II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta) was general and caused moderate damage in some fields at Chilliwack and Agassiz, B.C. (W. Jones). Black stem was recorded in 116 fields out of 146 examined in Alta.; infection was a trace in 17, slight in 79 and moderate in 20. Damage did not develop until late in the season, but it then occurred in a large proportion of the stands examined. Infection was again severe on Orestan and only slight to moderate on the other varieties at Lethbridge; it was slight to moderate at Lacombe (M.W.C.). Infection was slight at Melfort, Sask., in late June, moderate at Saskatoon in late July and in the White Fox alfalfa area in late August (H.W.M.). Black stem is very common on alfalfa throughout Man. (W.J. Cherewick). A field of alfalfa examined on June 26 at Cayuga, Ont., was virtually destroyed by black stem. The pathogen was identified by M.W. Cormack (J.D. MacLachlan, G.A. Scott).

A comprehensive study of Ascochyta imperfecta has recently been completed by M.W. Cormack (Phytopath. 35(10): 838-855. 1945). He finds that A. imperfecta is "primarily a parasite of stems and leaves of alfalfa and is of doubtful importance on other naturally infected hosts". It is regarded as less important than other root rotting pathogens in Alta. The numerous pycnidia that develop on affected stems in late fall are the most important source of inoculum. Infected seed may be of prime importance in disseminating the fungus to new fields or areas, but chemical treatment of the seed requires further study (I.L.C.).

CROWN ROT (low-temperature basidiomycete). The pathogen was isolated from a sample sent by S.E. Clarke from a severely damaged field at Vernon, B.C. (M.W. Cormack).

The estimated damage from crown rot in alfalfa fields examined in Alta. in 1945 is given below:

District	Fields Examined	Percentage of Fields Damaged		
		Sl.	Mod.	Total
		%	%	%
Southern Alta.(irrigated)	71	17	4	21
Central Alta.	165	31	3	34
All Alberta	236			29

Winter conditions in Alta. were apparently not favourable for the severe development of this disease in 1945. The damage consisted mainly of a partial rotting of the crown and killing of the crown buds, which resulted in a weakening of the plants (M.W. Cormack).

Damage from crown rot was moderate to severe on Ladak and other susceptible varieties in the plots of the Station, Swift Current, Sask. No killing occurred in Medicago falcata and in several hybrid strains (M.W. Cormack). Crown rot caused slight damage in a breeding plot at Saskatoon (H.W.M.).

BACTERIAL WILT (Corynebacterium insidiosum). The estimated damage caused by bacterial wilt in alfalfa fields examined in Alta. in 1945 is given in the table below.

District	Fields Examined	Percentage of Fields Damaged Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Brooks-Lethbridge (irrigated)	71	20	23	14	4	61
Clover Bar-Bremner (detailed survey)	109	26	6			32
Other districts in Central Alta.	56	9				9
All Alberta	236					35

Bacterial wilt was again found in all alfalfa stands 3-years-old or older examined in the irrigated district, and it was also present in several of the 2-year-old stands. It is apparently responsible for the almost complete disappearance of old stands of alfalfa in the Brooks district and for their rapidly decreasing numbers in the other irrigated areas.

The dry season of 1945 had a marked retarding effect on the disease in fields previously surveyed east of Edmonton. In four of these fields, where the damage ranged from 10 to 20% in 1944, an average of 6% of the plants were drying this year. The disease appeared, however, in several new fields in this district and was found for the first time causing a trace of damage in fields west of Edmonton and at Winfield and Cherhill. It probably became established in these fields during the wet seasons of 1942-44.

In a detailed survey made by R.W. Peake at the Station, Lethbridge, the percentage of damaged plants in the different varieties was: Ranger 4.2%, Viking 4.5%, Ladak 9.2%, Grimm 20.5%, Autogamous 24.5%, Ontario Variegated 42% and U.B.C. Strain 45.3%. Damage to Grimm in the rotation plots was: 1st and 2nd year 0, 3rd year 0.5%, 4th year 12.1%, 5th year 28.8% and 6th year 63.8% (M.W. Cormack).

Two samples of alfalfa collected by E.J. Britten and W.J. Chorewick, one at the Illustration Station, Pipestone, Man., and the other about 2 miles north of the Station, were found affected by bacterial wilt. In both samples Gram-positive bacteria were abundant in discoloured areas of the roots. This is the first report of bacterial wilt in Man. (W.A.F. Hagborg).

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.). The damage was moderate in the plots at Edmonton, Alta., and slight in several fields in central Alta. (M.W. Cormack).

WILT (Fusarium Scirpi var. acuminatum). A moderate infection was present in the alfalfa breeding plots at Saskatoon, Sask.; some plants were killed. (H.W. Mead, W.L. Gordon).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti), the less common of the two leaf spots of alfalfa in Man., was observed in several districts; the spots are somewhat irregular and pale buff in colour (W.J. Chorewick).

DOWNY MILDEW (Peronospora aestivalis). A slight infection was recorded at Lytton, B.C. (G.E. Woolliams). Infection was a trace in 4 fields, slight in 6 and moderate in 3 out of 146 examined in Alta.; a slight infection was present in the plots at Edmonton and Olds (M.W. Cormack). A severe infection was found in one hybrid strain at the Station, Swift Current, Sask., in late June and a trace on other strains and varieties (M.W. Cormack).

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii) caused considerable defoliation in the plots at the Farm, Agassiz, B.C. (W. Jones). A collection of this leaf blotch was made on Grimm at Oliver by J.C. Wilcox (G.E. Woolliams). Infection was slight in 2 fields and moderate in 2 out of 146 examined in Alta.; a moderate infection was also reported from a field in the B.C. block of the Peace River district (M.W. Cormack).

COMMON LEAF SPOT (Pseudopeziza Medicaginis). Infection was a trace in 2 fields, slight in 10 and moderate in 2 out of 146 examined in Alta. (M.W.C.). The disease moderately affected a plot at Saskatoon, Sask., causing some defoliation; a moderate to severe infection has been present in this plot for several years (H.W.M.). Of the 2 leaf spots of alfalfa found in Man., the small circular, dark brown spot caused by P. Medicaginis is the more common. The leaf spot and black stem diseases of alfalfa and sweet clover (q.v.) are only of minor importance under good cultural practice. A few fields were observed, however, where the previous year's crop was left unharvested and thus an abundance of inoculum overwintered on the old stems and debris permitting the virtual defoliation of the new growth before the crop was cut (W.J. Cherewick). A moderate infection was noted in the neighborhood of Guelph, Ont. (J.D. MacLachlan). A specimen of alfalfa collected on Sept. 30, 1944, in Middlesex Co. by W.D. Sutton was moderately infected (I.L.C.). This leaf spot caused slight defoliation in a field at Kentville, N.S. (J.F. Hockey).

ROOT ROT (Rhizoctonia Solani). R. Solani was occasionally isolated from plants damaged earlier in the season by the crown rot pathogen, and other low-temperature fungi. It appears to be mainly a secondary parasite of alfalfa and sweet clover under Alberta conditions (M.W. Cormack).

CROWN ROT (Rhizoctonia Solani strain) is the most widespread and destructive disease of alfalfa and sweet clover in Man. The disease, although the general symptoms are similar, is apparently distinct from the crown rot of alfalfa (q.v.) reported by Cormack in Alta.

