commonly in conjunction with Cercospora blight. The symptoms of the diseases are much alike with the Alternaria more likely to attack the older leaves (D.W. Creelman).

BLACK ROT (Alternaria radicina) was tr. on the market at Quebec City (D.L.) One warehouse lot at Grand Pre, N.S. showed a number of carrots with crown infections (K.A.H.).

CERCOSPORA BLIGHT (C. carotae). A sev. infection in a one-half-acre field near Aylmer, Que. caused mod. damage. Nearly 100% of the plants were affected and some petioles were girdled and yellowing (D.S. MacLachlan). A mod. infection also occurred in a 7-acre field at Sherrington, Que. (R. Crête). Gold Spike carrots from a Grafton, N.S. field infected with blight in 1957 were examined in Jan., 1958. There was a serious blackening of the skin and the roots were unsuitable for packaging. On 9 July tr. infections occurred in the same field. Although sprayed with zineb in early Aug. the yield was somewhat reduced. Heavy losses were incurred in another 10-acre field. At Weston, N.S. wild carrots were found infected and it is suspected that this weed, which is prevalent in the Annapolis Valley, is providing an overwintering host for the fungus (K.A.H.).

STORAGE ROT (Cylindrocarpon radicicola). Isolations from carrots in storage in March at Clarence, N.S. yielded this organism (K.A.H.).

SCLEROTINIA ROT (S. sclerotiorum). Samples were received at the Vancouver, B.C. laboratory. Infection is usually general after warm weather harvesting (H.N.W. Toms). Specimens from Quebec City and Giffard, Que. were seen in Jan. (D.L.). Losses in the 1957 crop in common storage ranged from 5-100% in Kings Co., N.S. A 2% infection was noted in Nov. in stored carrots from the 1958 crop at Kentville (K.A.H.).

STORAGE ROTS (various organisms). Rotting carrots from storage at Quebec City yeilded Botrytis cinerea, Rhizopus nigricans, Verticillium albo-atrum and Fusarium spp. The Fusaria were predominant (D.L.).

YELLOWS (Aster yellows virus) was tr. in a field at Medicine Hat, Alta. (J.E. Moffatt). Late in Oct. a 15-acre field in the Dover Marshes, Kent Co., Ont. showed 80-90% of the plants with typical symptoms. In the LaSalle area, south of Windsor, Ont. 10-15% infections were recorded in several fields (C.D. McKeen). A home garden planting at Carleton Place Ont. was infected (V.R. Wallen). Tr. infections were seen in several fields at Ste. Clothide and St. Blaise, Que. (R. Crête). It was sev. at Ste. Foy, Que. (D.L.). Aster yellows was general on carrots in P.E.I. with some infections as high as 80%. The vector was present in abundance (J.E. Campbell). In Kings Co., N.S. the disease appeared late and caused little damage (K.A.H.). Light infections were seen at St. John's West, Nfld. (O.A. Olsen).

HEAT AND DROUGHT INJURY caused a deformity in the upper part of roots at Estevan, Sask. (T.C. Vanterpool).

CAULIFLOWER

WIRE STEM (Pellicularia filamentosa) was mod. in seed beds at Ste. Foy, Que. (D. Leblond).

CLUB ROOT (Plasmodiophora brassicae) continues to be a limiting factor in cauliflower production in some Vancouver Island market gardens (W.R. Orchard).

DAMPING OFF (various organisms). Severe loss of seedling plants occurred in some glasshouses in Queens and Sunbury counties, N.B. (S.R. Colpitts).

BORON DEFICIENCY was mod. in 1 field at Fincastle, Alta. (J.B. Lebeau).

WHIPTALL (Molybdenum deficiency) was also mod. in 1 field at Fincastle, Alta. (J.B. Lebeau). A 1-acre field at Oromocto, N.B. was a complete loss with no heads forming (S.R.C.).

CELERY

LATE BLIGHT (Septoria apii). A 10-15% infection caused sev. spotting on leaves and petioles in a market garden at Victoria, B.C. (W.R. Orchard). Some losses were incurred in the Leamington, Ont. area by growers who failed to apply a protective fungicide in the seedling stage. Further losses were prevented by thorough weekly spraying with Bordeaux 10-10-100 in the field (R.W. Walsh). It was sev. in a portion of a field at Cyrville, Ont. (D.S. MacLachlan), and sl.-mod. in a 5-acre field at Ste. Clothilde, Que. (R. Crête).

ASTER YELLOWS (Aster yellows virus) was tr. in several large fields at Ste. Clothilde, Que. (R. Crête).

CHINESE CABBAGE

LEAF SPOT (Alternaria radicina) was sl. at Ste. Foy, Que. (D. Leblond).

CUCUMBER

Diseases of Greenhouse Cucumbers in Essex Co., Ontario in 1958

R.W. Walsh

In Essex County, between 1 Jan. and 31 July, approximately 80 acres of greenhouse vegetables, 65 acres of cucumbers and 15 acres of tomatoes, are grown. This acreage does not include that devoted to the production of vegetable seedlings grown for early field crops.

In February low incidence of light and low temperatures were the limiting factors in the production of cucumbers. During the period 13-16 Feb. shortly after most of the seedling plants had been set in the ground beds, outside temperatures dropped to -10°F. Heating facilities in many greenhouse ranges were inadequate and inside temperatures ranged from 38-45°F. for several hours. These low temperatures chilled tender plants and left them wilted for 5-7 days. Within a week bright sunny days raised greenhouse temperatures to over 90°F. further injuring the plants.

After the plants experienced these great temperature fluctuations they suffered a sunburn injury that desiccated the leaf margins and caused appreciable collapse of interveinal tissues. About 40% of the crop was adversely affected by these conditions and required several weeks to recover fully. Of the injured crop, 10% was replaced with new plants three to four weeks later. These new plants outgrew and out-produced those that were injured.

Powdery mildew (Erysiphe cichoracearum), usually the most serious disease of greenhouse cucumbers in this area, first appeared in one or two greenhouses in mid-April. Spread was gradual and a few traces of the disease could be found in most crops by June, at which time two or three outbreaks were too well established to be controlled with Karathane applied as a dust or by smoke generators. In such cases sprays containing 1/2 lb. Karathane/100 gal. water plus a sticker gave good control when thoroughly applied.

By mid-March the effects of inadequate soil sterilization were evident by an increase, over previous years, in the number of outbreaks of root knot nematode, Meloidogyne sp. and foot rot caused by Fusarium sp. "Nemagon" soil fumigant applied to growing plant effectively checks nematode development. At the rate of 9.7 Imp. pints/acre, 0.5 cc. applied by injector 4 in. from the base of each plant, spread of the nematode was halted and new plant growth developed. Some growers used the material on mature "hardened" plants at rates as high as 34.8 Imp. pt./acre without apparent phytotoxicity. Foot rot is most readily controlled by thorough steam sterilization.

Stem rot, caused by Botrytis cinerea and Sclerotinia sclerotiorum became quite prevalent during a period of warm weather in mid-April. On a few nights when outside temperatures rose to about 65°F, automatic heating systems set to operate at 65°-67°F, did not turn on. In the absence of circulating warm dry air, condensation formed on the plants affording ideal conditions for the spread of these stem rot organisms.

Adjustment of the greenhouse humidity to prevent condensation on plants and the use of ferbam or thiram applied as dusts, sprays or paste checked the disease spread. In two cases where Botrytis cinerea was was causing fruit rot, gross loss per acre was about $1200.00 when approximately 4% of the fruit were attacked. Sclerotinia sclerotiorum destroyed a few fruit in another crop.

The leaf spot caused by Trichothecium roseum occurred throughout the area causing slight to moderate damage, but one or two crops suffered severe defoliation. Maneb applied thoroughly once a week at 3 lb./100 gal. controls the disease.

Scab (Cladosporium cucumerinum) could be found wherever growers had allowed temperatures to drop long enough for condensation to form on the fruit. In one instance where the grower stopped heating his crop in early June severe scab lesions developed on about 75% of the fruit causing considerable loss.

In February and early March injury from agricultural chemicals occurred quite frequently.

(1) More than 2,500 cucumber seedlings planted in ground beds treated with DD soil fumigant suffered severe root injury before the concentration of the chemical dropped to a non-toxic level. Development of the crop was retarded three to four weeks, a delay that represented a considerable financial loss to the grower.

(2) Sprays containing 25% malathion wettable powder, 2 lb./100 gal. applied to young plants caused "burning" of the leaf margins and interveinal chlorosis. Malathion applied six weeks later to older plants still caused a marked necrosis of interveinal leaf tissue.

(3) Two applications of 50% Perthane wettable powder, 2 lb./ 100 gal. applied one week apart also caused a severe chlorosis of tissue. The injury was not apparent until after the second spray was applied.

(4) One spray of the acaracide Aramite, used at the rate of 2 lb./100 gal., was the cause of a severe interveinal necrosis occurring on leaves within a few days of application.

In most of the cases where injury occurred sprays were applied to plants that had been forced into lush growth at a time when low light intensity favored the development of very thin leaf tissue that was probably more subject in injury.

Fertilizer burn was seen in several crops where excessive amounts of chemical fertilizer were applied. Leaves were damaged and plants were killed from ammonia fumes rising from too fresh manure that was applied as a mulch in some crops.

A 600-plant crop growing in a small Leamington greenhouse was destroyed when dithio pyrophosphate smoke generators were ignited to control greenhouse red spider mites, Tetranychus sp., on a cloudy morning in June. The sun later shone brightly rapidly raising the temperature in the sealed greenhouse to over 90°F. In another crop the leaves on a number of plants were burned while being fumigated with HCN.

Other Observations

LEAF SPOT (Alternaria cucumerina). A specimen was submitted to the Charlottetown, P.E.I. laboratory for diagnosis. It is commonly seen in plantings in P.E.I. in recent years (D.B. Robinson).

GRAY MOLD (Botrytis cinerea). Infections were seen in May on about 10% of the stems in a greenhouse planting at Falmouth, N.S. (K.A. Harrison).

SCAB (Cladosporum cucumerinum) was observed as a 30% infection in a 4-acre field of pickling cucumbers at Paris, Ont. The field had grown 3 successive crops of cucumbers (B.H. MacNeill). It was prevalent in Queens and Sunbury counties, N.B. Early crops were sl. affected but the late crop bore heavy infections. Home garden crops were affected throughout the province (S.R. Colpitts). In the St. John River valley, N.B., varieties other than the Maine and Wisconsin resistant strains were affected (J.L. Howatt). In P.E.I. infection was at its lowest level in 8 years (J.E. Campbell). It was more common than usual in garden plantings in N.S. (K.A.H.).

WILT (Fusarium sp.). Specimens from the Montreal, Que. area were received for identification at Ottawa (V.R. Wallen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) was sl. in 1 field at Medicine Hat and tr. in 1 field at Countess, Alta. (J.E. Moffatt). Tr. infection was found in a planting at Ste. Eustache, Man. (W.A.F. Hagborg). It occurred in a 3-acre planting of pickling cucumbers at Kingsville, Ont. Infection was mod. except in one-half acre portion of the field sown to cucumbers the previous year. In that portion plants were stunted and the crop reduced by 50% (R.W. Walsh). It was 2% in a garden plot at Oromocto, N.B. (S.R.C.).

WILT (Verticillium albo-atrum) was tr. in a 2-acre field at Narrows, N.B. (S.R.C.).

MOSAIC (Cucumber mosaic virus) was prevalent in a home garden at Summerland, B.C. It occurs in that garden annually and greatly reduces yields (G.E. Woolliams). In the Harrow-Leamington area of Ont. the Burpee hybrid cucumber, considered tolerant to mosaic, was sev. affected. As well as exhibiting foliage mottling many of the fruits showed a pronounced mottling. Many tons of fruit were rendered unmarketable. A heavy melon aphid infestation was responsible for spread of the disease in cucumbers and to other crops such as muskmelon, squash and pumpkin (C.D. McKeen). A sev. outbreak at the Exp. Farm, Kentville, N.S. wiped out a series of trials of slicing varieties (K.A.H.).

CHEMICAL INJURY. Sev. chlorosis and marginal necrosis of many leaves resulted when cucumber vines were sprayed late in the day with tribasic copper sulphate 6 lb. and 25% malathion W.P. 2 lb./100 gal. water at Colchester South, Ont. At the same place seedlings were burned following the application of liquid fertilizer sprays in accordance with the manufacturer's directions (R.W.W.).

EGGPLANT

LEAF SPOT (Ascochyta lycopersici). Mod. infections were seen at Ste. Foy, Que. (D. Leblond).

GARLIC

BULB ROT (Fusarium sp.) caused the yellowing of foliage, decay of outer bulb scales and rotting of the roots in 80% of the plants in a one-sixth-acre planting at Harrow, Ont. The symptoms were observed early in June (C.D. McKeen).

LETTUCE

GRAY MOLD (Botrytis cinerea). A head lettuce crop at Melanson, N.S. was 30% infected on 23 May and a complete loss by early July. At New Minas, N.S. Botrytis rot associated with tip burn caused the loss of 300/2000 plants (K.A. Harrison).

DOWNY MILDEW (Bremia lactucae) was mod.-sev. in several large fields on muck soil at Ste. Clothilde, Que. (R. Crête).

SOFT ROT (Erwinia carotovora) affected 50% of the plants in a field at Haldiman, Que. High humidity in late Aug. and early Sept. favored its development (L.J. Coulombe).

DROP (Sclerotinia sclerotiorum) caused a 10% loss in a crop at Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

YELLOWS (Aster yellows virus). Ten-15% of the plants in head lettuce crops at La Salle, Ont. were infected in Oct. (C.D. McKeen). Infection was light in several fields at Ste. Clothilde, Que. (R. Crête). At Cornwall, P.E.I. a market gardener lost 80% of his late lettuce crop from yellows. Adjacent carrots were heavily infected (J.E. Campbell).

BIG VEIN (? Olpidium sp.). This disease, known to occur in many of the vegetable growing areas of the United States and also in Europe was observed in the spring head lettuce crop in Essex Co., Ont. The symptoms consist of a pronounced early vein clearing followed by enlargement and bleaching of the vascular regions of the petioles and leaf blades, vein banding and savoying of the leaves. In some fields 60% of the plants were affected and the crop headed very unevenly. For many years big vein was considered to be caused by a soil-borne virus. However, Grogan et al (Phytopathology 48:292-297, 1958) presented evidence that a species of Olpidium is associated with the disease. In the Ontario outbreak no attempt was made to determine whether the roots of affected plants were invaded by this fungus (C.D. McK.).

LIMA BEAN

SCLEROTINIA ROT (S. sclerotiorum). A 10-acre field near Chatham, Ont. was sev. infected. In many places the mycelium completely covered the damp earth between the rows and extended far up the stems of plants. Three weeks before harvest it was estimated that only about 60% of the field could have been harvested (R.W. Walsh).

MELON

ANTHRACNOSE (Colletotrichum lagenarium) was more widespread and caused more damage in Essex and Kent counties, Ont. than at any time in the last 8 years. Losses ranged from 25-100% in fields of varying sizes. Zineb sprays applied early checked the disease. It is apparent that seed treatment and a regular spray program will have to be a regular adjunct to melon production (R.W. Walsh).

BACTERIAL WILT (Erwinia tracheiphila) killed 25% of the plants in a 1-acre field at Tecumseh, Ont. Control of cucumber beetles had not been attempted (R.W.W.).

FUSARIUM WILT (Fusarium bulbigenum var. niveum). The susceptible variety Perfection was 75% killed in a 1-acre field at Harrow, Ont. (R.W.W.).

MOSAIC (? Muskmelon mosaic virus). A 1-acre field in Gosfield South, Ont. was 100% infected and suffered heavy damage. Aphid populations were high. Several other infections were observed throughout the season in Essex Co. The disease was at its highest incidence in 4 years (R.W.W.).

ONION

PURPLE BLOTCH (Alternaria porri) affected the Spanish-type varieties Riverside and Magnifico, particularly the latter, in Mersa Twp., Ont. Infections were heavy and the yield reduction was estimated at 20-25%. Foliage was killed about 3 weeks before the normal maturity date. Weekly applications of 10% zineb dust failed to check the disease this year (R.W. Walsh).

NECK ROT (Botrytis allii). A 20% infection was recorded in Kamouraska Co., Que. (R.O. Lachance). Light infections were seen on stored onions at Charlottetown, P.E.I. (J.E. Campbell). At Berwick, N.S. the variety Autumn Spice was 5% infected at harvest and specimens were received at the Kentville laboratory from Birch Cove, Cape Breton (K.A. Harrison).

SMUDGE (Colletotrichum circinans). At Erieau, Ont. over 75% of the crop from a half-acre field of white skin onions was unmarketable because of smudge. This grower has experienced similar losses for 3 years (R.W.W.). Specimens from St. Martin, Que. were received at the St. Jean laboratory (R. Crête). One specimen was seen on the market in Quebec City (D. Leblond).

DOWNY MILDEW (Peronospora destructor) was observed in several Vancouver Island market gardens where high infection rates resulted in sev. injury (W.R. Orchard). It was sev. at Lac des Aigles, Que. (D.L.). The variety Kenearly and some new lines were 100% infected at the Exp. Farm, Kentville, N.S. (K.A.H.).

YELLOW PATCH (Pythium irregulare). About 10% of the seedlings in 300 flats were killed by this disease at Tecumseh, Ont. (R.W.W.).

SMUT (Urocystis cepulae) was observed on Yellow Globe Danvers in several fields at Kelowna, B.C. It appears to be increasing in severity in this district (G.E. Woolliams).

BLAST (unfavorable weather condtions) was mod.-sev. in a 15-acre block at St. Blaise, Que. (R. Crête).

PEA

Pea Disease Survey in certain localities in Ontario, 1958

V.R. Wallen

In 1958, fifteen pea fields were surveyed as follows: twelve fields of canning peas, two fields of field peas and one field of garden peas. The canning peas, with the exception of two fields located near Markham, were all located in the Windsor area. The most prevalent and destructive disease found in the fields examined was pea streak.

Pea Streak (? pea streak virus) was present in slight to severe amounts infecting 20 per cent of the crop in a field of Alton garden peas at Ottawa. This field appeared yellow despite excellent growing conditions during pod formation. At maturity numerous plants did not set seed. Pea streak was also severe in a number of hybrid lines of field peas growing on the Central Experimental Farm. Some lines did not produce any seed. Pea streak was present in trace to moderate amounts in five fields of canning peas in the Windsor area.

Root Rot (Ascochyta pinodella, Fusarium sp.) was present in six fields of canning peas in the Windsor area in trace amounts. Ascochyta pinodella was the cause of the root rot in at least two of the six fields. In the Markham area extremely dry conditions had prevailed and the crop was light. Despite this condition root rot was present in 40 per cent of the crop. A species of Fusarium appeared to be responsible.

