II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was general but the damage was slight on Vancouver Island and in the Fraser Valley, B.C.; it was also general in the Okanagan district, being particularly noticeable along the irrigation flumes. Infection was severe in one field at Athabaska, Alta., and was slight to moderate in the plots and in 4 other fields out of 16 examined in Alta. At Macdonald College, Que., 75% of the leaves were affected in some fields on June 28 (W.E. Sackston). Infection was quite heavy on Grimm in September in Queens Co., P.E.I.

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii) was slight in a field at Lacombe and moderate in one at Edmonton, Alta., in early July. Ascochyta imperfecta was also present on most of the plants in both fields and later in the season when other diseases became more prevalent, yellow leaf blotch was never observed. This is the first report of the disease in Alta., but a specimen of alfalfa showing the disease was collected at Stavely, in 1935 (M.W. Cormack). The disease was observed at Saskatoon, Sask.

DOWNY MILDEW (Peronospora aestivalis). A trace was observed on Ladak and a slight infection on Lytton at Agassiz, B.C., on May 12; the latter variety is definitely more susceptible than other commercial varieties including Grimm, which is the most widely grown variety at the coast (W. Jones). Downy mildew was slight to moderate at Thorsby, Alta., on July 3 (A.W. Henry). A trace of disease was found in one field at White Fox, Sask., on May 31. (T.C. Vanterpool)

BLACK STEM (Ascochyta imperfecta) was severe in 2 fields in the Peace River district and in the plots at Lacombe, Alta.; it was slight to moderate in 8 other fields and slight on all varieties in the Beaverlodge, Edmonton, and Lethbridge plots. (M.W. Cormack)

BACTERIAL WILT (Phytomonas insidiosa) was found this year in the alfalfa fields in the Experimental Station, Summerland, B.C. In one field a large portion of the plants were killed. (H.R. McLarty) Bacterial wilt was suspected in southern Alta. last year and it was definitely identified by Dr. F.R. Jones, when he visited Alberta this spring. It has apparently been introduced rather recently, but it is spreading rapidly through the irrigated districts and is likely to become a serious problem. It was found in 18 out of 40 irrigated fields examined, but it was not observed in unirrigated fields, even in the same districts. The damage was a trace in 5 fields, slight in 6, moderate in 3, and severe in 4. The disease is at present most prevalent and severe in the Brooks district, where over

50% of the plants were dead or dying in 2 fields and the damage was slight to moderate in several others. A large acreage of four-year-old alfalfa was also ruined by wilt on a ranch north of Medicine Hat. In the Lethbridge district the disease was much less prevalent; it was found in only one field out of 15 examined. In late May many of the infected plants were wilting severely in the field. In late September wilt was found in additional fields in the Brooks district and also farther north in individual fields at Cluny and Strathmore. Grimm, almost the only variety grown in Alta., is also one of the most susceptible. (M.W. Cormack)

The only previous report of bacterial wilt in Canada was from Windermere, B.C., in 1936.

RUST (Uromyces Medicaginis). A collection of this rust was obtained by Mr. J.A. Goode at Goodlands, Man., on September 25. (W.L. Gordon)

ROOT ROT (Various fungi) was found in 19 out of 25 fields examined in Alta.; the damage was as follows: trace to slight in 11 fields, moderate in 6, and severe in 2. The latter were located at Airdrie and Lacombe, where half the plants were killed or seriously weakened. Early spring infection of alfalfa and sweet clover was relatively slight in southern Alta., while it was fairly prevalent and destructive in other parts of the province. Cylindrocarpon Ehrenbergi apparently caused most of the damage, but Fusarium avenaceum and Plenodomus Meliloti also occurred in several diseased stands. (M.W. Cormack)

Root rot was scattered through the plots at the University, Saskatoon, Sask., but no large patches were affected. Further killing was reported in mid-summer. Fusarium was isolated. Root rot was also observed at White Fox, an alfalfa seed producing area. (T.C. Vanterpool)

Yellows (boron deficiency) was suspected in a field near Charlottetown, P.E.I.; the field was moderately affected. (R.R. Hurst)

COMMON CLOVER

COMMON LEAF SPOT (Pseudopeziza Trifolii). In the fields about Macdonald College, Que., red clover plants chosen at random showed from 15 to 45% of this leaf spot early in the summer, but the disease was inconspicuous on the second growth (W.E. Sackston). The leaf spot was heavy in all fields examined in August in P.E.I. (R.R. Hurst)

POWDERY MILDEW (Erysiphe Polygoni). A trace was observed in the red clover plots at Edmonton, Alta. Powdery mildew was first observed on red clover in the plots at Macdonald College, Que., on August 9, although it had

been noted in the woods by Dr. Crowell at a much earlier date. It became increasingly abundant throughout the season and was seen in all districts visited. No mildew was seen on alsike clover although the plants were growing near heavily infected red clover (W.E. Sackston). Powdery mildew was unusually prevalent and severe this year in York and Carleton Co's., N.B.