In districts where alfalfa is more commonly grown, the disease often reduces the stand of plants by more than 50% in the third year. Many farmers are of the opinion that it is no longer profitable to grow alfalfa because it is difficult to establish a good stand of the crop, especially in short rotations, owing to this disease. Sweet clover, being a biennial crop, usually does not suffer as serious damage, although fields have been observed where more than 50% of the plants had been killed.

The pathogen attacks the plants at the soil level and in seedlings causes a damping off, whereas in older plants it produces a dry rot of the crown. Infected plants are predisposed to "winter-killing".

A root canker of alfalfa was found, for the first time in Man., in a few districts of the western and north central sections of the province. The disease, originally described by O.F. Smith (Phytopath. 33: 1081. 1943), is also caused by a strain of R. Solani (W.J. Cherowick).

STEM ROT (Sclerotinia sclerotiorum). Several affected plants were found in type selection plantings at Nappan, N.S.; sclerotia were abundant on old stems and around the crowns (J.F. Hockey).

RUST (Uromyces Medicaginis). A specimen of alfalfa collected in Middlesex Co., Ont., on Sept. 30, 1944, by W.D. Sutton shows a light sprinkling of uredinia (I.L. Conners).

CROWN WART (Urophlyctis Alfalfae) was reported for the first time in Canada when M.F. Clarke noticed the disease on May 16 at Agassiz, B.C., while alfalfa breeding material of a media-falcata cross developed at the University, Vancouver, B.C., was being set out. The organism was identified by W. Jones, at Saanichton and confirmed at Ottawa. Some 12% of the 275 lines transferred showed pronounced crown wart symptoms. When the U.B.C. plots were later examined a slight infection of crown wart was found. A slight infection was also found by W. Jones and M.F. Clarke on Lytton and Grimm in 2 fields at Chilliwack, but no infection was found elsewhere on the Farm at Agassiz, in the district, nor in the Matsqui, Dewdney or Sumas districts. The disease is thought to have been at the University as early as 1936, but its identity was not established. The disease has not been found in any of the plots established from plants or seeds in B.C. It is a matter of speculation how the fungus was introduced in the University plots, but there is the possibility that it came with alfalfa hay and reached the plots in liberal applications of manure (I.L. Conners). A careful examination of the U.B.C. strain of alfalfa did not reveal any evidence of this disease in plants grown from cuttings at Swift Current, Sask., nor in those grown from seed at Lethbridge, Brooks, Lacombe and Edmonton, Alta. (M.W. Cormack).

MOSAIC (Medicago virus 2). A trace of mosaic was found in 2 fields of Grimm at the Station, Fredericton, N.B.; affected plants were seen in a field near Oromocto (D.J. MacLeod). Mosaic affected an occasional plant in Queens Co., P.E.I. (R.R. Hurst).

WITCHES' BROOM (virus) caused slight damage in the plots at Edmonton, Alta. (M.W.C.).

COMMON CLOVER

LEAF SPOT (Cercospora zebrina). A slight infection was present in 3 fields out of 18 of alsike clover examined in west-central Alta. (M.W. Cormack). A slight infection was noted on alsike clover at Fort Garry, Man. (W.L. Gordon). A slight infection was found in 4 fields and moderate in one of red clover out of 21 examined in June, and a slight infection in all 19 examined in August in the Montreal district, Que. (T. Simard).

BLACK SPOT (Cymadothea Trifolii). A moderate infection occurred on some leaves of hybrid clover in the University area, Fort Garry, Man. (W.L. Gordon).

POWDERY MILDEW (Erysiphe Polygoni) was found throughout the Interior of B.C. on red and alsike clover, but the infection was usually slight (G.E. Woolliams). Infection was slight to moderate in 8 out of 13 fields of red clover and in one out of 18 fields of alsike examined in west-central Alta.; a trace occurred in the red clover plots at Lacombe (M.W. Cormack). A slight infection was recorded on red clover at Choiceland, Sask. (T.C. Vanterpool), and a heavy infection on some red clover plants at the University, Fort Garry, Man. (W.L. Gordon). Powdery mildew was moderate about Guelph, Ont., affecting about 50% of the leaves (J.D. MacLachlan). Infection was slight in 13 fields and moderate in one out of 19 examined in August in the Montreal district, Que.; no mildew was observed in June (T. Simard).

LEAF SPOT (Gloesporium spadiceum). A slight infection was present in 4 fields out of 13 of red clover examined in west-central Alta. (M.W. Cormack).

ANTHRACNOSE (Kabatiella caulivora). Infection was slight in 3 fields of red clover examined in west-central Alta. It was slight to moderate on Siberian red clover and a trace to slight on other varieties at Lacombe and Olds (M.W. Cormack). Anthracnose was rather severe on red clover in O.A.C. foundation plots, Guelph, Ont.; the range had a scorched appearance (J.D. MacLachlan).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora Meliloti). Infection in the 18 fields of alsike clover examined in west-central Alta. was estimated to be: trace to slight in 10 fields, moderate in 5 and severe in 1 (at Entwistle); infection was also moderate in the plots at Lacombe (M.W. Cormack).

BACTERIAL LEAF SPOT (?Pseudomonas syringae). A trace was present on red clover in the Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson). What appeared to be a bacterial leaf spot affected about 20% of the leaves in one corner of a field of red clover on the Auld Farm, O.A.C., Guelph; isolations were made by the Department of Bacteriology, but attempts to reinfect red clover plants failed (J.D. MacLachlan).

LEAF SPOT (Pseudopeziza Trifolii). Infection was slight in 11 fields and moderate in 4 out of 21 of red clover examined in June in the Montreal district, Que.; a slight infection was recorded on the new growth in 3 out of 19 examined in August (T. Simard).

LEAF SPOT (Stagonospora recedens) was of common occurrence and caused considerable damage to the foliage at Agassiz, Sumas, Chilliwack and in North Saanich, B.C. (W. Jones). Isolations made from material collected at Agassiz by W. Jones yielded cultures of S. recedens (M.W. Cormack). Infection was slight in 2 fields and moderate in 2 out of 13 of red clover examined in west-central Alta.; a trace to slight infection was found in the variety plots at Lacombe (M.W. Cormack). A light infection was present in a field of red clover near Carp, Ont. (D.B.O. Savile). A slight infection was recorded in one field of red clover in June and 2 in August in the Montreal district, Que. (T. Simard).

LEAF SPOT (Stemphylium sarcinaeforme). Traces only were observed on red clover in the Forage Crop plots, C.E.F., Ottawa, Ont. (R.G. Atkinson). Infection was slight in 8 fields of red clover and moderate in 3 out of 21 examined in June and slight in 12 fields out of 19 in August in the Montreal district, Que. (T. Simard).

RUST (Uromyces spp.). A heavy infection (U. Trifolii) was present on some plants of alsike clover in the University area, Fort Garry, Man. (W.L. Gordon). Rust infection (U. fallens) was slight in 5 fields of red clover out of 40 examined in the Montreal district, Que. (T. Simard). A trace of rust was observed on red clover in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus). A slight infection was recorded in one field of red clover in June and in 5 in August in the Montreal district, Que. (T. Simard). A trace of mosaic (Trifolium virus 1) was found in 4 fields of red clover and one of white at the Station, Fredericton, N.B.; it was also found in separate fields of both crops in several counties (D.J. MacLeod).