Common Mosaic (pea mosaic virus) was found in trace amounts in six fields of canning peas in the Windsor area. One field in the same area where aphid control had not been practiced was moderately infected with the disease.

Pea Enation Mosaic (pea enation mosaic virus) was found in trace amounts in six fields in the Windsor area. This disease was also present as a trace in a field of garden peas at Ottawa.

Pea Stunt (Red clover vein mosaic virus) occurred in one field in the Windsor area causing slight loss to the pea crop.

Bacterial Blight (Pseudomonas pisi). A moderate infection of the leaves and a trace infection on pods was found in a field of Arthur field peas at Ottawa

Mycosphaerella Blight (Mycosphaerella pinodes). A trace infection was located in one field of garden peas at Ottawa.

Leaf and Pod Spot (Ascochyta pisi) was found in trace amounts in one field of canning peas in the Windsor area.

Other Observations

FOOT ROT (Ascochyta pinodella) was sev. at St. Gabriel and St. Pierre Isle Orleans, Que. (L.J. Coulombe).

LEAF AND POD SPOT (Ascochyta pisi) was 1-mod./18 Alta. fields (J.E. Moffatt). In Man. 8/17 fields in the Portage la Prairie and Oakville areas had tr.-sl. infections (W.A.F. Hagborg). Pod infection was 20% at Colinet, Nfld. (O.A. Olsen).

POWDERY MILDEW (Erysiphe polygoni). Damage was generally sev. in gardens in the Saskatoon, Sask. area (R.J. Ledingham). It was tr. in 1/17 Man. fields (W.A.F.H.). Powdery mildew was widespread in N.B. but damage was light (S.R. Colpitts).

NEAR WILT (Fusarium oxysporum f. pisi, race 2). Traces of near wilt, first reported 3 years ago, have now been recorded in nearly all the areas of commercial pea production in s.w. Ont. A 10-acre field of Pride peas near Brantford which appeared to be badly affected with near wilt produced, according to the processor, only about 50% of the expected yield (B.H. MacNeill).

MYCOSPHAERELLA BLIGHT (M. pinodes). Infections were tr.-sl. in 4/17 fields examined in Man. (W.A.F.H.).

DOWNY MILDEW (Peronospora pisi) was 1-mod./18 fields in Alta. (J.E.M.). One field at Bridgetown, N.S. had a 2% infection in June (C.O. Gourley).

BACTERIAL BLIGHT (Pseudomonas pisi) was 11-tr./18 Alta. fields (J.E.M.). It was 4-sl. 1-mod. 1-sev./17 fields in Man. (W.A.F.H.).

LEAF BLOTCH (Septoria pisi) was 1-tr./18 fields examined in Alta. (J.E.M.).

ROOT ROT (various organisms) was 8-tr. 4-sl. 2-mod. 3-sev./18 fields in Alta. and caused an estimated 5% loss (J.E.M.). Specimens from Langham, Sask. were infected with Fusarium and Ascochyta (T.C. Vanterpool). It was 1-tr. 1-mod.-sev./17 fields in Man. (W.A.F.H.). Fusarium root rot was seen at New Richmond, Que. (D. Leblond). Infection was 60% at Fredericton, N.B. and damage was mod. (S.R. Colpitts).

RUST (Uromyces fabae). A 5% infection occurred in a small garden plot at Salisbury, N.B. (S.R.C.). At Kentville, N.S. a light late infection caused negligible damage (K.A.H.).

MOSAIC (Pea mosaic virus). Heavy aphid infestations in Kings Co., N.S. were followed by outbreaks of mosaic in fields where aphids were not controlled early (K.A.H.).

PHYLLODY (? virus). Typical symptoms were observed on a single plant in a garden at Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

MARSH SPOT (Manganese deficiency). Two samples of split peas from carload lots, one grown at Aylesham, Sask. and the other purchases at Morris, Man. but of unknown origin, had the central internal necrosis typical of marsh spot (W.A.F.H.).

PEPPER

VERTICILLIUM WILT (V. ? dahliae). Two pepper fields at Harrow, Ont. were sev. affected. The variety Vinedale has proven to be highly susceptible to Verticillium wilt (C.D. McKeen).

BACTERIAL SPOT (Xanthomonas vesicatoria). At Harrow, Ont. most of a planting of 56,000 pepper plants grown for processing had leaf and fruit symptoms of this disease. Fruit spotting was sufficiently sev. for the processor to reject the field and it was disced under (R.W. Walsh).

VIRUS DISEASES. In 1958 most of the pepper crops in s.w. Ont. became infected with one or more aphid-borne viruses. Losses ranged from 10-15%. The following viruses were isolated and identified: Potato Y, Cucumber mosaic, Alfalfa mosaic and Tobacco etch. Tobacco mosaic virus was also found affecting a few plants in 1 crop. Tobacco etch virus appeared in Ont. in 1950 and since that time has recurred each year in tobacco and pepper crops in the Harrow-Leamington area (C.D.McK.).

The data presented in Tables 10 to 12 relevant to Seed Potato Certification were submitted by the Plant Protection Division, Production Service, Canada Department of Agriculture.

The total acreage entered for inspection in 1958 and the number of acres passed both exceeded the comparable figures for the last three years. The large acreage of Sebago planted in P.E.I. accounted for 44% of the total. Two new varieties, Fundy and Avon, were released to seed growers in the Maritime Provinces. Ring rot and black leg were again the most important causes of rejection. The number of fields rejected because of leaf roll and mosaic was greater than in 1957.

EARLY BLIGHT (Alternaria solani) was found in 116/600 fields inspected in B.C., 94-sl. 20-mod. 2-sev. It was most prevalent in the Grand Forks and Okanagan districts (N. Mayers). It was present in most of the 91 fields inspected in n. Alta. where it hastened maturity in some fields of Warba (E.C. Reid). Sl.-mod. infections were observed in 12/112 seed fields in s. Alta., mainly on early varieties (R.P. Stogryn). It was sl. in the northern districts of Sask. (A. Charlebois). A few sl. infections appeared late in the season in Man. and n.w. Ont. (D.J. Petty). Early blight reduced the yield of Keswick and was also prevalent on Irish Cobbler in Ont. District #3 (H.W. Whiteside), tr. infections were seen on Katahdin in the Mount Brydges area of s.w. Ont. (J.T. McKercher), sl. amts. were seen in Durham, Northumberland and Ontario counties of Ont. at the time of the second field inspection (W.L.S. Kemp), and it occurred as 51-sl. 1-mod. infections /70 fields in e. Ont. (E.H. Peters). In Que. early blight was recorded as 238-sl. 48-mod. 1-sev./1,040 fields. It was most prevalent in the Chicoutimi and Lake St. John districts (B. Baribeau). Sl. infections were seen in a few fields of Keswick and Warba in York Co., N.B. (C.H. Godwin). It was very sl. in P.E.I. (H.L. McLaren). In N.S. it was reported in 17/233 fields inspected. No sev. infections were seen in 1958 (R.C. Layton). Mod. infections were encountered in the St. John's and Conception Bay areas of Nfld. (O.A. Olsen).

GRAY MOLD (Botrytis cinerea) caused a leaf spot in tr. amts. on Arran Victory at St. John's West, Nfld. (O.A.O.).

BLACK DOT (Colletotrichum atramentarium) occurred as a tr. infection on Irish Cobbler at Pleasant Grove, P.E.I. (J.E. Campbell). A planting of Keswick at Kentville, N.S. was 100% infected. The tops died down much earlier than normal (K.A. Harrison).

Table 10. Seed Potato Certification

Summary of Fields and Acres Entered and Passed - 1958

Province	Fields Entered	Fields Passed	% Passed	Acres Entered	Acres Passed	% Passed
P.E.I.	6,099	5,508	90.3	31,428	28,345	90.2
N.S.	233	184	78.9	493	333	67.5
N.B.	2,338	2,045	87.4	15,616	12,801	81.1
Que.	1,040	631	60.7	3,793	2,227	58.7
Ont.	544	478	87.8	1,660	1,086	65.4
Man.	123	106	86.1	1,088	944	86.7
Sask.	70	56	80.0	177	151	85.3
Alta.	203	172	84.7	1,615	1,306	80.9
B.C.	601	489	81.3	2,985	2,260	75.8
Totals	11,251	9,669	85.9	58,855	49,456	85.3
1957	11,417	9,879	86.5	57,667	48,588	84.2
1956	11,440	9,575	83.3	53,926	44,398	82.3
1955	12,003	10,239	85.3	51,627	42,173	81.7
1954	13,783	11,959	86.8	59,360	50,687	85.4

Table 11. Seed Potato Certification

Fields Rejected on Field Inspections - 1958

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	Foreign Varieties	Misc.	Total
P.E.I.	3	72	16	31	177	16	17	184	62	578
N.S.	7	11	1	3	6	1	11	6	1	47
N.B.	2	14	100	60	6		8	80	13	283
Que.	6	98	102	61	82		37	12	4	402
Ont.	13	6	19	31	23	3	1	7	4	107
Man.	1	1	3	5		2			5	17
Sask.	1		1	6	2	2			2	14
Alta.			6	16	9					31
B.C.	64						19	15	5	103
Totals	97	202	248	213	305	24	93	304	96	1,582
Rejection as a percentage of fields										
Inspected	0.8	1.8	2.2	1.9	2.7	0.2	0.8	2.7	0.8	14.1
Rejected	6.1	12.8	15.7	13.4	19.3	1.5	5.9	19.3	6.0	100.0

Table 12 Seed Potato Certification

Acreage Passed by Variety and Province - 1958

Variety	P. E. I.	N. S.	N. B.	Que.	Ont.	Man.-Alta.	B. C.	Total
Sebago	21,752	21	193	30	324		3	22,323
Katahdin	1471	17	5678	182	207		8	7,563
Kennebec	1793	126	3461	361	19	13	165	5,938
Netted Gem	4	20	663		2	1368	1691	3,748
Irish Cobbler	2024	38	410	53	79	169		2,773
Green Mountain	667	27	136	1421	41	7	31	2,330
Red Pontiac	324	11	1507			319	68	2,229
Keswick	102	15	313	151	72		3	656
Warba	17	4	16		12	153	90	292
Huron	2		12	4	214	1		233
Pontiac		3	142			29		174
Canso	150		8	1				159
Chippewa	4	1	40		113			158
White Rose			50			2	105	157
Rural Russet			147		1			148
Columbia Russet						99	6	105
Others	35	51	25	24	2	243	90	470
Total	28,345	334	12,801	2,227	1,087	2,402	2,260	49,456

BACTERIAL RING ROT (Corynebacterium sepedonicum) was found in tr. amts. in one seed crop and 4 tablestock crops in B.C. (N.M.). It was absent in n. Alta. (E.C.R.), and was tr. in 6/112 fields in s. Alta. Sixteen other adjacent fields were rejected (R.P.S.). Ring rot caused the rejection of 7/70 fields inspected in Sask. (A.C.). Twelve infected specimens were received from growers at Saskatoon, suggesting that the disease may be increasing in Sask. (R.J. Ledingham). Three fields in Man. and 1 in n.w. Ont. were found infected. Five other Man. fields were rejected because of suspicion of contamination (D.J.P.). In Ont. District #3, 19/373 fields inspected were rejected for ring rot and 31 adjacent fields turned down. Infection ranged from tr.-2% in individual fields. The use of custom planters seemed to be a contributing factor to the incidence of the disease (H.W.W.). One small field of Rural Russet in Durham Co., Ont. was rejected as coming from a known contaminated seed source (W.L.S.K.). Ring rot occurred in 102/1,040 fields inspected in Que. At harvest and bin inspection an additional 9 fields were rejected. This represents a great reduction over the number of rejections for ring rot in 1957. This reduction seems to be a reflection of the greater care taken by growers and the general use of quaternary ammonium compounds for disinfecting implements and premises. (B.B.). A 3-acre field of table stock was sev. infected at St. Pascal, Kamouraska Co., Que. and 34 others in the lower St. Lawrence district showed tr.-10% infections. Conditions were generally favorable for the detection of symptoms (H. Genereux). In N.B. 100/2,338 fields inspected showed symptoms of ring rot and an additional 60 fields were rejected because of infected table stock crops on the same farms. There was a sl. increase in the prevalence of ring rot in N.B. over the 1957 figures. (C.H.G.). Sixteen infected fields and 23 contact cases were reported /6,099 fields in P.E.I. A total of 418 acres were involved (H.McL.). Ring rot was found in 1/233 fields of seed potatoes in N.S., 2 fields from the same seed source were rejected, though showing no symptoms, and 2 other fields were rejected because of proximity to diseased table stock. In a survey of table stock potatoes in Kings Co., 11 fields totalling approximately 45 acres were found infected in amounts from tr.-4% (R.C.L.).

BLACK LEG (Erwinia atroseptica) was 41-tr. 2-mod. 1-sev./601 fields in B.C. Table stock crops of Waseca were heavily infected in the Okanagan Valley and there were marked increases in its occurrence at Grand Forks and in the Kootenays (N.M.). It caused the rejection of 9/91 seed stock fields in n. Alta. and was present in all seed varieties. It appears to be the most serious threat to certified seed production in n. Alta. (E.C.R.). It occurred in 78/112 fields inspected in s. Alta. and continues to be the most prevalent potato disease in that irrigated area (R.P.S.). It was sl. in Netted Gem at Medicine Hat, Alta. (J.E. Moffatt). In Sask. 25/72 fields showed some black leg infection on first inspection. Two fields were rejected (A.C.). In Man., 13% of the fields

inspected showed tr.-sl. infections, and in n.w. Ont., 30% of the fields were infected (D.J.P.). This disease was present in 86/373 fields in Ont. District #3 and caused rejection of 19. Sebago, Keswick, Kennebec, Rural Russett and Irish Cobbler seemed particularly susceptible (H.W.W.). More than a dozen cases of black leg in Irish Cobbler were encountered in Mersa Twp. in Essex Co., Ont. Losses ranged from 5-10% even in crops where seed piece treatment with captan and streptomycin had been carried out. Many of the tubers were infected with soft rot at harvest (R.W. Walsh). Light infections were seen in 20/33 fields inspected in s.w. Ont. (J.T.McK.). A few infected plants of Irish Cobbler from Lincoln Co. were examined at the St. Catharines laboratory (G.C. Chamberlain). Three fields were rejected in the Guelph area (W.L.S.K.). It was recorded in 19/70 fields in e. Ont. (E.H.P.). Black leg increased in prevalence in seed stocks in Que. It was recorded in 607 and caused rejection of 82/1,040 fields inspected (B.B.). It was observed in most of 35 table stock fields examined in the lower St. Lawrence district (H. Genereux). Black leg decreased in incidence in N.B. and only 6/2,338 fields were rejected (C.H.G.). In P.E.I. 177/6,099 fields were rejected (H.McL.). It was reported in 65/233 seed fields in N.S. and caused the rejection of 6 fields (R.C.L.). Black leg occurred on 2% of the plants of Kennebec in the Bonavista Bay area and on 1% of Arran Victory in the Conception Bay area of Nfld. (O.A.O.).

SOFT ROT (Erwinia carotovora). Specimens were received from Quebec City, St. Thomas de Caxton and St. Nicholas Station, Que. (D. Leblond).

DRY ROT (Fusarium spp.). F. coeruleum was isolated from a sample taken at Calgary, Alta. Dry rot was seen in 1/5 fields examined (J.E. Moffatt). Infections ranging from 6-8% were observed in a few lots of Keswick in Que. in the spring shipping season (B.B.). Sl. infections were recorded in Keswick in N.B. following adverse storage conditions (C.H.G.). It was generally sl. in P.E.I. (H.L.McL.). Three carloads of Foundation Katahdin seed originating in P.E.I. was found to be 30% infected on arrival in Montreal. The causal organism when isolated proved to be F. coeruleum (D.S. MacLachlan, R.A. Shoemaker). In N.S., F. sambucinum associated with a Pythium sp. caused 15% loss in Cherokee from Merigomish, Pictou Co. (K.A.H.).

WILTS (Fusarium spp., Verticillium albo-atrum) were of minor importance in B.C., appearing as tr. infections in 7/601 fields (N.M.). They occurred in 12/91 fields in n. Alta. (E.C.R.) and in 53/112 fields in s. Alta. (R.P.S.). Wilt was noted in 17% of the Sask. fields inspected but was sev. only in 3 fields of Cherokee (A.C.). In Man., 13% of the fields had varying degrees of wilt and 3 fields of Cherokee were rejected (D.J.P.).

Fusarium wilt was present in most fields and varieties in Ont. District #3. Verticillium wilt was not a problem (H.W.W.). In s.w. Ont. 2 fields of Kennebec were rejected (J.T. McK.). Six infected fields were found in the Guelph district (W.L.S.K.), and in e. Ont. 11/70 fields were infected (E.H.P.). Verticillium wilt, mostly on Keswick and Kennebec, affected 14/1,040 fields in Que. (B.B.). Fusarium wilt was sev. at Sillery, Que. (D. Leblond). No fields were rejected in N.B. though 17/2,338 fields carried tr. amts. (C.H.G.). The incidence of wilts in P.E.I. declined in 1958, only 16/6099 fields were rejected (H.L.McL.). Verticillium wilt was reported in 39/233 fields in N.S. and 1 field was rejected for wilt. Kennebec, Irish Cobbler, Sebago, Cherokee and the new variety Fundy were the most sev. affected (R.C.L.).

RHIZOCTONIA (Pellicularia filamentosa) was widespread throughout B.C. and was rated 300-sl. 119-mod. 16-sev./601 fields. In s.e. B.C. it caused considerable losses to some growers (N.M.). It continues to be found in most seed stocks in n. Alta. (E.C.R.). Premature wilting of vines in large areas of fields was observed in the Edmonton area (W.P. Campbell). It was 70-sl. 8-mod./112 fields in s. Alta. Sclerotia were present on 10-15% of the tubers at bin inspection (R.P.S.). Infection was noted in most Sask. fields but it is believed to have caused little damage as compared with 1957 (A.C.). It was sl. in most fields in Man. and n.w. Ont. (D.J.P.). Sev. field symptoms were observed in Dufferin Co., Ont. (H.W.W.). Irish Cobbler, Katahdin, Warba and Sebago were sl. affected in s.w. Ont. (J.T. McK.); in the Guelph district the organism is widely distributed in soils (W.L.S.K.), and in e. Ont. 29/70 fields were infected (E.H.P.). Infection was 133-sl. 3-mod./1,040 fields inspected in Que. and was mostly confined to the Chicoutimi, Lake St. John and Saguenay districts (B.B.). At Ste. Anne de la Pocatiere the varieties Chenango and King Edward were highly susceptible in sandy soil and Saco was susceptible in loamy soil (H. Genereux). It was sl. in a few fields in N.B. and sl. tuber infection was seen in a few fields at shipping time (C.H. Godwin). Rhizoctonia was not a serious disease in N.S. in 1958. The average infection was about 2% (R.C. Layton). A sev. infection was recorded on Irish Cobbler at Winterbrook, Nfld. Infections were light at St. John's West and Bay Roberts (O.A.O.).