STAGONOSPORA LEAF SPOT (S. recedens). A trace was found in one field of red clover at Athabaska, Alta. (M.W. Cormack)

GLOEOSPORIUM LEAF SPOT (G. spadiceum). A trace of infection was observed on red clover in the plots at Olds, Alta. (M.W. Cormack)

RUST (Uromyces Trifolii) was general on red clover in the plots at Agassiz, B.C.; the damage was slight to moderate. Aecia were found on the leaves and petioles of spaced plantings at Macdonald College, Que.; uredinia and telia were common later, both there and in fields about the College (I.H. Crowell). Rust was light on red clover at the Fredericton Station, N.B. A slight infection was observed in 4 fields examined in P.E.I.

ROOT ROT (Sclerotinia sp.). Forty-five per cent of the plants were killed in the trial rows at Sidney, B.C. (W.R. Foster)

WILT (Verticillium sp.) has been found affecting a few plants of the spaced plantings at Macdonald College, Que., but the affected plants wilt and die; a Verticillium sp. has been repeatedly isolated from the roots of diseased plants, but its pathogenicity has not been tested. (W.E. Sackston)

WINTER KILLING (Freezing and thawing). As a result of winter killing, clover was killed out in most fields in P.E.I., except in those protected by windbreaks. (R.R. Hurst)

SOOTY BLOTCH (Cymadothea Trifolii) was general in the Fraser Valley, B.C. (W. Jones). Sooty blotch was present throughout the season in low moist parts of fields of red clover about Macdonald College, Que., and was most pronounced in dense stands of young plants; traces were found in all fields. On white clover the disease was found in woods, along headlands, and in the ditches throughout the season; up to 50% of the leaves were affected (W.E. Sackston). Sooty blotch infection varied from a trace to severe in N.B., while traces only on red clover were observed in P.E.I.

STEMPHYLIUM LEAF SPOT (S. sarcinaeforme) was found everywhere on red clover about Macdonald College, Que., but infection varied greatly. It was

most noticeable on the second growth particularly on plants, which were fully grown. In some fields, where the disease was severe, quite a few leaves were killed (W.E. Sackston).

CERCOSPORA LEAF SPOT (C. zebrina Pass.) was fairly common on red and alsike clover about Macdonald College, Que., being somewhat heavier on the latter host. (W.E. Sackston)

MOSAIC (virus) affected 10% of the plants in spaced blocks at Macdonald College, Que. However, mosaic was seen in few fields, and then only isolated plants were affected (W.E. Sackston). A suspected virus disease of red clover, which was reported last year, was present again in field and greenhouse. It is less common than mosaic about Macdonald College, but it is much more destructive to individual plants. (I.H. Crowell)

The SLIME MOULD (Didymium squamulosum) was found fruiting on alsike clover, Sept. 12, 1939, at Macdonald College, Que. (M.C. Herb. 428). (I.H. Crowell)

SWEET CLOVER

STAGONOSPORA LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis (Stagonospora Meliloti). The leaves only were found affected in 8 fields out of 14 examined in Alta.; the infection was as follows: trace to slight in 6 fields, moderate in one at Athabaska, and severe in one at Peace River. (M.W. Cormack)

STEM CANKER (Ascochyta caulicola). Three fields were slightly infected in Alta. Yellow Blossom sweet clover was slightly to moderately affected in the plots at Olds, but the other varieties were free from infection. (M.W. Cormack)

ROOT ROT (Sclerotinia and Fusarium) was slight in the plots of the Dominion Forage Crops Laboratory at Saskatoon, Sask. Typical specimens were secured in company with Dr. F.R. Jones. (T.C. Vanterpool)

PHYTOPHTHORA ROOT ROT (Phytophthora sp.). A soft watery root rot of sweet clover was found in 4 fields out of 10 fields examined in southern Alta., and also on roadside plants on two occasions. The damage was slight except in one field near Lethbridge, where 20% of the plants were dying. A highly pathogenic species of Phytophthora was isolated which was identified by Mr. S.F. Ashby as a strain of Phytophthora Cactorum (Leb. & Cohn) Schroet. Sweet clover is apparently a new host for this species.