SWEET CLOVER

STEM CANKER (Ascochyta caulivora). A severe infection was found on scattered plants in 2 fields at Strathmore and in roadside stands in southern Alta. This is the first time that the "goose-neck" symptoms have been observed in Alta. (M.W. Cormack). The goose-neck disease, which causes hypertrophy of the host plant, has been observed at Brandon, Man., during recent years but it has not been found in other parts of the province (W.J. Cherewick).

BLACK STEM (Ascochyta lethalis) is very common on sweet clover throughout Man. (W.J. Cherewick).

ROOT ROT (Cylindrosporium Ehrenbergi, etc.) caused moderate damage in the plots at Edmonton, Alta., and in a few roadside stands (M.W. Cormack).

ROOT ROT (Fusarium spp.). Diseased plants from Essex, Ont., were received from J.D. MacLachlan and sent to W.L. Gordon for examination. After the roots were washed, sporodochia of F. avenaceum were found on them and when pieces of root were cultured, it was the predominant isolate; other fungi isolated were F. Solani, F. oxysporum and Trichoderma (I.L.C.).

LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). A trace to a slight infection was general on sweet clover stands examined in Alta. (M.W. Cormack). A moderate infection was observed on Arctic at Melfort, Sask., on June 21 (H.W.M.) and on leaves of scattered plants at Boissevain, Man., on June 12 (W.J. Cherewick).

ROOT ROT (Phytophthora Cactorum) caused slight damage in several roadside stands in southern Alta. (M.W. Cormack).

CROWN ROT (Rhizoctonia Solani strain) is the most widespread and destructive disease of alfalfa and sweet clover in Man. The disease is described more fully under alfalfa (q.v.) (W.J. Cherewick).

ROOT ROT (Sclerotinia sativa) caused moderate damage in the plots at Edmonton, Alta., and on the Pioneer variety at Lacombe (M.W. Cormack).

MOSAIC (virus) is quite general in the Okanagan Valley, B.C., wherever the plants are growing (G.E. Woolliams).

VETCH

LEAF BLIGHT (Ascochyta sp.) was severe in a field of hairy vetch (V. villosa) being grown for seed at Delhi, Ont. In 1944 the field was sown to vetch and oats and a healthy crop harvested. In the fall of 1944 the same field was sown to rye and vetch. In mid-June 1945 the field appeared to be free from disease, but by July 15 most of the leaves had dropped except at the tips of the stems. A species of Ascochyta, tentatively identified as A. Pisi, was found fruiting on stems, leaves and pods, O.A.C. Myc. Herb. 733 (J.D. MacLachlan).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was general on tartarian buckwheat in Westmorland, Queens, Kings, Sunbury, York, Carleton and Victoria Counties, N.B.; a trace was found in Silver Hull (Fagopyron esculentum) at the Station, Fredericton (D.J. MacLeod). An occasional plant was found affected in a 2-acre field in Queens Co., P.E.I. (R.R. Hurst).

CORN

RUST (Puccinia Sorghi). A 25% infection was present on one specimen from Queens Co., P.E.L., brought to my attention (R.R. Hurst).

SMUT (Ustilago Maydis) was generally prevalent about Guelph, Ont. (J.D. MacLachlan). A trace of smut was seen on Quebec 28 at Macdonald College, Que. (R.O. Lachance). A trace was recorded in a field in Sunbury Co., N.B. (D.J. MacLeod). An occasional "boil" was seen in a large field in Queens Co., P.E.I. (R.R. Hurst).

FLAX

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask., has prepared a summary of his observations, entitled "Flax Diseases in Saskatchewan in 1945."

Seedling blight exerted its usual toll on flax stands and root rot affected yields in some areas, but other pathogenic diseases were generally light. Physiological troubles were more conspicuous. Below average yields were again experienced in the west-central part of Sask. because of low rainfall, but yields improved further east and northeast. It was expected that flaxseed samples from the 1945 crop would show small amounts of seed-borne diseases, but platings to date show several samples from the dark-brown soil zone to be infected with Polyspora Lini, and several from the park belt to be infected with Alternaria linicola. This is attributed to the wet, cold fall in many districts, which delayed harvest and permitted seed infection to build up. It suggests that, from the disease angle, flax intended for sowing should be cut as soon as possible after it is ripe.

SEEDLING BLIGHT (Rhizoctonia Solani). Of 16 farm fields examined closely for seedling blight, 3 showed no damage, 3 trace, 3 slight, 5 moderate and 2 severe. In a few localities blighted seedlings were buried by drifting soil. Isolations were made from blighted seedlings from Saskatoon, Cory, Asquith, Kinhop, Juniata, Young, Viscount, Grandora and Scott, and in every instance R. Solani predominated. Little seedling blight has been found on flax on brome-grass sod. R. Solani was also the chief cause of seedling blight in experimental plots where the seed was inoculated with Polyspora Lini, Sphaerella Linorum or Phoma sp. Colletotrichum Lini, however, was the cause of seedling blight in the plots inoculated with this fungus.

RUST (Melampsora Lini) caused relatively little damage this year. Several fields of Royal on flax stubble showed moderate infection, but otherwise infection was trace to slight. In two fields about half a mile apart where Royal was grown on Royal stubble, one field in which the stubble had been ploughed under showed a trace of rust at harvest, and the other field in which much of the old flax straw was still exposed was moderately infected. This happened in a year not particularly favourable to flax-rust development. Fields are frequently seen in which the complete removal of flax stubble by ploughing or burning has not been effected. In order to prevent serious losses from infections of rust and other stubble-borne diseases, for example,

stem break and browning (see below), the practice of following flax with flax on the same land should be discontinued. As in 1944, rust was unusually light on wild flax (Linum Lewisii).

STEM CANKER (Melampsora Lini and Fusarium spp.). Light.

WILT (Fusarium oxysporum f. Lini). For the first time no wilt was found on survey and no reports were received from farmers.

STEM BREAK AND BROWNING (Polyspora Lini). The June survey indicated that there was the usual amount of seed-leaf infection; this was checked by miscroscopic examination and culturing in some instances. Weather conditions, however, did not continue to favour the disease as neither the stem-break nor the browning phase was conspicuous in the pre-harvest survey. Only one severe stem-break report was received (Canwood, Sask.). Of nine 1945 flax seed samples plated on malt extract agar, two were infected with P. Lini, with 6 and 15% respectively. It is probable that late harvesting of the flax in many districts permitted late development of the disease and infection of the seed. In artificially inoculated experimental plots stem lesions were late in appearing and developed slowly. There was, however, abundant inoculum in these plots when much of the late flax harvesting was being done on the farms, which suggests that there was plenty of time for seed infection where the disease was present in incipient form earlier. Thus to prevent a build up in the percentage of seed-borne Polyspora, flax seed for sowing should be cut as soon as it is ripe.