LATE BLIGHT (Phytophthora infestans) was reported 25 June at Saanichton, B.C. with an 80% infection in a field of Warba, and lesser infections in White Rose. Netted Gem suffered mod. foliage infections but no tuber rot was reported (W.R. Orchard). It was recorded as 17-sl. 3-mod./601 fields in B.C. (N.M.). The disease was fairly general throughout Ont. District #3 with Katahdin and Rural Russet the most seriously affected varieties with considerable tuber rot (H.W.W.).

It was recorded in several fields in s.w. Ont. (J.T. McK.) and was late in appearing in the Guelph, Ont. district. The greatest losses were in late planted crops of Chippewa and Katahdin (W.L.S.K.). Eight fields and 4 bins were affected in e.Ont. The disease appeared early in Aug. in Prescott Co., but did not appear until late September in Renfrew Co. (E.H.P.). Late blight was first observed in the lower St. Lawrence district of Que. in Temiscouata Co. on 23 July, about 2 weeks later than last year. Weather conditions throughout Aug. were favorable for its development and spread and by early Sept. it was epidemic throughout the province affecting all varieties. Tuber infection was observed in many fields. The extensive use of vine killers reduced tuber infection to a great extent. Infections in seed fields were rated 313-sl. 176-mod. 30-sev./1,040 fields. Losses in unsprayed fields ranged from 20-35% (B.B.). Tuber rot was 45% in an unsprayed field at Ste. Foy, Que. (D.L.).

Blight was sev. throughout N.B. in 1958 and was especially destructive in late-planted crops. Although reported from several areas the week of 17 July infection did not become sev. until late Aug. Crop reductions of as much as 50 bbl./acre were caused by the destruction of vines. Tuber rot was held to a minumum by a program involving good hilling and vine killers (H.L. McL., J.L. Howatt). Late blight occurred earlier than usual in P.E.I. Infected cull piles were observed on 15 July and the first field infections on 16 July. It spread rapidly and an epiphytotic developed. Adequate spraying and the use of vine killers kept losses generally at a minimum, but poorly sprayed fields suffered yield reductions and further losses from tuber rot (L.C. Callbeck). In N.S. the first infected cull pile was seen on 11 July. Spread was slow until late Aug. when several heavy rains occurred. Tuber rot was sev. and losses have been extensive in some cases (K.A. Harrison). Blight was reported in 45/233 seed fields inspected in N.S. It was general throughout the province by 20 Aug. Losses from tuber rot occurred even in some sprayed fields, particularly in Kennebec. A loss of 15-20% is estimated for the province as a whole (R.C.L.). Losses were not heavy in Nfld. in 1958. Blight appeared late and weather conditions were not particularly favorable for its development. Tuber rot was not reported (O.A. Olsen).

Distribution by Provinces of Physiologic Races of Phytophthora infestans in Canada in 1958

J.L. Howatt

The Fredericton Laboratory conducted for the fifth consecutive year a survey to determine the races of the late blight fungus occurring in the country during the growing season of 1958. A summation to November 18 reveals that 273 collections were examined and 363 isolates identified as to race from seven provinces. The collections obtained were in the form of leaves, tubers, potato balls and tomato fruits. The results of the survey are presented in Table.

Table 13

Physiologic Race	Provinces							
	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	B.C.	Total
1		4	17	2	4		3	30
2				1	2		1	4
3		1	25	3	13	2	4	48
4	2	7	82	8	44	6	4	153
1.2			2		1			3
1.3		2	13	1	7		1	24
1.4		4	38	10	20			72
2.3				1			1	2
2.4				1	3			4
3.4			8	4	6		1	19
1.3.4				1	1			2
1.2.3.4			2					2
	2	18	187	32	101	8	15	363

The results are based mainly on a single determination on the differential hosts. Race 4 appears to be the common race encountered but this may be due to the possible masking of race O. Race 1,4 is the second most prevalent form. The field records of this survey reveal several inconsistencies with regard to the race involved and the variety attacked In this compilation it was noted that the more specialised races of the fungus tended to develop in areas where blight resistant potatoes were

being tested. The two collections of race 1,2,3,4 were received from Nova Scotia in March. One of these races was isolated from tomato and the other from potato. These collections were misleading in that they registered as race 1,2,4 when received but in subsequent tests they registered on all the genotypes as a severe form of race 1,2,3,4.

LEAK (Pythium ultimum) affected 3 crops in central B.C. and 3 in the Pemberton district. All crops examined in s.e. B.C. were infected and some had as many as 5% of the tubers affected (N.M.). In Sask. the absence of a killing frost before 15 Sept. resulted in the harvest of many poorly matured tubers in the late varieties. There was considerable early storage breakdown. Five cases were investigated and in each case Pythium sp. was isolated (R.J. Ledingham). Early harvested crops in Man. had 2-5% infected tubers in the bin soon after harvest (D.J.P.); from 1/2-2% of the tubers of early varieties at the University of Man. were infected (W.C.McDonald). At Ste. Anne de la Pocatiere, Que. it was sev. on Irish Cobbler in loamy soils. Teton, grown in sandy soil, was free of infection at harvest but was 10% infected after 1 week in storage (H. Genereux). A 10% infection in Cherokee was recorded at Merigomish, N.S. Pythium sp. was isolated from diseased tubers (K.A.H.).

POWDERY SCAB (Spongospora subterranea). Trace infections on Netted Gem at Cedar, B.C. lowered the grade of tubers (W.R. Orchard). Sl.-mod. infections were seen in 8 bin lots inspected in Que. (B.B.). A tr. infection was seen on Bliss Triumph at Glenmont, N.S. (K.A.H.), and a light infection occurred on Fredericton seedlings at St. John's West, Nfld. (O.A.O.).

COMMON SCAB (Streptomyces scabies) caused damage to white-skinned varieties in B.C. but Netted Gem was little affected (N.M.). It was present in some seed stocks in n. Alta. and in some instances affected even the normally resistant Netted Gem (E.C.R.); sl. infections were seen on some smooth skinned varieties in s. Alta. (R.P.S.). In Ont. District #3 the incidence of scab was slightly lower than in 1957. It was observed causing superficial lesions on the resistant Huron variety in the Lafontaine area (H.W.W.). Sl. infections were general in s.w. Ont. (J.T.McK.). Common scab is one of the commonest troubles in Bruce, Grey, Dufferin, York, Waterloo and Wellington counties in Ont. The pH of the soils is high and sl. scab averages 20-25% and sev. scab 10-15% (W.L.S.K.). It was prevalent in Renfrew Co., Ont. Little or no scab was seen on Rural Russet and Huron (E.H.P.). Scab was reported in 315 bin lots inspected in Que. in the fall of 1958. It was mostly confined

to the n.e. portion of the province. Infection was generally 1/2-2% but a few severe cases reached 25-50% (B.B.). A 50% infection was seen on Waseca at Ste. Anne de la Pocatiere (H. Genereux). It was less prevalent than in previous years in N.B. (C.H. Godwin), and mod. in P.E.I. (H.L.McL.). The average loss from scab in grading in N.S. was about 3%. One lot graded 25% scab (R.C.L.). Light infections were seen in the St. John's and Conception Bay areas of Nfld. (O.A.O.).

WART (Synchytrium endobioticum). Infections were generally heavy in the St. John's and Conception Bay areas of Nfld. and the disease has spread to land not previously infested. Yield reductions of 75% were reported from Conception Bay. In experimental plots at Bay Roberts yield was reduced 50% in infected Arran Victory, Kerr's Pink and Irish Cobbler (O.A.O.).

SEED PIECE ROT (various fungi). A 6-acre field of Irish Cobbler in Mersa Twp., Ont. had only a 35% stand due to the rotting of seed pieces (R.W. Walsh).

CALICO (Alfalfa mosaic virus) was more prevalent in s.e. B.C. than in 1957 (N.M.).

LEAF ROLL (Potato leaf roll virus) caused the rejection of seed fields in all provinces except Alta. and Nfld. It was generally more prevalent than in 1957. A few specimen reports are cited below (D.W. Creelman).

It was recorded as 142-tr. 33-sl. 31-mod. 3-sev./601 fields in B.C. It remains the biggest potato disease problem in the province. It is estimated that 2,500 tons of Netted Gem have been reduced in grade from #1 to #2 or culls because of leaf roll necrosis (N.M.). Though present in 44/203 Alta. fields the infections were light (E.C.R., R.P.S.). In Ont. District #3 it occurred in 126/373 fields. Cherokee, Keswick, Warba, Chippewa and Huron were the varieties most affected (H.W.W.). Fields of Huron were infected in the Guelph district (W.L.S.K.). and in s.w. Ont. (J.T.McK.). It was recorded in 105/1,040 fields in Que. (B.B.). A 2-acre field was sev. affected at St. Antoine Abbé (R. Crête). Leaf roll continues to be of minor importance in N.B. (C.H. Godwin), and decreased in P.E.I. in 1958 (H.L.McL.). In N.S. it was reported in 85/233 fields inspected and caused the rejection of 7. Kennebec, Irish Cobbler, Sebago and Netted Gem in that order were the varities most affected (R.C.L.). It was recorded as 3-sl. 1-sev./15 fields examined on the Avalon Peninsula in Nfld. (O.A.O.).

MOSAIC (Potato viruses X, A and Y) were reported from all provinces and were resonsible for the rejection of seed fields in 6 provinces, notably in Que. and P.E.I. Representative reports only will be given here (D.W.C.).

Mosaic was 25-tr. 1-sl./601 fields in B.C. It was most prevalent in the Lower Mainland, Lulu and Sea Islands and on Vancouver Island (N.M.). It occurred in tr. amounts only in Alta. (E.C.R., R.P.S., J.E. Moffatt), was sl. in 15/70 fields in Sask. (A.C.) and was of no consequence in Man. (D.J.P.). Only 6/544 Ont. fields were rejected for mosaic (D.J.P., H.W.W., E.H.P.). Mosaic increased in Que. in 1958 and was found in 470/1,040 fields; 98 fields were rejected (B.B.). In N.B. 14/2,338 fields were rejected (C.H.G.). P.E.I. returns showed a slight increase in mosaic over 1957; 72/6,099 fields were turned down (H.L.McL.). Mosaic continues to be the most serious virus disease problem in N.S. It was found in 125/233 fields in 1958. Eleven fields were rejected. (R.C.L.). It was reported as occurring in the St. John's and Manuels areas of Nfld. (O.A.O.).

PURPLE TOP (Aster yellows virus) was found in 25/91 fields inspected in n. Alta. (E.C.R.). Little was seen in seed fields in Sask. (A.C.) and it was less than 1% in 2 fields examined near Saskatoon (R.J. Ledingham). Its incidence in the n. portion of Ont. District #3 was greater than in 1957. Katahdin, Sebago and Rural Russet were particularly affected (H.W.W.). Purple top has decreased in prevalence in N.B. in the last 3 years and was observed as tr. infections only in a few seed fields in 1958 (C.H.G.).

SPINDLE TUBER (Potato spindle tuber virus) was found in several plants in 1 field of Waseca in s. Alta. (R.P.S.). In Man. 4 fields of Kennebec with 2-8% spindle tuber were rejected (D.J.P.). Huron has been observed to be quite susceptible in Ont. District #3, spindle tuber occurring in varying percentages in every lot grown. Katahdin and Sebago were also affected (H.W.W.). It was observed in 1 field of Katahdin in s.w. Ont. (J.T. McK.). In e. Ont. Huron and Sebago were affected in several fields (E.H.P.). Sl. infections were seen in a few fields of Kennebec in Que. and 2/430 bins inspected showed tr. amounts (B.B.). In N.B. the incidence of spindle tuber was slightly greater than in 1957. Three/2,338 fields were rejected but tr. infections were recorded in a number of other fields, particularly in Kennebec, Netted Gem and Sebago (C.H.G.). A marked decrease was observed in P.E.I. in 1958 (H.L. McL.). In N.S. it occurred in 3/233 fields inspected (R.C.L.).

WITCHES' BROOM (Potato witches' broom virus) was 34-tr. 1-sl./601 fields in B.C. Its highest incidence was in the central portions and the Cariboo (N.M.). Tr. amounts were seen in n. Alta. (E.C.R.).

YELLOW DWARF (Potato yellow dwarf virus) was seen in a small plot of Keswick in Simcoe Co., Ont. (H.W.W.).

HAYWIRE (? virus) was tr. in 19/91 fields inspected in n. Alta. (E.C.R.), and in 8/112 fields in s. Alta. (R.P.S.).

FROST caused some damage to tubers in the ground in the north Okanagan district of B.C. (N.M.). Spring frost was general in n. Alta. and some fields were completely killed when the tops were 6 in. high. Recovery was good with whole small seed but only about 50% in some plantings of Warba from cut seed. Little fall frost damage was experienced (E.C.R.). Early fall frosts caused some damage in Ont. District #3 (H.W.W.), and in the Guelph area all but the early dug fields were affected to some extent. Some lots in bin showed 5-10% loss (W.L.S.K.). Late harvested potatoes in the Eastern Townships of Que. and the Montreal area suffered 5-8% damage in Oct. (B.B.).

GIANT HILL was observed in a few fields of Sebago in the Dufferin, Cochrane and Nipissing districts of Ont. (H.W.W.). In N.S. it was seen in Green Mountain, Irish Cobbler and Netted Gem. Affected plants in the field appear as upright, coarse growing plants which continue to grow longer than normal. In most cases the crop in affected hills is below average and the tubers may be off type and rough (R.C.L.).

HEAT AND DROUGHT INJURY caused necrotic areas extending up to one-half inch into tubers in the Cariboo and central B.C. (N.M.).

LIGHTNING INJURY was observed in a field of Sebago at South Melville, P.E.I. Tubers in the affected patch showed a breakdown (J.E. Campbell).

SPRAIN (cause unknown) was tr. in specimens received from Quebec City, Que. (D.L.).

SECONDARY GROWTH. Low rainfall in Sask. in 1958 resulted in an early maturation of tubers. With favorable growing conditions at the end of the season many tubers sprouted producing stolons and small potatoes. The late maturing varieties Kennebec and Netted Gem were mostly affected (R.J. Ledingham).

STEM END DISCOLORATION (non-parasitic) was seen in 30 bin lots in Que. affecting 1-3% of the tubers (B.B.).

MAGNESIUM DEFICIENCY was general in potato crops in the St. John's and Bonavista Bay districts of Nfld. (O.A.O.).

Little Leaf of Potato

D.B. Robinson

A disorder of potato, commonly called 'little leaf', has been observed in a few instances in potato fields in Prince Edward Island for several years past, but has become much more serious in the 1958 crop. It has been observed chiefly in the western part of the province and mostly in the variety Sebago, although it is occasionally reported in other varieties. Of the numerous fields in which outbreaks were recorded in 1958, 11 were affected to an extent of 0.1 % or more of the crop, and in one field 8% of the plants were affected.

'Little leaf' is so named because the chief characteristic of the disorder is the smaller than normal size of the leaves of affected plants. Also the foliage of such plants is generally somewhat lustreless, the flowers are smaller and the plants are slightly shorter. The tubers are normal in appearance but quite small. Preliminary observations indicate that the number of tubers formed is not affected but that total weight may be decreased by half. It has also been found that such tubers produce plants with typical little leaf symptoms the following season. Thus, the disorder may be spread very rapidly by the use of seed from an affected crop, and especially so because many of these smaller tubers are of acceptable seed size grade.

Elimination of 'little leaf' by rogueing is difficult because many cases have been observed in which the symptoms described above are not clear cut. In some instances this may be because of uneven fertility in the field, but in many others it seems apparent that the disorder is present in varying intensity so that some plants are slightly, and others severely, affected. This difficulty in diagnosis is increased when the crop is not grown in tuber units.

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) was quite general in the Okangan Valley towards the end of the growing season. (G.E. Woolliams).

RADISH

WHITE RUST (Albugo candida). Mod. infection occurred on a few plants of the variety Cherry Bell in a Foundation seed plot at the University of Manitoba (W.C. McDonald).

LEAF AND POD SPOT (Alternaria ? raphani) was mod. on a few plants at Winnipeg (W.C.McD.).

SOFT ROT (Erwinia carotovora) caused sev. damage to radish packed in polythene bags at Chicoutimi, Que. (D. Leblond).

BACTERIAL LEAF SPOT (Xanthomonas vesicatoria var. raphani). A 2-acre field at Sherrington, Que. was sev. affected (R. Crête).

RHUBARB

LEAF SPOT (Ascochyta rhei) was sev. at Ste Foy and La Gorgendiere, Que. (D. Leblond).

ANTHRACNOSE (Colletotrichum erumpens). A specimen recieved from a small market garden at Sackville, N.S. showed numerous lesions on some stalks (K.A. Harrison).

RED LEAF (cause unknown). A specimen was received from Saskatoon, Sask. (T.C. Vanterpool).

SQUASH

GRAY MOLD (Botrytis cinerea). A few Buttercup squash were rotted by this organism at Kentville, N.S. (K.A. Harrison).

SCAB (Cladosporium cucumerinum) affected about 10% of the variety Green Hubbard at Hall's Harbor, N.S. Scabs were typical of those on cucumber, though deeply sunken. When diseased material was placed in a moist chamber rot did not develop but the organism fruited (K.A.H.). This is the first report to the Survey of this disease on squash (D.W.C.).

STORAGE ROT (Colletotrichum atramentarium). Isolations from a few spots on 6 stored squash yielded C. atramentarium. These squash had been grown in an area of a garden at Kentville, N.S. where Keswick potatoes, susceptible to black dot, had been grown the previous season (K.A.H.). There are no previous reports to the Survey of this disease (D.W.C.).

POWDERY MILDEW (Erysiphe cichoracearum) was frequently found in Okanagan Valley, B.C. plantings towards the close of the growing season (G.E. Woolliams).

LEAF SPOT (Septoria cucurbitacearum). Specimens were received at Ottawa from Victoria, B.C. This is the first record of this disease in B.C. (D.W.C.). Buttercup squash at Kentville, N.S. was 100% infected with many lesions by mid-Sept. but damage to the crop was negligible (K.A.H.).

SWEDE TURNIP

LEAF SPOT (Phoma lingam) was observed on swedes, broccoli and Chinese cabbage at Ste. Foy, Que. (D. Leblond).

CLUB ROOT (Plasmodiophora brassicae). Specimens were received at Ottawa from a Montreal Island market garden (V.R. Wallen). Club root occurred at St. Ubald, Que. (D. Leblond). The disease is widely distributed in N.B. in both home gardens and commercial fields. In some cases crops grown on the same land for the second successive year were 100% infected. The varieties Ditmars and Laurentian were highly susceptible and Wilhelmsburger resistant. Cruciferous weeds in fields were also affected (J.L. Howatt, S.R. Colpitts). In P.E.I. infection was favored in swedes, cabbages and broccoli by heavy rains during June and July resulting in several sustained free soil moisture periods particularly favorable to the motile infective stage of the pathogen (G.W. Ayers). Club root development in Nfld. was generally less sev. than in 1957. Infections ranged from 1% at St. John's West to 30% at Bonavista Bay (O.A. Olsen).

HOLLOW HEART (excess water) was seen at Ste Foy, Que. (D.L.).

STORAGE ROTS (Rhizoctonia solani and others). At Grand Falls, N.B. a dry rot caused 5-8% loss to swedes in a damp storage house (S.R.C.). Well developed Rhizoctonia lesions were seen on 2% of the roots of 1 lot at Grand Pre, N.S. (K.A. Harrison).

BLACK ROT (Xanthomonas campestris) affected 10-20% of the crop in several swede fields in P.E.I. Infection is believed to have originated in the stecklings on which the seed was produced. This disease may be eliminated by the hot water seed treatment but none of the seed sold locally had been so treated (G.W.A.).

SWEET CORN

RUST (Puccinia sorghi). At St. Jean, Que. most of the leaves in a 10-acre field were covered with rust pustules. Many leaves dried up and died (R. Crête). Mod. infections occurred at Ste. Foy, Que. (D. Leblond).

TOMATO

Diseases of Greenhouse Tomatoes in Essex County, Ontario in 1958

R.W. Walsh

Approximately 15 acres of greenhouse space in Essex Co., Ont. is devoted to tomato production between 1 Jan. and 15 July. From August to about 15 Dec. about 45 acres are planted to tomatoes. This report is a summary of disease conditions in the spring and fall crops respectively in 1958.

Spring Crop

Damping-off caused by Rhizoctonia sp. and Pythium sp. was common in late Feb. and early March. The increase in the incidence of this disease seemed to stem chiefly from the practice of overwatering and over feeding during a period when light intensity and temperatures were low.

Stem rot, caused by Sclerotinia sclerotiorum, that developed in a few crops was traced to inoculum carried on mulching materials. The most serious outbreak of this disease occurred at Harrow on a 4600-plant crop where sunflower seed hulls were used for mulch. Lesions usually appeared on the plant at the base of a petiole that was covered by infected hulls. More than 10% of the plants in the crop were killed before the first fruit was picked. Spread of the disease was checked by removing hulls from contact with plant stems and also by dusting or spraying with zineb. Based on the average yield and returns that the grower received from this crop, his losses from stem rot exceeded $200.00.

The few scattered light infections of early blight Alternaria solani and Septoria leaf spot, Septoria lycopersici, seen throughout the area in late April were readily controlled by spraying with maneb at 4 lb/100 gal. of water.

Gray mold, Botrytis cinerea, caused stem and fruit rot in a few crops where temperatures were too low and ventilation was inadequate. Ferbam or thiram sprays and a reduction in the relative humidity arrested the disease.

A fruit rot caused by Trichothecium roseum was found at Harrow and Leamington in early May on the Michigan-Ohio Hybrid tomato. The organism appeared to invade the fruit through the blossom end by first attacking the necrotic remnant of the style. From this point the lesion radiated uniformly through the host without seriously changing the outward conformation of the fruit. Invasion by secondary organisms often occurred resulting in a rapid breakdown of the fruit.

In the most heavily damaged crop, half of the fruit in one set was infected resulting in a loss to the grower of about $100.00. Additional heat to improve ventilation and reduce humidity controlled these outbreaks. Maneb sprays or dusts also give satisfactory control.

Several outbreaks of leaf mold, Cladosporium fulvum, appeared in late May and spread slowly until checked by increased heat and improved ventilation which reduced the relative humidity of the air surrounding the plants. The Michigan-Ohio Hybrid tomato, which constitutes over 90% of the spring crop, is not resistant to the disease.

Fusarium wilt, Fusarium oxysporum f. lycopersici, killed 5% of the plants in a small crop of tomatoes planted in unsterilized soil. This disease is present in many crops but usually only one or two plants in every 1000 show serious symptoms, and crop losses are very slight. The Michigan-Ohio Hybrid tomato is reported to have inherited resistance to this disease from one of its parents, Ohio W.R. Globe.

Tobacco mosaic virus could be found in all crops in the area but in only a few were the severe fern leaf type of symptoms evident. In only one instance was there evidence of a marked reduction in yield from the disease.

Light outbreaks of blossom end rot were seen in many crops. A more serious loss of approximately one pound of fruit per plant was experienced by a grower at Kingsville in his 2000-plant crop. This apparently resulted from an inadequate water supply in the sub soil. Examination of the soil showed that the upper 6 inches of soil had

considerable moisture but below that depth the soil was "powdery dry". Normally this grower floods his greenhouse soils to leach out excess salts but being pressed for time he did not flood the soil in this house. The crops in his adjacent greenhouses, planted on ground that had been flooded, had a good even supply of moisture in the soil and were free of blossom end rot.

Magnesium deficiency became evident in some of the more heavily laden plants just before all the fruit on the first truss had been picked. At this time the fruit load on the plants is greatest as is, apparently, the need for magnesium. The condition was corrected by spraying the foliage with a solution of one pound of magnesium sulphate in 12.5 gallons water.

Fall Crop

Light infections of late blight, Phytophthora infestans, were general in the fall crop and most were readily controlled by reducing the relative humidity and by the thorough application of maneb 4 lb./100 gal.

Leaf mold caused by Cladosporium fulvum appeared in a few crops planted to varieties not resistant to the disease. More than 95% of the fall crop in Essex County is planted to the leaf mold resistant variety Vinequeen. At Kingsville heavy leaf mold infection was found in a crop reported to be Vinequeen. Pathogenicity tests, with samples of the organism from this crop, were performed by members of the Botany Department, University of Toronto, and these failed to produce lesions on plants known to be Vinequeen.

Fusarium wilt caused by Fusarium oxysporum f. lycopersici was troublesome in more crops this year than at any other time during the past 5 years. In several crops from 5-10% of the plants were killed by this disease.

Virus diseases were of especial importance in the crop this past fall. Tobacco mosaic virus, for example, was of widespread occurrence and caused symptoms that ranged from a mild mottle to the severe fern leaf type. In one establishment an appreciable quantity of fruit was rejected because of gray wall or blotchy ripening caused by tobacco mosaic virus infections. Virus streak has destroyed up to 10% of the plants in some greenhouses.

A few growers experienced considerable crop loss from heavy infestations of root knot nematodes, Meloidogyne sp. In an 8,000-foot house nearly all plants were attacked, some of them so severely that 40% were dead by 1 Oct. The balance of the crop was abandoned.

Other Observations

EARLY BLIGHT (Alternaria solani) was tr. in 2 plots at Lethbridge, Alta. (J.E. Moffatt). Only where inadequate protective measures were used was early blight a problem in s.w. Ont. (R.W. Walsh). Sev. infections occurred at La Gorgendiere, Que. (D. Leblond). It was widespread in N.B. but there was little damage to fruit (S.R. Colpitts). In Kings Co., N.S. early blight causes annually 25-75% defoliation. The new variety Scotia is quite susceptible. Maneb sprays, where applied, gave satisfactory control (K.A. Harrison).

GRAY MOLD (Botrytis cinerea) attacked all varieties in greenhouses at Kingston and Falmouth, N.S. Spots developed where floral parts were caught on leaves and in axils next to the stem. Stem infections developed killing 1-2% of the plants in the most sev. infected greenhouses. Infections in different houses ranged from 10-100%. Dull, rainy weather through the spring season contributed to the severity of the disease. With the return of sunny weather and the application of Thylate sprays the outbreak was checked (K.A.H.).

LEAF MOLD (Cladosporium fulvum) was observed at Saanichton, B.C. in 1 field where overhead sprinkler irrigation was used (W.R. Orchard). Specimens were received from a commercial greenhouse at Haney, B.C. Basal leaves only were attacked (H.N.W. Toms). Sev. infections on several susceptible varieties were observed at Kingston, N.S. following the dull, cold spring weather (K.A.H.).

ANTHRACNOSE (Colletotrichum spp.). In s.w. Ont. anthracnose was a problem only where sev. virus infections had limited foliage development or where protective measures were inadequate (R.W.W.). Fruit from the Leamington, Ont. area was 100% infected when examined on the market at Ottawa (D.S. MacLachlan). At Kentville, N.S. anthracnose was sev. on a crop grown on land that had borne infected crops in previous years. No infections were found on land planted to tomatoes for the first time (K.A.H.). (For a discussion of the organisms involved in the anthracnose complex in Canada see P.D.S. 37:85-86. 1957). (D.W.C.).

BACTERIAL CANKER (Corynebacterium michiganense) caused stem necrosis which killed plants throughout the season in Mersa Twp., Ont. The variety Bounty was principally involved. Mature fruit in some cases were too badly marked to be marketed and one 4-acre crop was a complete loss (R.W.W.). A sev. infection was recorded in Roberval Co., Que. (L.J. Coulombe).

FUSARIUM WILT (F. oxysporum f. lycopersici) caused sev. stunting and wilting of plants in one part of a field at Stamford, Ont. (G.C. Chamberlain.)

LATE BLIGHT (Phytophthora infestans) did not appear in the Vancouver, B.C. district until after the fruit was harvested (H.N.W.T.). Outbreaks were observed in canning crops in Essex Co., Ont. after 15 Aug. They occurred chiefly in the southern portion of the county, supporting the theory that the inoculum was wind-borne from infected areas in Ohio. None of the infected fields had received regular protective sprays (R.W.W.). It was sl. at Normandin, Que. in Aug. (L.J.C.). At Ste. Anne de la Pocatiere, Que. late blight was first observed early in Sept. and become sev. later in the month. It was reported that the tomato crop throughout Que. was seriously affected (H. Genereux). Slight infections were observed in Aug. at Gagetown and Oromocto, N.B. (S.R. Colpitts). In P.E.I. there was considerable late blight in most market and home gardens causing losses of 10-80% (J.E. Campbell). Losses were light in sprayed fields in Kings Co., N.S. One unsprayed field was defoliated by 25 Sept. and the fruit a total loss (K.A.H.). Infection was light at St. John's West, Nfld. (O.A. Olsen).

SOIL ROT (Rhizoctonia solani). Trace infections were seen at Kentville, N.S. (R.G. Ross).

SEPTORIA LEAF SPOT (S. lycopersici) was of minor importance in Essex Co., Ont. in 1958. Light infections occurred on some unsprayed crops (R.W.W.).

STEM ROT (Sclerotinia sclerotiorum). At New Minas, N.S. the high humidity under hot caps favored stem rot. About 1% of the plants were girdled at the collar and damped off (K.A.H.). Scattered infections were seen at Waterville, N.S. in a field which had previously been planted to cabbage (J.F. Hockey). The 1958 season was the worst on record for this disease in Kings Co., N.S. Most fields had at least tr. infections and several where weeds had become a problem had up to 25% of the plants infected (K.A.H.).

VERTICILLIUM WILT (V. albo-atrum) occurred generally in both field and greenhouse plantings in the Okanagan and Thompson Valleys of B.C. (G.E. Woolliams). At Ottawa, Ont. the organism was isolated from 2 mature wilted plants in a greenhouse. The vascular tissue was only slightly discolored (D.S. MacL.).

BACTERIAL SPOT (Xanthomonas vesicatoria). Six fields involving about 30 acres in the Harrow, Ont. area were infected in late July. The heavy initial infection caused sev. damage to new growth. Coalescing lesions caused necrosis of terminals while many older leaves dropped. The disease was checked by the use of copper fungicides and more favorable weather. At harvest few spotted fruits were seen (R.W.W.).

BLOTCHY RIPENING (virus). About 10% of the fruit from a 4-acre field of Moreton Hybrid near Kingsville, Ont. were affected. Many plants showed symptoms of TMV infection (R.W.W.). At Falmouth, N.S. all the fruits from the first 2 trusses in a greenhouse crop were severely affected. The foliage was badly deformed and showed virus symptoms (K.A.H.).

BROWN WALL (virus) was prevalent in several greenhouse and field crops in Essex Co., Ont. The plants bearing affected fruit were usually, but not always, infected with TMV. No virus could be detected in 60% of the plants in 1 field where the first harvested fruit showed blotchy ripening and brown wall (C.D. McKeen).

MOSAIC (virus) occurred throughout the Okanagan and Thompson Valleys of B.C. in both field and greenhouse crops (G.E.W.). In Essex Co., Ont. tobacco-etch, cucumber mosaic, and potato Y viruses were isolated from canning crops. Different types of mottle and mosaic symptoms were exhibited. A high percentage of the fall greenhouse crop was infected with TMV (C.D. McK.). A sev. infection was seen in a greenhouse at Hampstead, N.B. (S.R.C.).

PURPLE TOP (Aster yellows virus). Infection was more than 50% in an 8-acre field at Kingsville, Ont. Yield was greatly reduced (R.W.W.).

STREAK (virus) was found in a dozen or more fields in the Harrow-Leamington area and caused mod. losses. A higher than usual percentage of plants infected with TMV was observed in canning crops 2-3 weeks after field setting. Later, aphids migrated into some of these fields transmitting potato virus Y. Potato virus X was transmitted

mechanically on machinery used for cultivating, and perhaps by other means. Soon after the introduction of virus X, the second component of the streak complex, necrosis of stems and foliage developed. Shock symptoms created the impression that the crop might be totally destroyed, but a week to 10 days later affected plants began to recover. However, losses as high as 30-50% were seen (C.D. McK.).

BLOSSOM-END ROT (physiological) was troublesome in Sask. in 1958. Weather conditions were favorable to the disorder (R.J. Ledingham). An affected field at Gosfield South, Ont. had very low calcium levels and a pH of 4.6. After the application of 300 lb./acre of calcium nitrate with irrigation and foliar sprays of 12 lb. calcium nitrate/100 gal. the crop improved greatly and no further incidence of blossom-end rot was seen (R.W.W.). At St. Catharines, Ont. much of the early fruit of both staked and field tomatoes was affected (G.C. Chamberlain). Early ripening fruit of Scotia was affected in a number of fields in Kings Co., N.S. (K.A.H.).

CATFACE. This condition was general throughout Essex Co., Ont. especially on the varieties Clark Special and Camdown. Some fields of the latter variety had 15-20% of the fruit affected (R.W.W.).

CHEMICAL INJURY. Foliage on 5 acres of canning tomatoes in Colchester South, Ont. was moderately burned by the application of liquid fertilizer. Six acres of newly planted tomatoes at Dresden, Ont. were sev. damaged by drift from a 2,4-D and 2,4,5-T spray applied to the roadside. The field was disced under. Several other fields in Essex and Kent counties were injured by drift from herbicidal chemicals (R.W.W.).

FROST. The latest spring frost on record injured tomato plants in Kings Co., N.S. Killing frosts during the first 10 days of June caused considerable damage to tomatoes and other plants. Early fall frosts also killed tomato crops before the maturation of the fruit (J.L. Howatt). Immediate damage was sev. but all but about 10% of the plants recovered and produced a late crop (K.A.H.).

GROWTH CRACKS. Ripe fruit was mod. affected following showery weather at Oromocto, N.B. (S.R.C.).

LIGHTENING INJURY. A field near Kingsville, Ont. had the plants killed in an area about 50 ft. in diameter (R.W.W.).

MAGNESIUM DEFICIENCY. Sev. magnesium deficiency symptoms were seen in a half-acre section of a 5-acre field in Essex Co., Ont. Foliar applications of Mg SO4 corrected the condition (R.W.W.).

IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

CALYX-END ROT (Botrytis cinerea). Specimens were received at Summerland from Edgewood, B.C. (D.L. McIntosh).

END ROT (Coniothyrium fuckelii) was tr. on McIntosh at Berwick, N.S. C. fuckelii was isolated from a few fruits (J.F. Hockey).

FIRE BLIGHT (Erwinia amylovora) was sev. in the Edmonton, Alta. district. Bee population was high at blossom time (W.P. Campbell).

BROWN ROT (Monilinia fructicola) was reported from St. Nicholas, Que. The specimens examined showed evidence of Botrytis cinerea as well (D. Leblond).

BLACK ROT (Physalospora obtusa). Mod. infection was seen on young Cortland trees at Dunham, Que. (L. Cinq-Mars). Fruit of Macoun from cold storage at Rougement, Que. was affected in April (R. Crête).

POWDERY MILDEW (Podosphaera leucotricha) is widespread in the coastal areas of B.C. and annually causes sev. injury to foliage and to current season's terminals (W.R. Orchard). In Essex Co., Ont. it is quite general in orchards where organic fungicide sprays are used. One or two pre-bloom sulfur sprays have failed to check the disease in these orchards and considerable killing of terminals and russeting of fruit is occurring on susceptible varieties such as Jonathan (R.W.W.). In the laboratory orchard at St. Catharines, Ont. mildew was general on terminal leaves. On unsprayed trees 54% of the foliage was affected. In sprayed plots infections ranged from 3% in plots with a full sulfur program to 40% where no sulfur was used. Mildew was reported from most apple growing districts of Ont. affecting the varieties Cortland, Jonathan, Toleman and McIntosh (G.C. Chamberlain). Sl.-mod. infections were seen on Cortland at Dunham, Que. McIntosh in the same orchard was unaffected (L. Cinq-Mars). It was sev. on Cortland at Rougemont, Que. (R. Crête). Mildew was 7-sl. 1-mod./8 Que. nurseries inspected in 1958 (J. Ringuet).

SCAB (Venturia inaequalis). Some early infections were seen in the Creston Valley, B.C. on terminal growth but hot, dry weather during the summer effectively checked further development. Infected fruit was found only in inadequately sprayed orchards (J.M. Wilks). Unsprayed McIntosh at St. Catharines, Ont. had 30-40% foliage infection and 90%

fruit infection. Scab-free fruit was produced in plots sprayed with organic fungicides. Reports from the apple growing districts of Ont. indicate that scab was generally less important than usual and that spray programs were generally effective (G.C.C.). Specimens were received from widely separated areas in Que. (D. Leblond). Infection was 20% on Wealthy at Riviere aux Chiens, 30% on Wealthy and 50% on Fameuse at St. Pierre Isle Orleans, Que. (L.J. Coulombe). Scab was generally well controlled in N.B. in 1958 but inadequate or poorly timed spray programs resulted in some sev. infections. Pin-point scab was widespread at harvest. Some unsprayed trees were defoliated by July (S.R. Colpitts, J.L. Howatt). Apple scab was very sev. in N.S. in 1958. The first ascospore discharge was recorded 24 April and the first infection period 28-30 April. Primary scab lesions were first observed 20 May. Five infection periods occurred in May and timing of sprays was made difficult. June was fairly dry with only 1 mod. and 1. sev. infection period while in July there were 2 mod. and 2 sev. infection periods. Considerable late season scab developed in many commercial orchards particularly on McIntosh (R.G. Ross).