LATE ROOT ROT (miscellaneous fungi). Many instances were observed both in experimental plots and on survey where slightly stunted, prematurely ripened plants with slightly shrivelled seed were growing in between vigorous greener plants. This was often quite general and appeared definitely to be a disease condition. It doubtless contributed largely to many low yields. Premature ripening of flax in large areas in many flax fields, as for exampled at Earl Gray and Cory, was very common and one would hesitate to attribute much of this type of trouble this year to root rot. The same conspicuous "spotty" ripening of barley and oats on stubble in the same localities, suggest that soil and moisture factors were more intimately involved.

DIE-BACK (non-pathogenic). This trouble was common over central and northeastern Sask. Numerous isolation attempts were made. Where fungi were obtained they were very largely Alternaria species, not of the A. linicola type. Even early sown flax was late in "ripening off" and in most of the affected fields die-back plants and plants with the whole of the stems still green would be indiscriminately scattered; in a few fields, especially in the northeast, virtually all of the plants showed die-back, i.e., the top third would be brown and the lower two-thirds green. There was no consistent difference in size of seed on the two types of plants. Hypothetically, it seems that the type of trouble commonly referred to as die-back in Saskatchewan, is an attempt by the plant to adjust itself to adverse environmental conditions at ripening time.

HEAT CANKER. Severe damage was observed on June 23 at the Scott Station in four plots sown in an east-west direction (instead of the ordinary north-south direction). The damage followed three days of high temperatures, viz., June 20, 86°F., June 21, 91°F., and June 22, 86°F. Elsewhere only traces of heat canker were found.

CHLOROSIS. A relatively mild chlorosis appears early every summer on flax in the "dates of seeding" plots at the University where a narrow strip of alkaline (saline) soil runs across the plots (P.D.S. 23:23). Cereals (wheat, oats, barley and rye) in the same block showed no signs of yellowing on the alkaline strip.

WIND DAMAGE

a. WITHER-TIP. In certain plots at the University and on farms near Revenue, Tramping Lake and Dodsland, strong winds and drifting sand caused a complete collapse of the top half inch of seedlings in the fourth to sixth true leaf stage, the cotyledons usually remaining turgid. Occasionally the whole of the seedling above ground would be withered. If examined shortly after damage had occurred, the seedlings would be turgid at and below ground level, which symptom distinguishes them from the seedlings blighted by Rhizoctonia Solani which are collapsed at and usually below ground level.

b. BASE ENLARGEMENT. In many exposed flax fields a large percentage of plants could be found having basal enlargements two and sometimes three times the diameter of normal plants, but gradually tapering off to normal diameter half to three-quarters of an inch above and below ground level. The surface of the swellings was roughened with protective tissue. There was invariably a free space around each affected plant where the soil had been pushed back by the intermittent bending of the plants to and fro by strong winds. This trouble was particularly common in exposed fields where the stand had been reduced by seedling blight or heat canker, as at the Scott Station. No reduction in seed size in affected plants could be discerned, but comparative seed weights were not taken.

DICHLOROPHENOXY-ACETIC ACID (2-4-D) INJURY. When used as a weed spray on flax, this chemical produced enlargements with longitudinal fissures at the base of the stem and upper portions of the main root, while the finer branch roots tended to proliferate. Many plants died and the majority of the remainder were unthrifty.

SEED-BORNE BACTERIA. Northern-grown flax seed samples with a high percentage of internally-borne bacteria are commonly encountered. Infected seed usually fails to germinate but numerous mass and single cell cultures from such seed have failed so far to show other than weak pathogenicity on artificially inoculated flax seed.

PHOMA FOOT ROT (?). Over a period of two years several isolates of an extremely virulent species of Phoma have been secured from flax seed, from stems collected in late summer, and from overwintered straw. The pathogen causes severe pre-emergence killing in artificially inoculated soil in the greenhouse and in the field, but no foot rot, as reported from Ireland,

Europe, Australia, etc., for Phoma sp., has been observed. Little is known of the type and extent of damage which it produces under field conditions. As a seed parasite, it ranks close or equal to Colletotrichum Lini in reducing stands, and it is believed that under conditions conducive to its development it would cause considerable damage. The spore measurements agree most closely with those of Phoma exigua.

SELENOPHOMA ON FLAX. In the late summer of 1944 mature pycnidia of a species of Selenophoma were found on the finer branches and pedicels of flax in the experimental plots at Saskatoon and on a sample from Elstow. Pure cultures were readily obtained. The typical lunate spores averaged 18.8 microns by 2.5 to 3.3 microns. Seed inoculation has demonstrated only weak pathogenicity in the seedling stage. This appears to be the first report of a Selenophoma on Linum. In 1945, the same fungus was fairly common before harvest on the pedicels and finer branches of several varieties of flax in the experimental plots at Saskatoon. They appeared to be more plentiful on plants affected with die-back (see above) and on plants with early maturing dark brown bolls and pedicels.

A similar report of "Flax Diseases in Manitoba in 1945" has been prepared by W.E. Sackston, Dominion Laboratory of Plant Pathology, Winnipeg, Man.

Spring rains and cold weather delayed seeding by 2 to 4 weeks in many localities in Man. As flax is sown by many growers only after seeding of cereals is finished, and is sometimes used to fill in low wet spots in grain fields when they become sufficiently dry, many fields of flax were extremely late this season.

PASMO (Septoria linicola) appeared relatively late in farm fields; it was not definitely determined before a survey made Aug. 28 to Sept. 1. At that time, it was found in 19 of the 27 fields examined. The disease was a trace in 10 fields, light to moderate in 6, and severe in 3. On the other hand, pasmo had developed in inoculated plots at Winnipeg and Morden by mid-July, and was severe on leaves and stems early in August. The effect on yield was very pronounced; in field experiments at Winnipeg, inoculated plots of 2 highly susceptible varieties yielded only a third as much seed as check plots, while inoculated plots of 2 somewhat resistant varieties yielded only half as much as the uninoculated checks. Some of the varieties in the test plots at Winnipeg, Morden and Brandon were severely diseased, while others showed little or no pasmo. As these plots were not necessarily exposed to uniformly heavy infection, however, no definite conclusions on varietal reactions could be drawn from them. Septoria linicola was isolated from lesioned cotyledons of volunteer flax seedlings, collected in the variety test plots at Winnipeg Oct. 11. Alternaria sp. grew from the same tissues in many cases.

ANTHRACNOSE (Colletotrichum Lini). Seedlings of several sets of differential varieties being used to identify races of flax rust in the greenhouse, in January, 1945, developed conspicuous, water-soaked lesions on the cotyledons; these later dried out and turned brown, and in some cases the seedlings died. Isolations yielded pure cultures of C. Lini,

which was proved to be the pathogen by inoculation tests. Varietal differences in susceptibility were observed in inoculation tests. The outbreak of anthracnose in the greenhouse was traced to plants of the variety Bombay, from which rust had been taken. Dr. W.G. McGregor, Central Experimental Farm, Ottawa, sent specimens of diseased flax seedlings collected in June from 3 fields of Dominion fibre flax, grown near Richmond, Ont., from one seed source. In one field 95% of the seedlings were diseased, and about 30% were killed. Pure cultures of C. Lini were isolated from 60% of the tissues plated from the most severely diseased sample; the same organism predominated in the isolates from the other two samples. Leaf symptoms similar to anthracnose were seen in many farm fields examined in Man. in June; the only material from which C. Lini was isolated, however, was from the plots at the Brandon Farm, grown from seed received from Ottawa. C. Lini was also isolated from field material collected in July from diseased plants of Koto and Buda grown in demonstration rod rows near Teulon, and from Crystal and fibre flax grown in the plots of the Fibre Flax Pilot Plant at Portage la Prairie.

DAMPING OFF (? Pythium and Fusarium). Dead seedlings occurred in small patches in fields in June. Less than 1% of the plants were affected in farm fields, but more injury occurred in row plots at Morden, where it was most conspicuous in fibre flax. Platings yielded cultures of Pythium sp. and Fusarium sp. in a few cases, but most of the tissues gave rise to a miscellaneous assortment of fungi, as the seedlings had been dead for some time before they were collected.

HEAT CANKER (non-parasitic). Moderate injury due to heat canker was observed at Fannystelle and Portage la Prairie early in July by J.E. Machacek. Late in July, dead flax plants were received from Treherne, with reports of serious loss in a field of Royal flax there. Examination of the field showed the damage to be caused by heat canker. The injury first became apparent early in July; when the field was visited, about 25% of the plants were dead, others were seriously affected, and gaps in the rows indicated that plants which had died earlier had been beaten into the ground by rains. About 50% loss occurred. Affected plants turned yellow, and a swelling developed on the stems at or near the soil line. Eventually these plants fell over, died, and turned brown, although some plants seemed to recover. Affected plants were scattered throughout the field which had been cultivated intensively before flax was sown about May 15. The soil was a light sandy loam. Affected plants were scarce in another field of flax on the same farm, although the grower reported that more injury had been apparent there a week earlier.

ROOT ROT AND WILT (Fusarium oxysporum form Lini). Isolations from root-rotted plants collected in fields gave only Alternaria sp. From 1 to 2% of dead plants occurred in rows of fibre flax grown at the University of Manitoba when the plots were examined for disease at the end of August. The roots of the dead plants were grayish in colour. Platings of diseased and apparently healthy roots from the same plots gave Fusarium oxysporum f. ? Lini from 100% of the diseased tissues, and from about 15% of the "healthy" ones.

DROUGHT INJURY. Severe drought and heat injury were observed in several fields near Pipestone late in July. Large patches of prematurely brown and dry plants occurred in one field; the bolls were shrivelled and dead. In a large field, all the leaves below the flowering branches were dead; those on the peduncle appeared badly scorched. Some shrivelled flower buds persisted on the plants. The bolls were dry and brown, and contained only small, thin seeds.

LEAF SPOTS of various types occurred on flax plants throughout the growing season. In June the spots resembled those of anthracnose, although Colletotrichum Lini was isolated from only one collection. The most prevalent spots in July and August were dark brown, about 1 millimetre or less in diameter, and occurred at random on leaves at all levels on the stem. It was estimated in severe cases that these spots occupied 20% of the total leaf area. Other spots were light brown to dark brown in colour, fairly regular in outline, round, oval, or elliptical, not definitely localized on the leaf, and up to 1/4 inch in diameter. This type of spotting occurred frequently on the cotyledons and lower leaves of plants, and was often associated with basal leaves which were turning yellow, although the basal yellowing occurred in many fields where no leaf spotting was found. Alternaria sp. grew from diseased leaves when plated but no recognized leaf pathogens were recovered. Leaf lesioning apparently due to non-parasitic disorders was found in plots at Winnipeg, Morden, Brandon and Portage la Prairie. Some leaves appeared "scorched" at the tips or edges; others developed chlorotic and necrotic spots and streaks, generally accompanied by chlorosis of the terminal portion of the plant, and often by stunting.

TOP BROWNING AND BOLL BLIGHT. A sample of diseased fibre flax was received early in July from M.F. Clarke, Experimental Farm, Agassiz, B.C. The terminal parts of the affected plants were brown and withered, with the leaves, flowers and bolls dead and dry. The disorder developed rapidly in late June and early July, in a crop sown on sod, and beginning to suffer from lack of moisture. Tall, vigorous plants as well as short, stunted ones were affected. Colonies of Alternaria and Hormodendrum spp. grew from plated stem tips; very few colonies developed from the bolls.

In Man. boll blight was found in the plots at Winnipeg on August 7. Bolls affected early in their development remained small, turned brown, and died without producing any seeds. Most of the blighted bolls were smaller at maturity than healthy ones, and contained only one or two small, thin seeds. Affected bolls were brown and dry when normal ones were still filling, and had not yet started to turn colour. The seeds in some severely diseased bolls were extremely thin and light, and were dull and discoloured. The pedicels immediately below diseased bolls were brown, withered and brittle; many affected bolls abscissed, leaving the dry brown pedicel. Test plots examined at Morden, Aug. 10, had few blighted bolls, but a large proportion of withered pedicels, up to 30% in some plots. Boll blight was severe in pasmo test plots, but it also occurred in variety test plots at Morden, independently of pasmo symptoms on the stems. The trouble was conspicuous in farm fields examined late in August; it was absent in 4 fields, light in 8, and severe (20 to 40%) in 15 out of 27 examined.

Brown discoloration of the pedicels and peduncles was severe in the variety plots examined at Brandon, Aug. 31, but it was not correlated with the severity of pasmo symptoms.

BROWNING AND STEM BREAK (Polyspora Lini) were not recognized in the field during the growing season. P. Lini was isolated, however, from volunteer flax seedlings collected in the variety test plots at Winnipeg, Oct. 10. Only two colonies of P. Lini were obtained, one from a lesioned cotyledon, and one from a hypocotyl. The seed for the test plots came from Ottawa (W.E. Sackston).

Note: Cultures of the Alternaria sp. isolated from browned bolls and pedicels by W.E. Sackston, were identified by J.W. Groves as A. tenuis.

Other Observations

ANTHRACNOSE (Colletotrichum Lini). A moderate infection was seen in fields of fibre flax, the seed of which received no treatment, in Kamouraska and L'Islet counties, Que. (R.O. Lachance).

WILT (Fusarium oxysporum f. Lini) caused severe damage in patches (tr-40% of plants wilted) in a field at Cayley and it was also observed in one other out of 9 examined in Alta. (W.C. Broadfoot). Diseased specimens were received from Mr. K.R. Hillier, Plant Products Division, who reported outbreaks of wilt at Seaforth, Mitchell and Tavistock, Ont. (J.J. Miller).

Nearly half of the experimental plots of the Station and Laboratory at Ste. Anne de la Pocatiere, Que., were destroyed due to excessive rain in the early part of the season. These plots were on ill-drained clay soil. The damage was apparently caused largely by wilt, for other crops did well in adjacent plots. Specimens of wilted fibre flax were also received from Vandrieuil-Soulonges district (R.O. Lachance).

RUST (Melampsora Lini). Infection was slight to moderate in 6 unirrigated fields in southern Alta.; it was also slight to severe in the plots at Lethbridge (W.C. Broadfoot).