Ascospore discharge of the Apple Scab Fungus in Prince Edward Island in 1958

Carl Willis

Studies on the discharge of ascospores by the apple scab fungus Venturia inaequalis (Cke.) Wint. in relation to primary spring infection were begun on 6 May, 1958 and continued for a sixty-day period. A farm orchard of about twenty trees, situated near Charlottetown and comprised of several varieties, was chosen for the project. These trees, unsprayed in 1957, had been severely attacked by the scab fungus with the result that the ground was littered with leaves in which the fungus had overwintered. The smeared slide technique was employed in detecting and determining the relative extent of ascospore discharges.

Ascospore discharge took place over a 20-day period beginning 18 May and ending 6 June. Four periods of appreciable discharge took place, the first extending over a 3-day period, 18 May to 20 May the second and heaviest over the 2-day period 25 May to 26 May the third lasting but one day, 2 June and the fourth lasting but 1 day, 6 June. Trace discharges were found on 6 other days. All periods of discharge were marked by abundant rainfall and near normal temperatures. The first apparent infection showed on leaves of unsprayed trees on 6 June following a 20-day germination period marked by frequent showers and cool nights.

Table 14

Ascospore Discharge[1]

Period of Discharge	Number of Ascospores
May 18 to May 20	305
" 21	Trace
" 23	Trace
" 25 to May 26	742
" 28	Trace
" 29	Trace
June 2	573
" 6	470
" 14	Trace
" 22	Trace

[1]Figures are relative, being the total number of ascospores observed on ten high power microscope fields of the specimen slides.

In general, apple scab was severe in unsprayed and poorly sprayed orchards in the P.E.I. in 1958.

BARK DECAY. At Chatham, N.B. 13/36 trees were girdled by organisms apparently originating in compost piled around the bases of the trees (S.R.C.).

HAIL. An area of about 1 sq. mi. containing 20,000 trees at Rougemont, Que. was affected by a heavy hail storm on 26 July. On most trees about 50% of the fruit was cracked and rendered unsaleable (R. Crête).

RUSSETING. The effects of frosts and spray injuries were widespread in N.B. in 1958 (S.R.C.).

SOGGY BREAKDOWN (non-parasitic). McIntosh and Cortland samples at the retail level at Jonquiere, Que. in March were affected (D. Leblond).

MAGNESIUM DEFICIENCY was seen in 6 Que. nurseries. In 2 of these, on light soils, the condition was sev. at the end of the season (J. Ringuet).

Pome Fruit Virus Diseases in British Columbia

M.F. Welsh and F.W.L. Keane

The apple virus investigations initiated at Summerland in 1953 have produced results in 1958 that indicate the common occurrence of several viruses in commercial apple plantings in British Columbia. The virus that causes stem pitting in a number of hardy apple body stock varieties has been demonstrated to be carried in commerical apple trees of Golden Delicious, Rome Beauty, Red Delicious and Red Winesap.

The presence of the rubbery wood virus has been demonstrated in Red Delicious in commercial orchards and is strongly suspected in clones of several other varieties. A virus obtained from a clone of Rome Beauty when transferred to Virginia Crab caused dwarfing and decline, and another virus from two clones of Viriginia Crab caused a leaf mottle in Prunus tomentosa. Evidence has been obtained that would indicate that the rubbery wood virus is distinct from the stem pitting virus.

Transmission tests have shown that a fruit pitting condition in Flemish Beauty pear is caused by a virus distinct from the stony pit virus, since it could not be transmitted to the variety Bosc.

PEAR

FIRE BLIGHT (Erwinia amylovora) was generally mod. in the Creston Valley, B.C. but sev. in some orchards where proper control practices were not carried out (J.M. Wilks). It was not a problem in the Niagara Peninsula, Ont. but specimens of diseased wood from the Georgian Bay district were seen (G.C. Chamberlain).

LEAF SPOT (Septoria pyricola) caused some defoliation at Toronto, Ont. (G.C.C.).

SCAB (Venturia pirina) was mod. in Flemish Beauty at St. Catharines, Ont. and caused blemishes on 15-20% of the fruit (G.C.C.). Sl.-mod. infections were seen in Kamouraska Co., Que. (R.O. Lachance). Specimens were received at Kentville from Pictou and Halifax Counties, N.S. (J.F. Hockey).

ANJOU PIT (cause unknown). This disease, also known as cork spot was sev. on d'Anjou pears in the Okanagan and Similkameen Valleys of B.C. Industry officials estimated that one-quarter to one-third of the d'Anjou crop was affected. This fruit pitting occurs in varying degrees of

severity in a few scattered orchards each year. In most orchards it occurs in only some seasons with crops of normal fruit in the intervening years. In 1958 it was more common and more sev. than in any previous season, especially in districts from Kelowna north. Two lines of investigation have been in progress at Summerland for several years: (1) to determine the effect of rootstock type on disease incidence and, (2) to determine whether or not the disease is of virus origin (M.F. Welsh).

LEAF SCORCH (physiological) is a fairly common condition in the St. Catharines district of Ont. where it affects only the variety Bartlett. Foliage assumes a reddish-brown coloration and leaves eventually dry out and die. It is considered to be related to shallow rooting and the occurrence of hot, dry weather (G.C.C.).

B. STONE FRUITS

APRICOT

BLOSSOM AND TWIG BLIGHT (Monilinia laxa). A small percentage of trees in a few orchards at Osoyoos, Okanagan Falls, Penticton and Summerland were affected (D.L. McIntosh).

VERTICILLIUM WILT (V. albo-atrum). All the trees in a newly planted block of 3-year old stock were affected at Trout Creek Point, B.C. (G.E. Woolliams).

Twisted Leaf of Cherry and Ring Pox of Apricot

T.B. Lott and F.W.L. Keane

Twisted leaf of cherry and ring pox of apricot have, for some years, been spreading slowly in the Okanagan and Similkameen Valleys of B.C. The two diseases frequently occur together in the same locations. It was shown experimentally that inoculum from diseased cherries often produced ring pox on apricot, and inoculum from ring pox infected apricots produced twisted leaf in cherry. It was also shown that the common native chokecherry could be a symptomless carrier of the twisted leaf virus. Chokecherries growing in locations where one or both of the diseases were present in commerical orchards were indexed on Bing cherry and on apricot. Ring pox appeared on some but not all of the apricots and twisted leaf on some but not all of the cherries. This work confirmed the fact that the viruses causing twisted leaf and ring pox were present in chokecherries growing adjacent to infected orchards. Further work is in progress to test for the presence of the viruses in chokecherries growing at some distance from commerical orchards.

CHERRY

CORYNEUM BLIGHT (Clasterosporium carpophilum) occurred in a home garden at Vancouver, B.C. (H.N.W. Toms).

BLACK KNOT (Dibotryon morbosum). Specimens on sour cherry were received from La Malbaie, Quebec City and Duchesnay, Que. (D. Leblond), and was sev. on Montmorency at Ste. Anne de la Pocatiere, Que. (R.O. Lachance).

BITTER ROT (Glomerella cingulata) was particularly sev. on sour cherry throughout the lower St. Lawrence district of Que. (D. Leblond).

SHOT HOLE (Higginsia hiemalis). Sl. infections were observed in July in the St. Catharines district, Ont. The disease became more sev. in the fall and caused partial defoliation in Oct. It was generally less serious than in recent years (G.C. Chamberlain). Shot hole was recorded from Quebec City, Mont Joli and Montmagny, Que. (D.L.). Unsprayed trees at Kentville, N.S. were completely defoliated (C.O. Gourley).

BLOSSOM AND TWIG BLIGHT (Monilinia fructicola). Bing had 13% infection at St. Catharines, Ont. (G.C.C.). Early Rivers at Tupperville and most varieties at Kentville, Grand Pre and Round Hill, N.S. were 1-2% infected with resultant die back of twigs (C.O.G.).

BROWN ROT (Monilinia fructicola, M. laxa). Diseased fruit from Vernon, B.C. was infected with M. laxa. At Osoyoos, 20% of the fruit on a few trees in 1 orchard were infected with M. fructicola (D.L. McIntosh). Bing was 20% affected at harvest at St. Catharines, Ont. (G.C.C.), and was 50% rotted on an unsprayed tree at Kentville, N.S. (C.O.G.).

POWDERY MILDEW (Podosphaera oxyacanthae) was seen on a few young nursery trees at Ocean Park, B.C. (H.N.W.T.). Unsprayed trees of Montmorency and Sam in the Creston Valley, B.C. had 60% of the new growth affected (J.M. Wilks), and infections were found throughout the Summerland, B.C. district on young leaves and fruit. Affected fruits were much smaller than healthy fruits (G.E. Woolliams). It was commonly encountered in the St. Catharines, Ont. district causing a curling of terminal leaves (G.C.C.).

VERTICILLIUM WILT (V. albo-atrum). Wilt was found in bearing sweet cherry trees in several orchards in the Summerland, B.C. district (G.E.W.).

LITTLE CHERRY (virus). Symptoms were sev. on Lambert in the Creston Valley, B.C. rendering much of the crop unmarketable. Bing was only mildly affected (J.M.W.).

Little Cherry and K.+S. Disease

T.B. Lott and F.W.L. Keane

Kwanzan and Shiro-fugen flowering cherries at Summerland, B.C. were indexed for the virus causing K.+ S. disease. This virus causes a disease in sweet cherry very similar to little cherry. The indexing showed that the stocks of Kwanzan in use at Summerland were infected but that the Shiro-fugen stocks were not. The Kwanzan stocks have been eliminated.

Despite the proximity of the Kwanzan stocks to sweet cherry trees of bearing age and to the indexed stocks of Shiro-fugen there was no evidence of natural spread of the K.+ S. virus from Kwanzan to sweet cherry or Shiro-fugen. Flowering cherries are present to a limited extent as ornamentals throughout the Okanagan Valley. It appears probable that the K.+ S. virus, similar to, and perhaps identical with, the little cherry virus, is now present and has been present for years in at least some of the flowering cherry trees. In the absence of spread to sweet cherries, and in the absence of symptoms in the flowering cherries, the K.+ S. virus could remain present and undetected in the flowering cherries indefinitely.

Little cherry is as yet unreported in the Okanagan and Similkameen Valleys.

Yellows and Necrotic Ring Spot of Cherry

T.R. Davidson

In the Niagara Peninsula leaf symptoms of yellows accompanied by leaf drop was widespread in 1958 but not as sev. as in 1957. Etch symptoms of necrotic ring spot were somewhat more prevalent than in 1957 but did not reach the proportions of 1956. Weather conditions in the spring of 1958 seem to have favored the development of yellows rather than ring spot symptoms.

Spread of these diseases appears to depend upon the age of trees, internal inoculum and isolation from diseased orchards. The greatest spread occurs in orchards 5-10 years of age. One non-isolated virus-free orchard remained healthy for 4 years but in the fifth year 4.5% of the trees

became diseased. A similar orchard with minimum isolation of 100 yards also remained healthy for 4 years. However, in the fifth year 1% of the trees developed disease. In contrast, the spread of virus diseases in a third orchard without isolation and containing an initial internal inoculum of 3% diseased trees has been 4, 5, 7, 16 and 3% in each of the five years respectively.

Other Observations

One English Morello tree at Kentville, N.S. was sev. infected with yellows (G.O. Gourley).

GUMMOSIS (cause undetermined). A few branches of 1 tree in a home garden at Vancouver, B.C. bore linear lesions quite different from those of bacterial canker (H.N.W.T.). A gummosis of undetermined origin was also observed at Loretteville, Que. (D. Leblond).

PEACH

SCAB (Cladosporium carpophilum). Numerous scab spots occurred on the stem end of fruit of Golden Jubilee in an orchard at St. Catharines, Ont. In another the complete crop of 6 trees was badly blemished (G.C. Chamberlain). At Canard, N.S. the scab organism produced small cankers on peach twigs (C.O. Gourley).

CORYNEUM BLIGHT (Clasterosporium carpophilum) caused sl. damage to a tree in a home garden at Vancouver, B.C. (H.N.W. Toms). Light infections were seen on unsprayed trees in the Creston Valley, B.C. (J.M. Wilks).

DIE BACK (Cytospora leucostoma) was sl. at Grand Pre and Wolfville, N.S. (C.O.G.).

BLACK KNOT (Dibotryon morbosum). Tr. infections occurred at Grand Pre, N.S. (C.O.G.).

BLOSSOM AND TWIG BLIGHT (Monilinia fructicola) was tr. in home garden in Vancouver, B.C. (H.N.W.T.). Infection was 5% on Vedette at St. Catharines, Ont. (G.C.C.).

BROWN ROT (Monilinia fructicola). Between 25 and 62% of Vedette fruit held in common storage for 5 days at St. Catharines, Ont. was affected (G.C.C.). A tr. infection was seen at Woodville, N.S. (C.O.G.).

RHIZOPUS ROT (R. nigricans) destroyed a third of the fruits in a packed basket at St. Catharines, Ont. (G.C.C.).

The Post-Harvest Treatment of Peaches for Processing

T. B. Harrison

Fruit rots can cause serious losses in harvested peaches held at the farm until soft ripe for the processor. Infection generally appears at the stem end which is occasionally torn at picking.

In 1958 fruit was available from Elberta trees which had been sprayed with sulphur and DDT three weeks before harvest. Fruit dips were prepared using three commercial fungicides at the following rates in 100 gallons of water (a) captan, 2 lbs., (b) Cyprex, 1 lb., and (c) wettable sulphur, 6 lbs. A water dip served as a control. Harvested fruits were dipped for one minute in each of the preparations and were then stored in either (1) the orchard, (2) the packing shed, or (3) a darkened potato cellar.

After seven days the stored fruit was examined for the presence of rots and infected fruits were set aside of positive identification of the organism concerned. Rot in unprotected fruits held in the orchard exceeded 50 per cent. The fungicidal dips reduced this wastage by one half. Unprotected fruits stored in the packing shed were about 25 per cent rotted and those receiving the fungicidal treatment showed less rot. In the cellar, under uniform day and night temperatures of about 62°F, the differences between treatments were negligible. Sulphur treated fruit did not become infected. The cellar, in contrast to the packing shed and particularly the orchard, was not infested with fruit flies Drosophila spp.

Rhizopus sp. was the causal organism most frequently encountered with some brown rot, Monilinia fructicola, evident on sulphur treated and unprotected fruits. This trial demonstrated that environmental conditions are of considerable importance in the post-harvest ripening of peaches, that fungicidal dips will reduce post-harvest losses from rots under adverse conditions, and that Rhizopus sp. rather than Monilinia fructicola may be the principal rot organism involved.

POWDERY MILDEW (Sphaerotheca pannosa) affected the shoot tips of a dozen trees in the University orchard, Vancouver, B.C. and was seen on fruit from a home garden in Vancouver (H.N.W.T.). It caused blotchy spotting on 50% of the fruits of several varieties at Beamsville, Ont. in a low area where air drainage was poor (G.C.C.). Powdery mildew was seen for the first time in N.S. All varieties in all orchards examined at Woodville and Kentville were affected to the extent of 1-5% of the fruit. Application of sulfur fungicides checked its development (R.G. Ross, C.O.G.).

Powdery Mildew of Peach

G.O. Gourley

On the 15 July, 1958, an abnormal spotting was noticed on the fruit of a peach tree growing in a home garden at Kentville, N.S. This proved on examination to be a species of powdery mildew, possibly Sphaerotheca pannosa (Wallr.) Lev. Cleistothecia were not produced on the peach fruit.

Subsequent examinations of commercial peach orchards revealed that powdery mildew was present on the fruit in all orchards visited ranging in intensity from a trace to approximately five per cent. Mildew was not found on the twigs, buds or leaves of the peach tree. Infected areas on the fruit ranged from barely visible greyish spots to spots of 1-1 1/2 inches in diameter.

A survey of the variety trial orchard situated on the Kentville Experimental Farm showed that the possibility of varietal resistance to powdery mildew is quite remote. Of the 68 varieties examined 58 had mildew infection on the fruit, seven had no fruit and three had less than a dozen peaches per tree. Since this is the first time that powdery mildew has been found on the peach in Nova Scotia it is difficult to explain the sudden widespread infection that occurred in 1958.

An application of sulfur fungicide, on the recommendations of the Kentville laboratory, arrested the growth of established infections and no new infections developed on sprayed trees. The color of the infected areas, after the fungicidal application, gradually faded until at harvest the spots were scarcely discernible.

LEAF CURL (Taphrina deformans) affected 10 trees early in April in the University orchard, Vancouver, B.C. (H.N.W.T.). A few unsprayed trees at Port Weller, Ont. were almost 100% infected.. No leaf curl was seen in sprayed orchards (G.C.C.). Infection was sev. at Woodville Mills, P.E.I. (J.E. Campbell). In N.S. dormant sprays of ferbam or Bordeaux did not give complete control in 1958. Specimens were received from most peach growing areas of the Annapolis Valley (C.O.G.).

VERTICILLIUM WILT (V. albo-atrum). Most of the 3-year old trees in a newly planted block of Valient and Jubilee were mod.-sev. affected at Trout Creek Point, B.C. The disease is also present in older trees in

several other orchards in the district (G.E. Woolliams). It caused the loss of 25% of the trees in a 6-acre, 2-year old block in Essex Co., Ont. Tomatoes, peppers and other susceptible crops had been planted on this land for several years prior to the setting out of the orchard (R.W. Walsh). At Virgil, Ont. wilt caused defoliation of 1 side of 8/100 trees (G.C.C.).

WINTER INJURY. In many orchards in Essex Co., trees died from injury attributed to the low temperatures and drying winds of the previous winter. Necrotic areas 3-10 inches wide occurred in the bark of the trunks from ground level to a height of 2 feet. In many cases the trunk was completely girdled. Necrotic spots 10-50 mm. in diameter appeared in the cambium layer of scaffold limbs. Losses ranged from a few to 10% of the trees in orchards of 2-10 acres in size and from 2-12 years of age (R.W.W.).

PLUM

BLACK KNOT (Dibotryon morbosum) occurred in a home garden at Kelvington, Sask. (T.C. Vanterpool). Many trees in the Saint John, N.B. area were sev. affected (S.R. Colpitts). Approximately 25 trees in a neglected plum orchard at Canard, N.S. were killed by the black knot fungus (C.O. Gourley). Damson plum trees were sev. affected in the South East Placentia district of Nfld. (O.A. Olsen).

BLOSSOM AND TWIG BLIGHT (Monilinia fructicola) affected about 1% of the twigs of Magnum Bonum at MacDonald's Corner, N.S. (C.O.G.).

PLUM POCKETS (Taphrina pruni) destroyed 50% of the fruit of trees in a home garden at Ottawa, Ont. (I.L. Conners). Trees in a small orchard at St. Stepehen, N.B. were sev. infected (S.R.C.). Infection was 10% on Burbank at Upper Dyke, N.S. (C.O.G.).

LOW TEMPERATURE INJURY. About 80% of the fruit in a carload of California plums showed internal evidence of protracted storage at temperatures close to 32°F. (J.L. Howatt).

PRUNE

BLACK KNOT (Dibotryon mobrosum). Fellenburg prune trees at Port Weller, Ont. were sev. attacked. Italian prune was much less seriously affected. Scattered infections were reported on Stanley prune at Niagara Falls, Ont. (G.C. Chamberlain).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was mod. on 1 red currant bush at Clearwater Bay, Ont. (W.L. Gordon). Infection was heavy at Trois Pistoles, Que. (D. Leblond). It was observed in 7 Que. nurseries. Infection ranged from 5-80% (J. Ringuet). Light infections were seen at St. John's West, Nfld. (O.A. Olsen).

ANTHRACNOSE (Drepanopeziza ribis). A 2% infection caused some defoliation at Waterville, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae) occurred on the foliage and fruit of black currants at Summerland, B.C. Cleistothecia developed on the fruit. The disease is common throughout the Okanagan Valley (G.E. Woolliams). Sev. affected specimens were received from 2 localities in northern Sask. (R.J. Ledingham). Infection was tr. on black currants at Trois Pistoles, Que. (D.L.).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola). Light infections were recorded on several varieties at St. John's West, Nfld. (O.A. Olsen).

RUST (Puccinia caricina) was tr. at Kentville, N.S. (C.O. Gourley).

POWDERY MILDEW (Sphaerotheca mors-uvae). The variety White Smith was sev. infected at Kentville, N.S. and suffered a loss of 50% of the fruit (C.O.G.).

D. RUBUS FRUITS

RASBERRY

CROWN GALL (Agrobacterium tumefaciens) was seen on Viking in 2/27 nurseries inspected in Que. (J. Ringuet).

GRAY MOLD (Botrytis cinerea). Infection of twigs and berries was sl. at Berthier and Ste. Foy and sev. at Lac des Aigles, Que. (D. Leblond).

SPUR BLIGHT (Didymella applanata) was general in the Quebec City area causing varying amounts of damage (D.L.). Specimens were received from Abitibi Co., Que. (L.J. Coulombe). Viking was 15% infected at Berwick, N.S. (C.O. Gourley).

ANTHRACNOSE (Elsinoë veneta). Sev. affected canes from Belleville, Ont. were received at Ottawa (D.W. Creelman). It was observed on Herbert, Newburg and Viking at Ste. Foy, and specimens from Ste. Angele de Laval and Beaumont, Que. were examined (D.L.). It was 1-sl./27 Que. nurseries (J. Ringuet). Anthracnose is common in N.B. An unsprayed plantation of Viking at Sussex, N.B. was 100% infected with some killing of young shoots (S.R. Colpitts). Infection was 2% on Viking, Newburg, Durham and Indian Summer at Berwick, N.S. (C.O.G.). Sev. damage occurred in a planting at Port Lorne, N.S. New growth was sharply reduced and many berries were deformed. At Kentville, N.S. fall cutting and burning of infected canes of a susceptible variety was effective in cleaning up a sev. infection. (K.A. Harrison). Anthracnose was general in P.E.I. in 1958 especially where canes were crowded. Flower stalks and fruit as well as leaves and canes were attacked at Charlottetown causing considerable damage to the crop (J.E. Campbell). Infection ranged from 10-15% at St. John's West, Nfld. (O.A. Olsen).

CANE BLIGHT (Leptosphaeria coniothyrium) was mod. at La Gorgendiere, Que. (D.L.).

LATE LEAF RUST (Pucciniastrum americanum) occurred in 12/27 Que. nurseries (J. Ringuet). It was widespread and destructive in N.B. in 1958. The cool, wet weather seemed favorable for its development. In many cases 50% of the berries were affected (J.L. Howatt). Viking was heavily attacked at New Haven, P.E.I. (J.E.C.). Viking also showed 30% fruit infection at Aylesford and 100% infection in a planting at Kentville, N.S. Many specimens were received at Kentville, for identification (K.A.H.). A 10% infection was seen at Berwick, N.S. (C.O.G.). and tr. infections occurred at St. John's West, Nfld. (O.A.O.).

LEAF SPOT (Mycosphaerella rubi) was tr. on Trent at Melvern Square and Berwick, N.S. (C.O.G.).

VERTICILLIUM WILT (V. albo-atrum) was more prevalent in Essex Co., Ont. than at any time in the last 8 years. In addition to its occurrence on raspberry it was observed on a wide range of hosts including strawberry, tomato, pepper, eggplant, barberry and multiflora rose (R.W. Walsh). It was sev. at Berthier, Que. (D.L.). At Ste. Famille and Ste. Pierre on Ile Orleans and at Chateau Richer, Que. wilt was sl-mod. in poorly drained portions of fields (L.J.C.).

BLUESTEM (Verticillium albo-atrum). Specimens were seen from Dundas, Ont. (G.C. Chamberlain).

LEAF CURL (virus). A plantation at Moncton, N.B. was 75% affected. Plants were stunted and the crop was a near failure (S.R.C.).

MOSAIC (virus) ranged from 0.2-5% in 17/27 Que. nurseries (J. Ringuet). It is widespread in most garden plots in N.B. A 30% infection was recorded in Viking at Gagetown, N.B. (S.R.C.).

TOBACCO NECROSIS VIRUS. This soil-borne virus infected plants both in the greenhouse and in experimental plots at Vancouver and Agassiz, B.C. (R. Stace-Smith).

FROST INJURY. Late spring forsts injured plants at Ste. Angele de Laval, St. Henri and La Ferme, Que. (D.L.).

HEAT AND DROUGHT INJURY. Dry weather affected raspberries generally in Sask. The injury was further aggravated by mite infestation (T.C. Vanterpool).

IRON DEFICIENCY symptoms occurred on second-year canes in 2 home gardens at Lulu Island, B.C. (H.N.W. Toms).

BLACKBERRY

ANTHRACNOSE (Elsinoë veneta). Blackberry canes in a home garden at Southport, P.E.I. did not set fruit. Anthracnose lesions were numerous on leaves and canes and particularly on flower parts (J.E. Campbell).

MAGNESIUM DEFICIENCY. Interveinal and marginal necrosis typical of Mg. deficiency was quite pronounced on blackberry leaves at Tryon, P.E.I. (J.E.C.).

E. OTHER FRUITS

BLUEBERRY

Twig and Blossom Blight of Lowbush Blueberry

C.L. Lockhart

Twig and blossom blight caused by Botrytis cinerea Pers. and Monilinia vaccinii-corymbosi (Reade) Honey was more severe than usual in lowbush blueberries in Nova Scotia during 1958. Blueberries at

Steam Mill and two fields at Lakeville in Kings County were found to be 5 and 2 per cent infected respectively. In a survey in Cumberland County in mid-July, blighted blossoms and mummy berries were found in the Farmington district where the disease had not been observed previously. The Farmington fields showed 2 per cent infection.

A grower at West Brook, also in Cumberland County, reported a heavy infection of twig and blossom blight in a field not dusted while nearby blueberry fields that were dusted showed a satisfactory control of twig and blossom blight.

The blueberry crop in 1958 was about two-thirds of a normal crop and it is estimated that 15 per cent of the loss was due to twig and blossom blight.

Frost damage to lowbush blueberries

C. L. Lockhart, Kentville, N. S.

Lowbush blueberry blossoms were damaged by frost on June 9, 1958 in a field at West Brook, Cumberland County, N.S. The plants were near the mid-bloom stage. The petals and stamens turned brown and dropped. On examination it was found that 10 per cent of the ovaries had turned dark due to the frost. The subsequent loss of 95 per cent of the blue berry crop may have been partially due to the loss of pollen when the petals dropped. Several other fields in Cumberland County were visited in mid-July and none were found to have been seriously affected by the frost. Two growers with fields in the Truro area of Colchester County reported severe frost damage. One grower did not attempt to rake his fields and the other had only a 5 per cent crop.

Other Observations

RED LEAF (Exobasidium vaccinii) was widespread in most blueberry fields in Charlotte Co., N.B. but damage was sl. (S.R. Colpitts). The average damage caused by red leaf in N.S. was estimated at 3% (C.L.L.). At Avondale and Upper Gullies, Nfld. red leaf was much more prevalent than in 1957 (O.A. Olsen).

FUSICOCCUM CANKER (F. putrefaciens). Crowns of the variety Kengrape at Kentville, N.S. were sev. infected (C.L.L.).

TWIG AND BLOSSOM BLIGHT (Monilinia vaccinii-corymbosi) was general in Charlotte Co., N.B. in 1958 and damp, cool weather prevailed during bloom. The yield reduction attributed to blight was 10% (S.R.C.).

WITCHES' BROOM (Pucciniastrum goeppertianum) was present in all blueberry fields examined in Charlotte Co., N.B. (S.R.C.). Scattered infections were seen in all fields at the blueberry sub-station at Avondale, Nfld. The heaviest infections occurred in the area burned over in the spring of 1958 (O.A.O.).

MOSAIC (virus). One plant of each of the varieties Pioneer and Atlantic was infected at Kentville, N.S. The Atlantic plant showed sev. symptoms (C.L.L.).

STUNT (virus). One 30-year old plant of the Grover variety at Kentville, N.S. was sev. affected and produced little fruit (C.L.L.).

CHEMICAL INJURY. At Sutherland's Lake, N.S. sev. defoliation followed a heavy application of dust containing calcium arsenate for maggot control (C.L.L.).

GRAPE

BLACK ROT (Guignardia bidwellii). Infection on Agawam at Stamford, Ont. was light and a few vineyards at Grassie's Ont. were mod. infected with some berry rot and shelling (G.C. Chamberlain).

DEAD ARM (Phomopsis viticola). Sev. stunting of arm growth was noted in young plantings of Seibel 10878 in the Niagara Peninsula, Ont. This is a new variety which appears to be very susceptible to infection by P. viticola (G.C.C.).

DOWNY MILDEW (Plasmopara viticola). In the absence of protective sprays heavy infections occurred on such susceptible varieties as Van Buren and Fredonia in many small plantations in Essex Co., Ont. It was more sev. and widespread than at any time in the last 8 years (R.W. Walsh). In the St. Catharines district of Ont. the disease was commonly found in vineyards of Fredonia, Buffalo and Van Buren causing a considerable loss of fruit clusters. A complete loss of fruit was sustained in a 200-vine planting of Buffalo despite the application of Bordeaux sprays. Poor timing of the first spray was probably responsible (G.C.C.).

POWDERY MILDEW (Uncinula necator). Mod.-sev. infections occurred on Seneca, Delaware and Agawam in the Niagara Peninsula, Ont. (G.C.C.).

STRAWBERRY

GRAY MOLD (Botrytis cinerea) was sev. in a planting at Fort Garry, Man. About 50% of the blossoms were destroyed (B. Peturson). A few fruits of Premier were rotted at St. Catharines, Ont. (G.C. Chamberlain). It was mod. on Senator Dunlop at Ste. Foy, Que. (D. Leblond). Flower infection and rot of berries was sev. at Gagetown, N.B. The weather at harvest was cool and damp. Plantations with lush growth suffered heavily (S.R. Colpitts). In Kings Co., N.S. Botrytis fruit rot was not serious in 1958. It occurred near the end of the picking season in some irrigated fields (C.O. Gourley).

LEAF BLIGHT (Dendrophoma obscurans) was tr. on Senator Dunlop at Kentville, N.S. (C.O.G.).

LEAF SCORCH (Diplocarpon earliana). The perfect stage was found on overwintered leaves at Kentville, N.S. (C.O.G.).

LEAF BLOTCH (Gnomonia fructicola) caused sl.-mod. injury to foliage in Vancouver Island, B.C. plantings (W.R. Orchard). Infection on hulls of ripe berries of Sparkle was 2% at Kentville, N.S. (C.O.G.).

LEAF SPOT (Mycosphaerella fragariae) was widespread in N.B. fields and in some caused defoliation (S.R.C.). Wild strawberries at Melvern Square, N.S. were 100% infected (C.O.G.). Infection was about 20% on several varieties at St. John's West, Nfld. (O.A. Olsen).

RED STELE (Phytophthora fragariae) is present in many Vancouver Island, B.C. plantings. Damage ranges from sl.-sev. (W.R.O.). At Chester Basin, N.S. Catskill plants in a low, wet area of a field were sev. affected by red stele. Sparkle plants, immediately adjacent but not quite so wet, were entirely free of the disease (C.O.G.).

ROOT-LESION NEMATODES (Pratylenchus penetrans) were found in 24/48 samples from the Fraser Valley and in 8/12 samples from Vancouver Island, B.C. (J.E. Bosher).

PIN NEMATODES (Paratylenchus sp.) occurred in 5/12 soil samples from strawberry fields at Keating, B.C. (J.E.B.).

CROWN AND ROOT ROT (Rhizoctonia solani). This organism was isolated consistently from plants whose characteristic field symptom was a sudden permanent wilt immediately prior to and during the early fruiting stage. The disease was widespread on the B.C. mainland and Vancouver Island and caused an estimated 5-10% loss of the potential crop (W.R.O.).

POWDERY MILDEW (Sphaerotheca humuli) caused sev. damage on Vancouver Island, B.C. in plantings where preventative sprays were not applied. At Penticton, B.C. the disease caused sl. injury consisting of an indefinitely outlined red-colored lesion. The fungus grows on the lower leaf surface as a very scanty, evanescent growth which can be detected only with the aid of a microscope (G.E. Woolliams). Infection was light in a home garden at Hemmingford, Que. (R. Crête). Tr. infections were seen in several districts in N.S. both in fruiting and nursery plantings. The application of Karathane appeared to provide protection (C.O.G.).

WILT (Verticillium albo-atrum) continues to be a problem in commercial strawberry plantings in B.C. In some cases damage is sev. (W.R.O.). At Port Williams, N.S. 50% of a small planting was infected. The infected plants died (C.O.G.).

GANGRENE (various organisms). Affected plants were observed at St. Laurent, Deschambault, Les Boules and Trois Pistoles, Que. Isolations from affected crowns yielded Botrytis cinerea, Verticillium albo-atrum, Fusarium spp. and other organisms (D. Leblond).

ROOT ROT (various organisms) caused sl. damage to Senator Dunlop at St. Pierre, Isle Orleans, Que. (L.J. Coulombe).

GREEN PETAL (virus) was mod. on Senator Dunlop at Ste. Foy, Que. Yellows symptoms were striking on adjacent carrots, and Callistephus and alsike clover growing amongst the strawberries showed symptoms of phyllody (D.L.). It was tr.-mod. mainly on Senator Dunlop in the lower St. Lawrence and Quebec City districts. In fields in their first year of production tr. infections only were seen. In the second producing year infection was as much as 5-10% while in a few older fields 20-25% of the plants were affected. Green petal does not seem to be a menace since very few growers retain plantings past the second production year (R.O. Lachance). In N.B. it was widespread but did not exceed 2% infection in any of the fields checked (S.R.C.). Green petal was found in all commercial varieties in Kings and Annapolis counties, N.S. Most new plantings had some infection which in some instances ran as high as 5%. The average infection was 2%. Specimens were seen as well from Pictou, Yarmouth, Lunenburg and Cumberland counties (C.O.G.).

TOBACCO NECROSIS VIRUS. This soil-borne virus affected plants in both the greenhouse and experimental plots at Vancouver and Agassiz, B.C. (R. Stace-Smith).

JUNE YELLOWS (genetic breakdown) occurred on Premier affecting about 5% of the plants in fields at Grantham and Port Weller, Ont. Affected plants were stunted (G.C.C.).

CHEMICAL INJURY. The application, in hot weather, of lime-sulfur for powdery mildew control caused sl. injury to the foliage of plants on Vancouver Island, B.C. (W.R.O.).

V. DISEASES OF TREES AND SHRUBS

ABIES - Fir

Witches' Broom (Melampsorella caryophyllacearum). Light infections were observed on A. balsamea at Upton, P.E.I. (J.E. Campbell).

ACER - Maple

Leaf Spot (Phleospora aceris) was sev. on A. pensylvanicum at Ste. Anne de la Pocatiere, Que. (D. Leblond).

Leaf Spot (Phyllostica minima) was mod. on A. rubrum at Ste. Anne de la Pocatiere and specimens on A. saccharinum were received from Quebec City, Que. (D.L.).

Tar Spot (Rhytisma punctatum) was sev. on A. spicatum at Ste. Anne de la Pocatiere, Que. (D.L.).

Frost Injury. Late spring frosts in Que. caused extensive damage to A. saccharinum at Quebec City and to A. saccharum at St. Come de Liniere and St. Jean de Dieu, Que. (D.L.).

AESCULUS - Horse Chestnut

Leaf Blotch (Guignardia aesculi). Leaf blotch was general on horse chestnut in P.E.I. in 1958. (J.E. Campbell). Reports from Amherst, N.S. indicated a 90% infection and sev. defoliation in Aug. (J.F. Hockey). At Kentville, N.S. about 2% of the foliage was infected (C.O. Gourley).

AMELANCHIER

Rust (Gymnosporangium clavariaeforme) was mod. on A. stolonifera at Ste. Anne de la Pocatiere, Que. (D. Leblond) and sl. on Amelanchier sp. in the vicinity of St. John's, Nfld. (O.A. Olsen).

Leaf Spot (Phyllosticta ? paupercula) caused a mod. infection on A. stolonifera at Ste. Anne de la Pocatiere, Que. The spores in this collection were larger than those of P. innumerabilis (D.L.).

Leaf Blotch (Physalospora obtusa) was sl. on A. stolonifera at Ste. Anne de la Pocatiere, Que. (D.L.).

BERBERIS - Barberry

Leaf Spot (Phyllosticta berberidis). Mod. infections were seen on B. vulgaris in Battlefields Park, Quebec City, Que. (D. Leblond).

Rust (Puccinia graminis) was mod.-sev. in a nursery at St. Hilaire, Que. (J. Rinquet).

CARAGANA

Leaf Spot (Phyllosticta gallarum). Infection was sl. on C. arborescens at Trois Pistoles, Que. (D. Leblond).

CORNUS - Dogwood

Bark Splitting. The effects of the 1955 freeze continue to be reported on native dogwoods (C. nuttalli) in the Vancouver, B.C. area (H.N.W. Toms).

CRATAEGUS - Hawthorn

Leaf Blight (Entomosporium thuemenii) was sev. on hawthorns at La Gorgendiere, Que. (D. Leblond).

FORSYTHIA

Blossom and Twig Blight (Botrytis cinerea) affected 60% of the flowers and adjacent leaf buds at Kentville, N.S. (K.A. Harrison).