Rust was only of very minor economic importance in Man. in 1945. Although present on flax throughout the province it occurred only in trace amounts in most fields and in several fields a considerable search failed to reveal its presence. The low incidence of flax rust this year can be attributed to the decrease in the acreage of the somewhat susceptible variety Redwing, the almost complete elimination of the very highly susceptible variety Bison, and the increased use of the resistant variety Royal and the immune variety Viking. That the light flax rust infections in 1945 were due to the use of resistant varieties rather than to unfavourable weather conditions was indicated by the amount of the disease that developed on susceptible varieties in field plots at Winnipeg, near to heavily rusted stubble from the 1944 crop. In these plots Bison and Redwing averaged 80 and 50% infection respectively (B. Peturson).

A trace to a very heavy infection occurred in a block of Cirrus in the Cereal Division plots, C.E.F., Ottawa, Ont.; only traces were observed on other varieties (R.G. Atkinson). Infection was slight in 2 fields and moderate in one out of the 4 examined in the Ste. Martine district, Que. (T. Simard).

STEM BREAK and BROWNING (Polyspora Lini). From some Manitoba-grown flax affected by pasmo sent by J.E. Machacek in Nov. 1943 both Septoria linicola and Polyspora Lini were isolated (T.C. Vanterpool).

FOXTAIL MILLET

SMUT (Ustilago Crameri). A single affected head was received from C.W. Buchanan, Agricultural Representative, who reported a heavy infection in a field at Napanee, Ont. (D.B.O. Savile).

MANGEL

CROWN GALL (Agrobacterium tumefaciens). A severely affected root was brought to the Laboratory, Charlottetown, P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola) slightly affected Long Red in the plots at Agassiz, B.C. (W. Jones). A moderate infection was observed about Guelph, Ont. (J.D. MacLachlan).

BLACK LEG (Phoma Betae) was fairly general as a leaf spot in one field at Ladner, B.C. (W. Jones). Infection was moderate on the leaves, and slight on the seed stalks and crowns of a few plants on a seed crop of Tip Top in the plots of the Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson).

LEAF SPOT (Ramularia beticola) caused slight damage to the leaves of Yellow Intermediate in the University plots, Vancouver, B.C. (W. Jones).

MOSAIC (Beta virus 2). A trace was found in 2 plots at the Station, Fredericton, N.B. (D.J. MacLeod).

FASCIATION (? Corynebacterium fascians (Tilf.) Dowson). Three plants were found affected in a seed plot at the Station, Fredericton, N.B.; all attempts to transmit the condition to healthy mangels by grafting were unsuccessful (D.J. MacLeod).

SUGAR BEET

A short report on the "Diseases of Sugar Beets in southwestern Ontario in 1945" was contributed by Dr. A.A. Hildebrand, Dom. Laboratory of Plant Pathology, Harrow, Ont.

In the sugar beet growing area of southwestern Ont., two diseases were of economic importance in 1945, namely BLACK ROOT (various fungi) of seedlings and RHIZOCTONIA ROOT ROT (R. Solani) which attacks the beets later in the growing season. Regardless of how environmental conditions may vary from season to season the area affected by blackroot remains fairly constant at about 800 acres. Consequently, when the total acreage of beets declines, as has been the case during the past two years, the losses caused by this disease become proportionately more important as a limiting factor in production. The incidence of blackroot and rhizoctonia rot has been found to be highest on the heavier, more closely compacted soil types that lack organic matter.

As in the past several years CERCOSPORA LEAF SPOT (C. beticola) was serious in only a few fields and could not be regarded as of economic importance.

Other Observations

LEAF SPOT (Corcospora beticola) was moderate about Guelph, Ont. (J.D. MacLachlan).

DAMPING OFF (Rhizoctonia Solani) caused a moderate infection of young plants at Lakeland, Man.; the plants were girdled just below the soil line and the fungus was abundant in the host tissues (J.E. Machacek).

RUST (Uromyces Betae) was general on the foliage at the Station, Saanichton, B.C. on Jan. 8, 1946. Fresh uredinial pustules were common. Rust was also prevalent throughout the fall and caused slight damage. (W. Jones).

ARGENTINE RAPE

WHITE RUST (Cystopus candidus). A slight scattered infection was general in the Morden area, Man. (W.L. Gordon).

STEM ROT (Sclerotinia sclerotiorum). About 40% of the plants were dead in a field at Portage la Prairie, Man. Sclerotia were abundant on the stems (J.E. Machacek).

BLACK ROT (Xanthomonas campestris) was present in the leaves of a few plants from the Morden area, Man. (W.L. Gordon). Specimens of Argentine rape bearing bacterial lesions were examined. The lesions were chlorotic and characterized by a darkening of the veins as in black rot of cabbage. The causal organism was isolated and identified as Xanthomonas campestris. It was compared pathogenically with cultures from cabbage and turnip. No evidence of specialization was found. Cultures from the 3 hosts caused infection on broccoli, Brussels sprouts, cabbage, cauliflower, kohl rabbi, radish, Argentine rape, and swede turnips (W.A.F. Hagborg).

HEAT CANKER (high temperature). A condition similar to that in flax was seen in a field at Portage la Prairie, Man., on Aug. 30. The injury is believed to have occurred during a severe 2-day heat wave in late July (J.E. Machacek).

SAFFLOWER

ROOT ROT (? Fusarium spp.) resulted in the death of about 3% of the plants in the plots at Lethbridge, Alta.; species of Fusarium were isolated, but their pathogenicity has not yet been tested (M.W.C.).

RUST (Puccinia Carthami). Infection was moderate in the plots at Lethbridge, Alta., in late August (M.W.C.).

SOYBEAN

The account on "Soybean Diseases in Southwestern Ontario in 1945" presented below was prepared by Drs. A.A. Hildebrand and L.W. Koch, Dom. Laboratory of Plant Pathology, Harrow, Ont.

Both in 1943 and 1944 soybeans in southwestern Ont. were harvested under dry and otherwise almost ideal weather conditions, as a result of which they went into storage with a very low moisture content. This circumstance probably as much as any other accounts for the fact that during the past two growing seasons incidence of disease in this crop has been relatively low in the district.

BACTERIAL BLIGHT (Pseudomonas glycinea). First noted early in July, the disease was then continuously seen throughout the season in most of the fields visited. Only in a few plantings on Pelee Island, however, was infection severe enough to reduce the yield through defoliation. Of the 2 varieties grown on the island, namely, A.K. Harrow and Harman, the former was much more severely infected than the latter.

BROWN SPOT (Septoria Glycines). During an examination of plants in the Laboratory plots on July 3, reddish brown spots were noted near the base of the plants on the unifoliate or first true leaves and, in a few cases, on the lower trifoliate leaves. By the symptoms (and later by isolations from affected material) the disease was diagnosed as brown spot. A close examination of varieties in the plots revealed Earlyana to be apparently the most susceptible, Richland, Lincoln and A.K. Harrow to be intermediate, and Harman and a new, as yet unnamed, selection designated Harrow A to be least susceptible. A more extensive survey revealed that infection of the unifoliate leaves was universal throughout the district. In no case, however, was infection found to have spread beyond a few of the lower trifoliate leaves, and accordingly, when the pair of first true leaves dropped off, the disease virtually disappeared. Infection was as prevalent among plants originating from seed treated with various seed protectants as among those developing from untreated seed. Circumstantial evidence suggested that infection of lower leaves originated from splashings from the soil.

BUD BLIGHT (virus of the tobacco ring-spot group), the first authentic cases of which were noted about mid July, was not as prevalent as last year. However, if the disease should be seed-borne, as is soybean mosaic, the number of infected plants was still sufficient to constitute a potential source of danger in seed to be planted in 1946.

MOSAIC (Soja virus 1), though not abundant, was much more prevalent than last year. As in previous years Manchu varieties seemed to be especially susceptible to this disease.

DOWNY MILDEW (Peronospora manshurica). Although in 1944 not a single case of downy mildew was encountered, this year the disease was fairly widespread and abundant especially on Richland and A.K. Harrow. In 1943 the Harrow Laboratory reported to the Survey (P.D.S. 23:30) that in certain plants infected with mildew, infection, instead of producing the more typical scattered spots on the leaf, involved the whole under-leaf surface, producing symptoms of the mottle type that could be easily mistaken for mosaic. This year among the approximately 13,000 plants of the variety A.K. Harrow grown in the laboratory experimental plots, 8 plants showed the type of symptom referred to above. Attention was first attracted to these plants by the gray-green colour and mosaic-like appearance of their upper leaves. The plants were marked in the rows as soon as noted and kept under almost daily observation. After an interval of a week to ten days, Peronospora manshurica was found fruiting abundantly on the lower surface of the lower leaves of each plant. Later the fungus was found fruiting on the lower surface of the leaves midway up the stem and finally on those at the tip of the plant. On the latter, both the mottle and the rugose effect were due to the occurrence of "green islands" within which the fungus, though it may have been present, did not sporulate. What is of outstanding interest and importance is that these 8 plants became centres of infection within the plots. Direction and extent of infection were correlated with wind direction and velocity. It is believed that infection of these 8 plants originated from the seed and became completely systemic.

FUSARIUM BLIGHT (Fusarium oxysporum f. tracheiphilum), though fairly widespread in its occurrence, was not concentrated in any particular area and was unimportant in its effect on yield.

POD and STEM BLIGHT (Diaporthe Phaseolorum var. Sojae). Throughout most of the district this disease was only of sporadic occurrence. However, in a few fields on the heavier soils in Kent Co., infected plants amounted to 3% of the stand. The loss in yield due to the incidence of the disease is not so important as the possible contamination of seed to be used next year.

PHYLLOSTICTA LEAF SPOT (P. sojaecola). This year, as in 1944, Phyllosticta leaf spot was noted on the lower leaves of plants for a short time in the earlier part of the season, after which time it entirely disappeared.

FROG-EYE (Cercospora sojina) continues year after year to appear only on the stems of plants that have reached maturity, and apparently has little or no effect on yield.

Other Observations

DOWNY MILDEW (Peronospora manshurica). A slight infection was present on Black Eye in a garden in Agassiz, B.C. (W. Jones).

BACTERIAL BLIGHT (Pseudomonas glycinea) was recorded as follows: slight infection in 2 rows of Black Eye at Agassiz, B.C. (W. Jones); slight infection in the plots at Lacombe, Alta. (M.W.C.); trace to slight infection only on Mandarin, Kabatt and Pagoda in the plots, Division of Forage Crops, C.E.F., Ottawa, Ont. (R.G. Atkinson). The disease has been seen for several years in the plots at Charlottetown, P.E.I. (R.R. Hurst).

CURLY TOP (Beta virus). A 25% infection was found in one lot of soybeans in the verification plots at Summerland, B.C. (G.E. Woolliams).

MOSAIC (virus) affected 5% of the plants of Black Eye in a garden at Agassiz, B.C. (W. Jones).

SUNFLOWER

POWDERY MILDEW (Erysiphe Cichoracearum). A light to moderate development of the oidial stage was present on a specimen received from Mont Rolland, Que. (I.L.C.).

DOWNY MILDEW (Plasmopara Halstedii). A number of severely stunted, rosetted plants of Mammoth Russian was found in the crop on unrotted muck soil at the Station, Kapuskasing, Ont.; the germination was also poor. Only a trace of infection was present on the lower leaves when the same variety was grown in a rotation (R.G. Atkinson).

WILT (Sclerotinia sclerotiorum). A slight infection occurred in a planting at Fort Garry, Man., but a third of the plants were broken over and rotted in a planting at Pleasant Home (W.L. Gordon).

MOSAIC (virus). Nine plants of Mennonite at the Station, Fredericton, N.B., showed a striking yellow veinal mottling and a slight ruffling of the leaves; the plants were also slightly dwarfed. The virus was transmitted to healthy sunflowers by grafting (D.J. MacLeod).

BORON DEFICIENCY was slight in a plot of Mennonite at the Station, Fredericton, N.B. Streaking and cracking of the stem and petioles were noticeable in some plants on one side of the plot (D.J. MacLeod).

CULTIVATED GRASSES

Some records are here included on grasses not in cultivation where they belong to genera containing cultivated species.

AGROPYRON - Wheat Grass

Leaf Spot (Ascochyta graminicola) was present on faded leaves of A. trachycaulum along with Phyllachora graminis in the University area, Fort Garry, Man.; spores mostly 17.5-20 x 5 microns (W.L. Gordon).

Ergot (Claviceps purpurea) was present on A. repens in patches in the University area, Fort Garry, Man. (A.M. Brown). It was common along the dykes at Starrs Point, N.S. (J.F. Hockey).

Leaf Blight (Fusarium dimerum). The fungus was sporulating profusely on the odd blighted leaf in a patch of A. Smithii at Fort Garry, Man. (W.L. Gordon).

Powdery Mildew (Erysiphe graminis). Trace to moderate infections occurred on leaves of A. repens at Fort Garry, Man. (W.L. Gordon).

Tar Spot (Phyllachora graminis) was prevalent on the leaves of A. trachycaulum in a clump of the grass at the University, Fort Garry, Man. (W.L. Gordon).

Stem Rust (Puccinia graminis). Uredinia of P. graminis var. Tritici were present on a patch of A. trachycaulum var. typicum at Fort Garry, Man. (A.M. Brown, T. Johnson). A moderate infection occurred at Cypress River (T. Johnson). Infection was moderate to heavy on a thick stand of A. repens in a small block of Garnet wheat on a farm near Ottawa, Ont. (R.G. Atkinson).

Leaf Rust (Puccinia montanensis). A moderate infection of both P. montanensis and P. graminis was present in a plot of A. trachycaulum var. unilaterale at Brandon, Man. (T. Johnson).

AGROSTIS - Bent Grass

Leaf Rust (Puccinia coronata) was collected on A. alba at Fort Garry, Man., Sept. 27, 1944. Germinating telia were suspended over leaves of Rhamnus alnifolia on June 4 and resulted in pycnia on June 14 (A.M. Brown).

BRACHYPODIUM

Stem Rust (Puccinia graminis var Phlei-pratensis). A moderate infection was more or less general in a plot of B. pinnatum at Morden, Man. When the uredinia were cultured it proved to be var. Phlei-pratensis. The grass is thus a new host for timothy rust (T. Johnson).

BROMUS - Brome Grass

Leaf Spot (Ascochyta ?graminicola). A trace of infection was found on blighted leaf tips of B. inermis at Hargrave, Man. Pycnidia about 100 microns in diam. with pore; spores somewhat irregular in size and shape, many still continuous, 8.7-15 x 3-4 microns (W.L. Gordon).