ILEX - Holly

Leaf and Twig Blight (Phytophthora ilicis) was found in a single holly orchard at Gordon Head, B.C. Infection resulted in leaf spotting, premature defoliation and some cankering of twigs on lower branches. A survey of commercial holly orchards on Vancouver Island showed that this disease is not widespread in the area (W.R. Orchard).

Green Scum (Protococcus sp.) A green alga grows profusely on leaves and twigs of established holly trees in B.C. and other parts of the Pacific Northwest and presents a nuisance problem to most holly orchardists. The currently recommended sanitary spray schedule of 1 fall and 1 spring spray with tri-basic copper sulphate 2/100 will not eliminate the problem where air drainage is inadequate or where low pressure apparatus fails to give good coverage (W.R.O.).

Oedema (cause unknown). A few affected leaves were received from Hatzic, B.C. for diagnosis (H.N.W. Toms).

LONICERA - Honeysuckle

Leaf Blight (Herpobasidium deformans) was sev. on specimens from Granby and mod. on 1000 plants at Ste. Foy, Que. (H.S. Thompson). It was also sev. on L. tatarica at Thetford Mines and Montreal, Que. (D. Leblond).

Leaf Spot (Kabatia lonicerae) was sev. on L. canadensis at Ste. Anne de la Pocatiere, Que. (D.L.).

MALUS

Rust (Gymnosporangium clavipes). A heavy infection occurred on ornamental crabs at St. John's West, Nfld. Most of the infected fruits produced aecia. No infection occurred in an apple orchard 350 yds. from the site (O.A. Olsen).

MAHONIA

Rust (Cumminsiella mirabilissima). Heavy infections occurred on 2500/3000 plants in a nursery at Trafalgar, Ont. The plants were imported in 1956 (H.S. Thompson).

PICEA - Spruce

Needle Rust (Chrysomyxa ledicola) was recorded on P. pungens var. glauca at St. Edouard, Que. (D. Leblond).

POPULUS - Poplar

Ink Spot (Ciborinia whetzelii) affected 3 small trees of P. nigra var. italica at Riviere du Loup and was mod. on 200 other trees in a nursery at Ste. Foy, Que. (H.S. Thompson). The same species of poplar was also affected at Sacre Coeur, Que. (D. Leblond).

Canker (Cytospora chrysosperma). More than 50% of the trees of P. grandidentata in a large stand at Silver Lake Provincial Park, Ont. bore large trunk or branch cankers. Affected trees had not produced leaves in mid-May and it seemed probable that all would die (D.W. Creelman).

Leaf Spot (Marssonina brunnea) was mod. on specimens received from St. Bruno, Que. (H.S.T.).

Rust (Melampsora abietis-canadensis). Sev. infections were seen on P. tremuloides at Ste. Anne de la Pocatiere, Que. (D.L.).

PHILADELPHUS - Mock Orange

Leaf Spot (Ascochyta sp.). Mod. infections occurred on 1000 plants in a nursery at Rougemont, Que. (H.S. Thompson).

PINUS - Pine

Rust (Cronartium coleosporioides) was found on a branch of a 5-6-year old tree of P. contorta near Summerland, B.C. (G.E. Woolliams).

White Pine Blister Rust (Cronartium ribicola) affected about 10% of the trees in a young stand of P. strobus at Kentville, N.S. (C.O. Gourley).

PRUNUS - Flowering Cherry

Blossom and Twig Blight (Monilinia fructicola). A sev. infection on P. glandulosa resulted in cankering and death of 10-75% of the shoots of a number of shrubs at Kentville, N.S. (J.F. Hockey).

Leaf Drop (cause undetermined). Defoliation of P. cerasifera at Vancouver, B.C. was noticeable in May (H.N.W. Toms).

PYRACANTHA

Scab (Fusicladium pyracanthae) caused heavy damage to berry clusters of P. coccinea at Saanichton, B.C. In one garden 75% of the fruits and pedicels were infected (W.R. Orchard).

PYRUS - Mountain Ash

Fire Blight (Erwinia amylovora) occurred on P. americana at Quebec City, Que. (D. Leblond).

Rust (Gymnosporangium spp.). Sev. leaf infections were seen on P. decora at Clearwater Bay, Ont. Nearby P. aucuparia was not infected (W.L. Gordon). P. americana was infected by G. juniperi at St. John's West, Nfld. (O.A. Olsen).

Leaf Spot (Phyllosticta sp.) was sl. on P. americana at Ste. Anne de la Pocatiere, Que. (D.L.).

QUERCUS - Oak

Anthracnose (Gloeosporium nervisequum). Leaves bearing mod. infections were received from Manotick, Ont. (D.W. Creelman)

Leaf Blister (Taphrina caerulescens) was mod. on Q. rubra at Charlottetown, P.E.I. (J.E. Campbell).

RHAMNUS - Buckthorn

Crown Rust (Puccinia coronata). Tr. infections only were seen on R. cathartica at Charlottetown and Summerside, P.E.I. It was much lighter in intensity than usual (J.E. Campbell).

RHODODENDRON

A Wilt of cultivated Rhododendron associated with Pestalotia macrotricha Klebahn

J.F. Hockey

Some of the cultivated rhododendron plants grown in a "slat" house in a commercial nursery at Centerville, Nova Scotia were observed on September 25, 1958 to be affected by a wilt. The majority of the wilted plants had one or more stems affected. The leaves drooped along the stem rather than holding their normally rigid position, and some of the current season green wood bore tan-colored cankers extending from a basal scar upwards toward the top whorl of leaves.

An examination of the crowns of affected plants revealed the presence of partially or completely girdled scion wood, the bark of which loosened readily to expose a thin, white felt of fungus mycelium. The stocks on which the scions were grafted appeared normal and buds had developed from some stocks giving rise to shoots.

Observations were made about a week later on the plants remaining and the prevalence of wilt was recorded. These data presented in the following table.

The incidence of wilt in the nine varieties of rhododendron

Caractacus	10/16	Mrs. P. Den Ouden	0/25
Dr. H.C. Dresselhuys	3/25	Lee's Dark Purple	0/30
America	3/28	Dr. H.J. Lovink	0/30, 0/30
Mrs. C.H. Sargent	10/22	Van Dee Hoop	0/28
F.D. Goodman	2/30		

Cultures on potato-dextrose-agar of sub-epidermal tissue from affected plants yielded a Pestalotia which fitted well the description of P. macrotricha Klebahn. Acervuli of this fungus appeared on affected stems after about two weeks in a moist chamber.

A similar condition was described by Howarth and Chippendale (Gard. Chron. 86: 471, 1929). They reported a heavy mortality in rhododendrons 3 to 5 years after grafting and stated that Pestalotia macrotricha was readily isolated from stems and branches of affected plants. White (Phytopath. 20: 85-91, 1930) showed P. macrotricha and P. rhododendri to be weak parasites on rhododendrons. Both organisms could enter the plants through wounds or injuries and once established could invade otherwise healthy tissues.

Note: Specimens from Centerville submitted with this report agreed well with Klebahn's description of P. macrotricha and with collections filed under this name in DAOM. P. macrotricha has not previously been reported on Rhododendron in the Survey, though there is a collection on leaves from Annapolis Royal, N.S., in the Kentville herbarium. P. rhododendri (D. Sacc.) Guba has been reported as causing a leaf spot in B.C. (P.D.S. 12: 1933) and Quebec (P.D.S. 16: 1937).

Guba (Phytopath. 19: 191-231, 1929) in his monograph of Pestalotia retains Klebahn's species as distinct from P. rhododendri. In a more recent study Steyaert (Bull. Jard. bot. Brux. 19: 285-354, 1949) maintains that Pestalotia de Not. is a monotypic genus with P. pezizoides de Not. the single species. The remaining species of Pestalotia he disposes in two new genera, Pestalotiopsis and Truncatella. He places P. macrotricha Klebahn in synonomy with Pestalotiopsis guepini (Desm.) Steyaert, the type species of the new genus (D.W. Creelman).

RIBES - Flowering Currant

Anthracnose (Drepanopeziza ribis). Heavy infections occurred on 1000 plants of R. alpinum in a nursery at Port Burwell and mod.-sev. infections were prevalent in the Ottawa, Ont. district (H.S. Thompson). At St. Jean, Que. 50% of the plants in a hedge were sev. infected and defoliation was about 20% (L. Cinq-Mars, D.B.O. Savile). It was sev. at Les Saules and mod. on 3000 nursery plants at Ste. Monique des Saules, Que. (D. Leblond, H.S.T.). Anthracnose was 8-sl. 5-mod. 1-sev./14 Quebec nurseries inspected (J. Ringuet).

ROBINIA - Locust

Anthracnose (Gloeosporium sp.). Mod. infections occurred on leaves and twigs of R. pseudo-acacia at Ste. Anne de la Pocatiere, Que. (D. Leblond).

ROSA - Rose

Gray Mold (Botrytis cinerea) caused sev. flower spotting on floribunda roses at Saanichton, B.C. The infection was apparently spread from an underplanting of Viola by overhead irrigation (W.R. Orchard). Rosebuds in a garden at Lethbridge, Alta. were affected (J.E. Moffatt).

Black Spot (Diplocarpon rosae) was not as sev. in the St. Catharines laboratory garden as in previous years but did develop in unsprayed plots late in Sept. and early in Oct. (W.G. Kemp). Most varieties in a nursery at Bunbury, P.E.I. showed sl.-mod. infections (J.E. Campbell). Infections as high as 80% occurred on the varieties Doctor and Mrs. Calcombeth at Kentville, N.S. Other varieties were less affected (J.F. Hockey).

Powdery Mildew (Sphaerotheca pannosa). An extremely sev. infection was observed on the variety Better Times in a large rose range at Port Dover, Ont. The greenhouse was drafty and humid (W.G.K.). Sl.-mod. infections were seen in several gardens at St. Jean, Que. (R. Crête). It was mod. on several varieties in a nursery at Bunbury, and mod.-sev. on climbers at Charlottetown, P.E.I. (J.E.C.). Specimens of mildew paratized by Cicinnobolus sp. were received from Meteghan, N.S. (R.G. Ross).

Wilt (Verticillium dahliae). The organism was isolated from 1/5 plants from a garden at Lachine, Que. The affected stems showed light to medium brown diseased areas (H.S.T., J.W. Groves).

Mosaic (virus). One plant of the variety White Butterfly was infected in a greenhouse at Oxford, N.S. (K.A. Harrison).

? Manganese Toxicity. Interveinal chlorosis typical of manganese toxicity or molybdenum deficiency, either of which is expressed under the acid soil conditions prevailing, was pronounced on a climber rose bush at Charlottetown, P.E.I. Blooms did not persist but dropped off within 24 hours (J.E.C.).

SALIX - Willow

Crown Gall (Agrobacterium tumefaciens) affected 1 tree of S. blanda at L'Abord a Plouffe, Que. (J. Ringuet).

Canker (Cytospora chrysosperma). A sample of 10 young trees was submitted from a nursery in Toronto. All were heavily infected and only 2/10 were alive at the time of examination (H.S. Thompson).

Scab and Twig Blight (Fusicladium saliciperdum, Physalospora miyabeana). Several trees on a golf course near Hull, Que. were sev. damaged, others moderately so and still others bore traces of infection. P. miyabeana was fruiting in small branch cankers (D.W. Creelman). Specimens were seen from Quebec City, Roberval, Turtle Lake and Carleton, Que. (D. Leblond). Willows in a nursery at Southport, P.E.I. suffered considerable damage (J.E. Campbell). At Grand Pré, N.S. where many willows were killed a few years ago, some blight has occurred on young shoots that have developed in the last 3 or 4 years. S. babylonica and S. pentandra have made good recovery and S. caerulae is immune to blight (K.A. Harrison).

Powdery Mildew (Uncinula salicis) was prevalent near Kleena Kleene, B.C. Cleistothecia developed in abundance (G.E. Woolliams).

SPIRAEA

Leaf Spot (Cylindrosporium spiraeicola) was mod. in nurseries at St. Paul de Joliette and Rougemont, Que. (J. Ringuet).

Coral Canker (Nectria cinnabarina) caused sl. damage to S. vanhouttei at Quebec City, Que. Both the Nectria and Tubercularia stages were present (D. Leblond).

SYRINGA - Lilac

Leaf Spot (Phyllosticta ? syringella). A sl. infection was observed on a hedge at Ste. Anne de la Pocatiere, Que. (D. Leblond).

Twig Blight (Pseudomonas syringae). Specimens were received from Halifax, N.S. with a report that 20% of the shoots in a hedge were affected (J.F. Hockey).

Frost Injury. June frosts caused sev. damage to lilacs at Val Brilliant and Quebec City, Que. (D.L.).

THUJA - Cedar

Drought Injury. A reddening of leaves, attributed to drought, was general on T. plicata in the lower Fraser Valley, B.C. (H.N.W. Toms).

Twig Reddening. The effects of the 1955 freeze still continue to show up in the Vancouver, B.C. district (H.N.W.T.).

TILIA - Basswood

Anthracnose (Gloeosporium tiliae) was mod.-sev. on T. americana at Point Prim, P.E.I. One tree was defoliated early in the season but produced a second crop of foliage which was also attacked (J.E. Campbell).

ULMUS - Elm

Leaf Spot (Gnomonia ulmea) was sl. on a hedge at Cornwall, Ont., sl. on 175 plants of U. pumila at La Tugue, sl.-mod. on 1,000 plants at Charlesbourg, and on 400 plants at Ste. Foy, Que. (H.S. Thompson).

Coral Canker (Nectria cinnabarina) sev. affected a hedge and affected 900/1000 plants of U. pumila in a nursery at Ottawa, Ont. (H.S.T.). Specimens were seen from Ste. Germaine and Quebec City, Que. (D. Leblond). A hedge at Charlottetown, P.E.I. was mod. attacked (J.E. Campbell).

Chemical Injury. Chemical weed control programs in the city of Windsor, Ont. resulted in considerable damage to U. pumila as well as to roses, Hibiscus, Liriodendron, Salix, apples, pears, and grapes (R.W. Walsh).

VIBURNUM

Downy Mildew (Plasmopara viburni). Light infection caused negligible damage to V. opulus in a nursery at Les Saules, Que. (J. Ringuet).

VI. DISEASES OF HERBACEOUS ORNAMENTALS

ALTHAEA - Hollyhock

Rust (Puccinia malvacearum) was commonly encountered in the Okanagan Valley, B.C. (G.E. Woolliams). Heavy infections occurred at Winona and Hamilton (W.G. Kemp), and at Carp and Mountain, Ont. (H.S. Thompson). Specimens were received from Valcourt, Roberval and Levis, Que. (D. Leblond). Infection was sev. at Moncton, N.B. (S.R. Colpitts) and mod.-sev. at Charlottetown, P.E.I. (J.E. Campbell).

ANTIRRHINUM - Snapdragon

Powdery Mildew (Oidium sp.) was particularly heavy on a block of 300 young plants of the variety Christina at Hamilton, Ont. (W.G. Kemp).

Rust (Puccinia antirrhini). The greenhouse variety Indian Chief was heavily infected at St. Catharines, Ont. Snowman and Hercules were infected to a lesser degree (W.G.K.).

Stem Canker (Rhizoctonia solani) affected 77/100 Snowman plants in a Hamilton, Ont. greenhouse. It appeared that the seedlings had been planted too deeply (W.G.K.).

AQUELIGIA - Columbine

Powdery Mildew (Erysiphe cichoracearum) was common in all sections of the Okanagan Valley, B.C. (G.E. Woolliams).

ARABIS

White Rust (Albugo candida) was general on all plants of A. albida in a home garden rockery at Vancouver, B.C. (H.N.W. Toms).

ASTER

Rust (Coleosporium asterum) was sl. on A. novi-belgii at Ste. Thérèse, Que. (J. Rinquet).

Wilt (Fusarium sp.) was sev. in a planting at the University, Edmonton, Alta. (L.E. Tyner).

AZALEA

Gray Mold (Botrytis cinerea). Sev. defoliation and bud infection occurred after a shipment of Azalea plants had been kept in a greenhouse for 2 months in Kings Co., N.S. Some injury was evident when the shipment was received (K.A. Harrison).

BEGONIA

Anthracnose (Gloeosporium begoniae) was sl. at Ste. Foy, Que. (D.L.).

Powdery Mildew (Oidium begoniae). Mod. damage was observed on potted greenhouse plants at Victoria, B.C. (W.R. Orchard). At Penticton, B.C. the disease was evident on several varieties in a home garden. Leaves were dwarfed and fewer in number than normal. Flower production was much reduced (G.E. Woolliams). It occurred in a home greenhouse at Vancouver, B.C. (H.N.W. Toms). Mildew was mod. in a garden at St. Jean, (R. Crête), and occurred at St. Lazare, Que. (D. Leblond).

Tuber Rot (various organisms). Tubers from Belgium, examined at St. Catharines, Ont. showed an advanced stage of rot. Pythium sp., Fusarium sp., Cylindrocarpon sp. and bacteria were isolated (W.G. Kemp).

CALADIUM

Soft Rot (Erwinia carotovora) occurred on tubers at Niagara Falls, Ont. (W.G. Kemp).

CALENDULA

Aster Yellows. (Aster Yellows virus) was sl. in plantings at Winnipeg (W.L. Gordon). Infection was light at Kentville, N.S. Leafhopper populations were not large (K.A. Harrison).

CALLISTEPHUS - China Aster

Aster Yellows (Aster Yellows virus) occurred in several plants at Armstrong, B.C. (G.E. Woolliams). The majority of the plants in a border at Winnipeg were sev. infected (W.L. Gordon). Infection was sev. at Ste. Foy, Que. (D. Leblond). Infection was considerably lighter than usual at Kentville, N.S. (K.A. Harrison).

CAMPANULA

Rust (Coleosporium campanulae). Plants growing under shade by the roadside at Orono, Ont. were heavily rusted (I.L. Conners).

CANNA

Mosaic (virus) affected 26/100 plants of the President variety at St. Catharines, Ont. None of the other canna varieties in the nursery appeared to be infected (W.G. Kemp).

CHRYSANTHEMUM

Flower Blight (Botrytis cinerea). A single large bloom of the variety Fred Shoesmith was heavily attacked in a bed of 500 plants at Hamilton, Ont. (W.G. Kemp).

Powdery Mildew (Erysiphe cichoracearum) developed on several varieties in a garden in Essex Co., Ont. (C.D. McKeen). Sev. infections were found on Fred Shoesmith at Hamilton and a potted plant of Beauregard was heavily infected at St. Catharines, Ont. (W.G.K.).

Rust (Puccinia chrysanthemi). Leaves bearing heavy rust infections were submitted from Jordan, Ont. Rust pustules in concentric rings were present on the undersides of leaves. According to local chrysanthemum growers rust was prevalent in Niagara Peninsula greenhouses in the fall of 1958, but damage was not considered to be sev. (W.G.K.).