Ergot (Claviceps purpurea) was common on volunteer B. inermis in the University area, Fort Garry, Man.; sclerotia were beginning to form on July 26 (A.M. Brown).

Leaf Blotch (Helminthosporium Bromi). A trace was present on B. inermis at Elm Creek, Man., and moderate spotting on some leaves at Starbuck (W.L. Gordon).

Leaf Rust (Puccinia coronata). A moderate infection on B. sp. (Ottawa 1927-449) in a plot at Brandon, Man., when cultured, proved to be variety Avenae (T. Johnson).

Stem Rust (Puccinia graminis). Slight infection on B. condensatus and B. marginatus in a plot at Brandon, Man.; when cultured both proved to be var. Avenae (T. Johnson).

Scald (Rhyncosporium Secalis). Infection slight in the plots of B. inermis at Lacombe, Alta. (M.W.C.); infection slight on B. inermis at Melita and moderate on some leaves at Gilbert Plains and Jordan, Man., spores 12.5-17.5 x 2.5-5 microns (W.L. Gordon).

Leaf Spot (Selenophoma bromigena). Common and often severe on plots of B. inermis at Saskatoon and Melfort, Sask. (H.W.M.); out of 16 collections of leaf spots on B. inermis made in Man. 11 yielded S. bromigena alone or with other organisms; infection varied from slight to severe (W.L. Gordon).

CALAMOVILFA

Rust (Puccinia amphigena). Infection severe on C. longifolia at Carberry, Man. (T. Johnson).

DACTYLIS GLOMERATA - Orchard Grass

Powdery Mildew (Erysiphe graminis). Odd scattered leaf affected in a field at the Auld Farm, O.A.C., Guelph, Ont. (J.D. MacLachlan).

? Purple Leaf Spot (Mastigosporium rubricosum). Infection common on early spring growth at Saanichton, B.C.; damage slight (W. Jones).

Brown Stripe (Scoletotrichum graminis). About 15% of the leaves were distinctly injured in a field at the Auld Farm, O.A.C., Guelph, Ont. Some of the leaves showed long indefinite dead stripes but only in a few areas was the fungus fruiting (J.D. MacLachlan, I.L. Conners). A slight infection on Hercules in the plots of the Division of Forage Crops, C.E.F., Ottawa (R.G. Atkinson).

ELYMUS

Ergot (Claviceps purpurea). Slight infection on a clump of E. Macounii at the University, Fort Garry, Man. (W.L. Gordon).

FESTUCA

Ergot (Claviceps purpurea). A trace in the plots at Olds, Alta. A moderate infection on a 1/3rd acre block of F. rubra variety Duraturf at the C.E.F., Ottawa, Ont. (R.G. Atkinson). Ergot affected 35% of the panicles of F. rubra var. Refon at one end of the range and 10% over the rest in the plots, O.A.C., Guelph, Ont. (J.D. MacLachlan).

Leaf Spot (Helminthosporium dictyoides). Infection general but slight on F. pratensis var. Mefon in the plots, O.A.C., Guelph, Ont.; fruiting on the basal leaves (J.D. MacLachlan).

Rust (Puccinia coronata). Uredinial infection general but mild on Mefon in the plots at Guelph, Ont. (J.D. MacLachlan). Infection varied from 5 to 40% on F. pratensis var. Ensign in the plots, C.E.F., Ottawa, Ont. (R.G. Atkinson).

Brown Stripe (Scoletotrichum graminis). Infection slight on F. rubra var. Duraturf in the plots, C.E.F., Ottawa, Ont. (R.G. Atkinson).

HOLCUS LANATUS

Twist (Dilophospora Alopecuri). Common in some areas on Lulu Island, B.C. (W. Jones).

HORDEUM

Stem Rust (Puccinia graminis var Tritici). Odd stems of H. brevisubulatum heavily infected at Morden, Man. (T. Johnson).

KOELERIA CRISTATA

Stem Rust (Puccinia graminis). Slight infection in a plot at Morden, Man. (T. Johnson).

Rust (Puccinia monoica). Light infection at Wawanesa, Man. (T. Johnson).

LOLIUM

Ergot (Claviceps purpurea). Fairly general in one field of L. perenne at Ladner, B.C. (W. Jones).

Leaf Spot (Helminthosporium siccans). Infection general but slight on L. perenne var. Peron in the plots, O.A.C., Guelph, Ont.; sporulating on the older basal leaves (J.D. MacLachlan).

Eye Spot (Ovularia Lolii). Fairly general on L. italicum and L. perenne, causing moderate damage to the foliage of the latter at Saanichton, B.C. (W. Jones).

PHALARIS

Ergot (Claviceps purpurea). Trace in canary seed (P. canariensis) in the plots at Lacombe, Alta. (M.W.C.).

PHLEUM PRATENSE - Timothy

Root Rot (low-temperature basidiomycete). Plants were killed in small patches in an old alfalfa field at Lacombe, Alta.; the pathogen was isolated (M.W. Cormack).

Leaf Spot (Heterosporium Phlei). Infection moderate to severe in 2 fields in west-central Alta. (M.W.C.). Infection was slight to moderate on Medon, a hay type, and generally prevalent on Paton, a pasture type, but causing few leaves to collapse at the Auld Farm, O.A.C., Guelph, Ont. When leaves bearing the characteristic spots of the disease were incubated over night, the fungus sporulated sparingly (J.D. MacLachlan, I.L. Conners).

In surveys conducted in the Montreal district, Que., unidentified leaf spots were found causing a slight infection in 10 out of 24 fields in June, while the infection was slight in 21 fields and moderate in 11 out of 35 visited in July (T. Simard).

Stem rust (Puccinia graminis var. Phlei-pratensis) moderately infected some clumps in the University area, Fort Garry, Man. (A.M. Brown). Infection was slight in 5 fields and moderate in one out of 35 visited in July in the Montreal district, Que. (T. Simard).

Brown Stripe (Scoletotrichum graminis). A slight infection was present on both Medon and Paton timothy in fields at the Auld Farm, O.A.C., Guelph, Ont. (J.D. MacLachlan).

POA

Stem Rust (Puccinia graminis). Odd stems of P. glaucifolia and P. nevadensis were heavily rusted in a plot at Mordon, Man. When the rust was cultured, the variety Avenae was obtained (T. Johnson).

Brown Stripe (Scoletotrichum graminis). Infection was a trace on P. pratensis var. Kenon, but it was moderate to severe on P. canadensis var. Canon in the plots at O.A.C., Guelph, Ont. (J.D. MacLachlan).

LAWNS and GOLF COURSES

Snow Mould (low-temperature basidiomycete). The mycelium which developed on lawns and golf greens in the early spring in Alta., was mainly superficial and caused relatively little damage in 1945 (M.W.C.). Snow mould was of no importance on lawns at Saskatoon, Sask., this year (T.C. Vanterpool).

Brown Patch (Rhizoctonia Solani). Rather extensive areas were present on June 29 in a lawn containing a high percentage of Colonial Bent at St. Catharines, Ont. (G.C. Chamberlain).

Dollar Spot (Rhizoctonia sp.) was observed on several golf courses in 1945 in Ont.; some of the greens were badly disfigured (J.E. Howitt).