Stem Rot (Rhizoctonia solani). Elongate, reddish-brown lesions occurred at soil level on stems of a few Yellow Igloo plants at St. Catharines, Ont. R. solani was isolated from affected tissues (W.G.K.).

Leaf Spot (Septoria sp.) was heavy in the propagating beds of a large commercial greenhouse at Leamington, Ont. The varieties Cotillion and Rubicon were the most seriously affected. It was also prevalent in propagators' ranges at Beamsville, Ont., particularly on the Shasta varieties. A few potted plants of Personality were sev. affected in a Hamilton, Ont. greenhouse (W.G.K.). Leaf spot was heavy on 200 plants at Port Burwell, Ont. (H.S. Thompson). Tr. infections of S. leucanthemi occurred in a Kentville, N.S. greenhouse (K.A. Harrison).

Wilt (Verticillium albo-atrum) was identified from wilted specimens of varieties Indianoplis and White Shasta from Leamington, Ont. (W.G.K.).

Aster Yellows (Aster yellows virus). Specimens of stunted, rosetted plants were received from Burlington, Ont. The grower reported that plants with similar symptoms had developed green-colored flowers when moved from the outdoors to the greenhouse (W.G.K.).

Stunt (virus) affected virtually 100% of the plants of several varieties grown under glass in a large propagating establishment at Leamington, Ont. (C.D. McK.). In another propagating range at Leamington 35% of the variety Indianapolis Yellow and 50% of Beauregard were stunted (W.G.K.).

CLARKIA

Anthracnose (Colletotrichum sp.). A sl. infection was seen on C. elegans at Ste. Foy, Que. (D. Leblond).

Aster Yellows (Aster yellows virus) affected Clarkia at Saskatoon, Sask. (T.C. Vanterpool).

COCHIA

Aster Yellows (Aster yellows virus). Infected plants were seen at Saskatoon, Sask. (T.C. Vanterpool).

COLCHIUM

Smut (Urocystis colchii) caused sev. injury to foliage of affected plants in a commercial planting at Deep Cove, B.C. (W.R. Orchard).

CROCUS

Leaf Spot (Alternaria sp., Heterosporium sp.). Spotting of minor importance occurred on maturing leaves of crocus at Keating, B.C. (W.R. Orchard).

Gray Mold (Botrytis cinerea) caused a slight spotting on crocus at Keating, B.C. (J.E. Bosher).

CYCLAMEN

Gray Mold (Botrytis cinerea) caused sev. petiole and flower bud blast in potted cyclamens in a greenhouse at Esquimalt, B.C. Excessive humidity was a contributing factor (J.E. Bosher).

DAHLIA

Mosaic (virus). A few infected plants were seen at St. Catharines, Ont. (W.G. Kemp).

Blind Tuber (cause undetermined). A single tuber at Vancouver, B.C. exhibited unusual adventitious growth at the root end. No shoot developed. Similar abnormal growth and secondary tuber formation have been reported in potato. (R. McKay. Potato Diseases. Dublin, 1955) (H.N.W. Toms).

DELPHINIUM

Stem and Crown Rot (Erwinia ? atroseptica) occurred in a planting of seed stocks. The disease was most prevalent in low areas which had been abnormally wet because of poor drainage. Bacteria were isolated in 10/11 cases (G.E. Woolliams).

Powdery Mildew (Erysiphe cichoracearum) caused sev. injury to a mixed variety planting at Saanichton, B.C. (W.R. Orchard).

DIANTHUS - Carnation

Branch Rot (Alternaria sp.). Diseased tissues of specimens received from Burlington, Ont. consistently yielded Alternaria sp. (W.G. Kemp).

Fusarium Wilt (F. oxysporum f. dianthi). Infection was 10% in a greenhouse at Sarnia, Ont. As the soil in the bench had been thoroughly sterilized it is assumed that the disease was introduced in the cuttings (R.W. Walsh).

Stem Rot (Fusarium sp.) was so sev. at Port Dover, Ont. in a bed of 1500 plants that the grower was forced to pull up the entire planting (W.G.K.).

Leaf Spot (Heterosporium echinulatum). Extensive plantings of Pink Apollo and White Apollo were sev. affected at Burlington, Ont. Siren and Athena were affected to a lesser degree. Electra showed no infection even where grown adjacent to badly infected varieties (W.G.K.).

DICENTRA - Bleeding Heart

Crowding Out. Bleeding heart growing in a bed at Lethbridge, Alta. was crowded out by Thelephora terrestris. The organism was identified by R.J. Bourchier (J.B. Lebeau).

DIGITALIS - Foxglove

Wilt (Verticillium sp.) kills 2-4% of the plants annually in plantings on Vancouver Island, B.C. (W.R. Orchard).

EPIPHYLLUM - Orchid Cactus

Leaf Spot (undetermined organism). Necrotic, sunken, circular lesions, often with a shot-hole effect were seen on a plant at Vancouver, B.C. (H.N.W. Toms).

EUPHORBIA - Poinsettia

Basal Stem Rot (Pythium sp.). Affected specimens from Grimsby, Ont. yielded Pythium sp. from diseased tissues (W.G. Kemp).

FUCHSIA

Wilt (Verticillium albo-atrum) was isolated from several wilted plants from Victoria, B.C. (W.R. Orchard).

GARDENIA

Leaf Drop (cause unknown). A sl. but disfiguring leaf drop occurred in a small greenhouse at Burnaby, B.C. Irregularities in temperature and ventilation were the probable causes (H.N.W. Toms).

Flower Bud Drop (high temperatures) occurred on plants in a private home at Vancouver, B.C. (H.N.W.T.).

GLADIOLUS

Fusarium Yellows (F. oxysporum f. gladioli) occurred at Stouffville, Ont. (W.C. Kemp).

Scab (Pseudomonas marginata) affected 400/600 corms in one lot at Saskatoon, Sask. (T.C. Vanterpool). About 10% of the corms in one area in a garden at Kentville, N.S. were infected (K.A. Harrison).

Dry Rot (Stromatinia gladioli). Specimens of infected corms were received for diagnosis at Fredericton, N.B. (S.R. Colpitts). The disease has been increasing steadily in gardens at Kentville, N.S. Snow Princess and Dieppe show some resistance, Elizabeth the Queen and Purple Supreme less resistance, and Spotlight, Yangtze, Miss Wisconsin and Susquehanna are very susceptible (K.A. Harrison). Infection was 8% at South Berwick, N.S. (J.F. Hockey).

Flower Break (virus complex). Different varieties of gladiolus from several plantings of 1/4 acre or more in size in Windsor and other parts of Essex Co., Ont. showed a sev. flower break and foliage mottle. Isolations from 3 plantings revealed the presence of cucumber mosaic virus and tomato ringspot virus. Flower break symptoms were particularly sev. in progeny of Picardy (C.D. McKeen).

HYACINTHUS - Hyacinth

Leaf Spot (Alternaria sp.) was seen on hyacinth at Saanichton, B.C. (W.R. Orchard).

Wilt (Sclerotium sp.). Affected plants at Saanichton, B.C. were wilted and yellowed and ultimately died. Sclerotium sp. was isolated from several specimens (W.R.O.).

Yellows (Xanthomonas hyacinthi). Approximately 0.1% of the bulbs in a 1-acre planting of mixed varieties at Metchosin, B.C. were infected in mid-April (W.R.O.). Yellows was tr.-mod. in 11/18 fields examined on Vancouver Island, B.C. (N. Mayers).

HYDRANGEA

Leaf Spot (Phyllosticta hydrangeae) was mod. at Ste. Foy, Que. (D. Leblond).

Frost Injury. Late spring frosts caused mod. damage in the suburbs of Quebec City, Que. (D.L.).

IRIS

Gray Mold (Botrytis cinerea) occurred on a few over-wintering flower stalks at Kentville, N.S. (J.F. Hockey).

Leaf Spot (Didymellina macrospora) was found in 5/16 plantings on Vancouver Island, B.C. Infections ranged from tr.-mod. (N. Mayers). Heavy infections occurred on the foliage of a number of varieties in an experimental planting at Guelph, Ont. (W.G. Kemp).

Soft Rot (Erwinia carotovora). A few corms exhibiting extensive soft rot were received from a garden at Vineland, Ont. The incidence of rot seemed associated with the Iris borer (Macronoctria onusta) (W.G.K.).

Bulb Rot (Penicillium spp.) occurred on poorly cured and damaged bulbs at White Rock, B.C. (H.N.W. Toms). At Guelph, Ont. 18-20% of 6000 plants were affected. Poor growth and stunted plants were produced from affected bulbs (H.S. Thompson).

Mosaic (virus). Infections were tr.-1.6% in 3/16 Vancouver Island, B.C. plantings (N.M.).

LILIUM - Lily

Blight (Botrytis elliptica). At Saanichton, B.C. sev. infections were observed on Lilium hollandicum, L. bulbiferum var. crocum, L. testaceum and L. martagon. Infection was less sev. on L. speciosum and L. leucanthemum var. chloraster (J.E. Bosher). Regal lillies in a small bed at Kentville, N.S. were 100% infected and badly defoliated during the summer (K.A. Harrison).

Leaf Spot (Phyllosticta ? lilii) was sl. on L. regale at Ste. Foy, Que. (D. Leblond).

NARCISSUS

Smoulder (Botrytis narcissicola). Trace infections were found in 7 plantings on Vancouver Island and in 4 on the mainland of B.C. (N. Mayers). At Markham, Ont. 20% of 6,000 bulbs were affected (H.S. Thompson).

Basal Rot (Fusarium oxysporum f. narcissi) occurred on about 8% of a shipment of 5 tons of bulbs of the variety Magnificence imported into Victoria, B.C. from Washington, U.S.A. (J.E. Bosher). It was seen in some B.C. plantings (N.M.).

Leaf Scorch (Stagonospora curtisii). Trace infections were seen in 27/30 plantings on the B.C. mainland and in 1 Vancouver Island planting (N.M.).

Mosaic (virus) was tr. in 2/30 plantings on the B.C. mainland and sl. in 8/30 Vancouver Island plantings. This disease, easily detected, can be readily controlled by spring rogueing (N.M.).

Decline (virus complex). A 1% infection was found in 1/10 plantings on the B.C. mainland. On Vancouver Island infection ranged from 1-12% in 8/30 plantings (N.M.).

PAEONIA - Peony

Blight (Botrytis paeoniae) caused bud blast and stem rot in a garden at Saanichton, B.C. (J.E. Bosher). A few plants at Dorval, Que. were sev. affected. The fungus was fruiting profusely on stems (D. Creelman). Blight was mod. at Charlesbourg and Ste. Foy, Que. (D. Leblond). It was very common in Kings Co., N.S. As much as 50% of the bloom was affected (J.F. Hockey).

Sterile Buds (cause unknown) was frequently encountered in the Kindersley and Regina districts of Sask. No lesions were noted nor were there any indications of insect damage (T.C. Vanterpool).

PAPAVER - Poppy

Aster Yellows (Aster yellows virus). Trace infections were observed in 2 gardens at Lethbridge, Alta. (J.E. Moffatt).

PELARGONIUM - Geranium

Pelargonium Leaf Curl

W.G. Benedict

Krauselkrankheit (leaf curl disease) incited by the Pelargonium leaf curl virus has caused heavy losses to propagators of the florists' geranium Pelargonium domesticum in recent years in northern Essex County, Ontario. The chief source of the many varieties of geranium grown in the Windsor area has been a Chicago wholesaler. The cuttings, certified free of disease, are imported in the spring and are usually shipped directly from California where the plants are grown out of doors.

Chlorotic leaf spots generally appear in the potted imported cuttings about the first week in November. At that time the cuttings are being used as stock plants for propagation. Spotted leaves are ruffled and crinkled. The infected plants do not die and normally bloom the following spring. Symptoms of the disease do not appear in the new foliage produced during the summer. The only known method of transmitting this virus is by grafting. This fact was confirmed by experiments with one of the infected plants.

Pelargonium

The geranium variety Pink Sensation has been generally infected and the greatest losses to propagators in the Windsor area have been with this variety. One grower lost all of 1,000 stock plants and numerous cuttings of the variety in 1957-58 as well as about 200 stock plants of other varieties. Three years previously the same grower lost 2,000 plants of the variety Carlsbad White from the same disease. Two other Essex County growers have suffered recurring losses of equal magnitude in recent years, especially with the variety Pink Sensation. No locally grown varieties selected from propagation have ever shown symptoms of leaf curl.

The actual losses to the propagator are very real. The loss of a single stock plant represents a loss of approximately $4.00 to the grower. It also occurs at a time of year when no plants can be secured from which to obtain cuttings for his next year's stock. As a result of these experiences, growers in the Windsor area have placed a self-imposed ban on all geraniums grown in California.

Other Observations

Gray Mold (Botrytis cinerea) caused a basal stem rot on cuttings in the Okanagan Valley, B.C. (G.E. Woolliams), and a leaf, petiole and pedicel blight on the varieties Ricard and Apple Blossom Pink at St. James, Man. The varieties Radio Red and Potavain in the same planting were reportedly not attacked (W.E. Sackston).

Black Shank (Pythium ultimum) was mod. in a greenhouse at Neuville, Que. (D. Leblond).

Wilt (Verticillium sp.) caused the loss of several potted plants at Harrow, Ont. (R.W. Walsh).

Stem Rot (Xanthomonas pelargoni) affected 500/1000 plants at Brampton, and single infected plants were observed at Hamilton and London, Ont. (W.G. Kemp).

Oedema (physiological) was sl. in a greenhouse at Regina, Sask. (R.J. Ledingham). A plant received from Toronto, Ont. showed small, watery swellings on the leaves and corky ridges on the petioles and stems. The grower reported that the condition was prevalent in his stock plants (W.G.K.).

PETUNIA

Leaf Spot (Ascochyta petuniae). Sl. infections were seen at St. Foy, Que. (D. Leblond).

Gray Mold (Botrytis cinerea) caused considerable damage to plants in a bed at the Arboretum, Ottawa, Ont. Leaves were attacked and flowering was almost completely checked. Frequent rainfalls in

September appeared to favor disease development (H.S. Thompson, D.B.O. Savile). Sev. corolla infections occurred at Kentville, N.S. in a bed which had been sprinkler irrigated. Nearby unsprinkled beds were unaffected (J.F. Hockey).

Root Knot Nematodes (Meloidogyne sp.). Eggs and larvae of the nematode were found in galls on the roots of a single stunted plant at St. Catharines, Ont. (W.G. Kemp).

Late Blight (Phytophthora infestans). S. infections were seen on petunias at Ste. Foy, Que. Sporulation occurred on the upper surface of leaves (D.L.).

Aster Yellows (Aster yellows virus) affected scattered plants in a bed at Winnipeg, Man. (W.L. Gordon).

PHLOX

Powdery Mildew (Erysiphe cichoracearum) was sev. on several perennial plantings in the vicinity of Ste. Anne de Bellevue, Que. (R.H. Estey). It was mod. at Dorval, Que. (D.W. Creelman). Specimens were received from Valcourt, Quebec City, Drummondville and St. Narcisse, Que. (D. Leblond). It was more common and more sev. than usual in Que. nurseries (J. Rinquet). Heavy infections occured in a nursery at Bunbury, P.E.I. (J.E. Campbell).

Aster Yellows (Aster yellows virus) occurred in city parks in Winnipeg, Man. (W.L. Gordon).

SAINTPAULIA - African Violet

Root-knot nomatodes (Meloidogyne sp.). A single plant from Greenwood, N.S. showed sev. distortion of crowns, leaves and petioles. Numerous root-knot nematodes, both male and female, at all stages of development were found in the plant (C.O. Gourley).

Chemical Injury. Fumes from paint burning off the surface of a new furnace caused bud-drop and leaf scorching in a substantial crop of African Violets in a small commercial greenhouse near Vancouver, B.C. (H.N.W. Toms).

TAGETES - Marigold

Aster Yellows (Aster yellows virus) affected a few plants in a border at Winnipeg, Man. Infection was much less sev. than in 1957 (W.L. Gordon). Affected plants at St. Catharines, Ont. displayed delayed and abnormal flower formation. Portions of the blooms were green. Plants were slightly stunted and many of the upper leaves were chlorotic (W.G. Kemp).

TULIPA - Tulip

Fire (Botrytis tulipae). Secondary infections were 61-tr., 5-mod./73 plantings examined on the B.C. mainland. On Vancouver Island primary infections were seen in 70/104 fields and secondary infections in 88/104 fields ranging from tr.-sev. Where good spraying practices were used fire was controlled (N. Mayers). Fire was sev. in a commercial greenhouse at Edmonton, Alta. (L.E. Tyner). Infections were heavy and killed many plants in a second-year bed at Kentville, N.S. A nearby first-year bed bore only light infections (K.A. Harrison). It was general in western N.S. with older beds being the most sev. affected (J.F. Hockey).

Basal Rot (Fusarium oxysporum). At Sidney, B.C. 6% of 5000 Nivea bulbs were infected. There was also sev. injury to Basra bulbs at Port Kells. Both the above mentioned stocks were imported from Holland in 1957. It was also seen on Golden Harvest bulbs from Summer, Wash. (W.R. Orchard).

Bulb Rot (Sclerotinia sativa) affected 15% of the plants of the variety Red Giant in a Quebec City, Que. greenhouse. The organism was isolated by J.W. Groves (H.S. Thompson).

Mosaic (virus). A 1% infection was seen in 1/73 plantings on the B.C. mainland. A tr. infection occurred in 1/104 Vancouver Island plantings (N.M.).

VIOLA - Pansy

Crown Rot and Leaf Spot (Centrospora acerina). This disease was first noticed in a nursery at Centerville, N.S. in the fall of 1957, but pure cultures were not obtained until Nov., 1958. Sporulation is sparse in culture and growth is best at temperatures below room temperature. Spores, however, are common in the debris where the leaves touch the soil. About 75% of the plants in a large block were affected and about 5% of the infected plants were killed (K.A. Harrison).

Powdery Mildew (Sphaerotheca humuli) was tr. on many of the 2000 plants in a bed at St. Catharines, Ont. early in July (W.G. Kemp). It was mod.-sev. on a few dozen plants in 2 Ottawa, Ont. gardens. Control was obtained by spraying with Karathane. Mod. infection was also seen in a large planting at Carleton Place, Ont. (H.S. Thompson).

ZANTEDESCHIA - Calla Lily

Soft Rot (Erwinia carotovora). Infected rhizomes, originating in California, were received from Niagara Falls, Ont. (W.G. Kemp).

ZINNIA

Stem Rot (Sclerotinia sclerotiorum) was sev. in 1 planting in Regina, Sask. (T.C. Vanterpool).

INDEX OF HOSTS