The symptoms of the disease are similar to those of the Phytophthora root rot caused by P. megasperma Drechsl. in the United States (Jones, F.R., Phytopathology 19: 909-910. 1939), but apparently in Alberta it is caused by a different species of Phytophthora. (M.W. Cormack)

VETCH

DOWNY MILDEW (Peronospora Viciae) was severe on the varieties Gray, Spring, Nain, Blanche, Poivre, Jean Baptiste, Divine, and Blanche Desmarais in the plots at the Sidney Station, B.C., while no infection was found on Hungarian, Monantha, Scarlet 527, Hairy, Black Bitter, Tangier, and Scarlet 524. As the varieties were grown alongside of each other and the disease was heavy on the affected varieties, it is believed the differences in infection are due to varietal reaction to the disease. (W. Jones)

FOOT ROT. Odd plants of the variety Monantha were found affected at Brandon, Man. Isolations yielded Fusarium Scirpi var. acuminatum and F. redolens. (W.L. Gordon)

RUST (Uromyces Fabae) was slight on a few plants of Vicia Cracca near Bridgewater, N.S. (J.A. Boyle)

BROOM-CORN MILLET

SMUT (Sorosporium Panici-miliacei) was heavy on Hog millet at Brandon, and moderate on Hog, Red Turgai, and Turgai Proso millet at Mordon, Man. Smut affected 50-75% of the heads of a Hog millet crop in Lincoln Co., Ont.; the crop was worthless for hay. (G.C. Chamberlain)

BACTERIAL LEAF SPOT (Phytomonas Holci). A moderate, general infection occurred on Empire, Kuisk, Hansen's Proso, Hungarian, and Siberian millet at Brandon, Man.

BUCKWHEAT

YELLOWS (virus) was widespread on buckwheat in York, Sunbury, Queens, Westmoreland, Northumberland, and Charlotte counties, N.B. The disease was severe on the rough varieties, but was slight on the smooth in commercial fields. At the Station, Fredericton, 10-14% of the plants were affected in the plots of the rough Tartarian varieties, 1.2-1.6% were affected in those of the smooth Japanese sorts. (D.J. MacLeod)

The two so-called types of buckwheat belong in reality to two different species of Fagopyron. The smooth type is Fagopyron esculentum Gaertn., which is known as Buckwheat or Common Buckwheat, while the rough type is F. tartaricum Gaertn. which is called India-wheat, Tartary Buckwheat, Rye Buckwheat, or Duck-wheat. According to Dr. W.G. McGregor, the common buckwheat is probably grown more extensively than the Tartary Buckwheat, except possibly in New Brunswick. Dr. McGregor also reports only two or three plants are affected by yellows in any one season in the plots at Ottawa. (I.L. Conners)

CORN

SMUT (Ustilago Zeae). A trace of infection was observed at Medicine Hat, Alta. (R.A. Ludwig). Smut was reported in Man. as follows: Brandon, moderate infection, but less than in 1938; Morden, slight general infection; Winnipeg, 60% of plants of Minn. 13 and 7% of Manitoba Amber infected. Smut was present in every field examined in south-western Ontario, but in amounts that it appeared to be of slight economic importance. (J.K. Richardson)

RUST (Puccinia Sorghi). In Manitoba, rust infection was moderate and general at Brandon, heavy in patches at Morden, and slight and general at Winnipeg. Rust was general in Ontario in September, but it apparently caused little damage (J.K. Richardson). A very slight infection occurred in P.E.I.

STALK ROT (Fusarium moniliforme). A pink coloured rot was found occasionally affecting the nodes and adjacent tissue. Isolations yielded F. moniliforme and moulds. The above is the first record of the occurrence of this pathogen on corn in Man. (W.L. Gordon)

ROOT ROT (cause undetermined). Several fields were observed in south-western Ontario, where the stands were poor and growth uneven. The roots on the affected plants were sparse and badly rotted. (J.K. Richardson)

EAR ROTS (Fusarium and Diplodia Zeae) was just beginning to show up in the fields examined in Essex, Kent, and Lambton counties, in late August, but was present in every field. (L.W. Koch)

FLAX

RUST (Melampsora Lini). A slight infection was observed at Brooks, and a trace on most varieties at Lacombe, Alta. A trace of rust was seen in a field at Garrick, Sask., out of 6 examined; it was severe on a sample

from Rosetown out of several received from growers. Traces of rust were reported from Elie and Haywood, Man., and a slight infection from Rosenfeld.

WILT (Fusarium Lini) caused slight damage in two fields out of 6 examined in Sask. Only a trace occurred in the plots at Saskatoon.

BROWNING (Polyspora Lini). Several specimens of flax showing in some instances severe damage were received at the Saskatoon Laboratory in the summer of 1939 (P.M. Simmonds). Browning caused slight to moderate damage according to the variety in the plots at Saskatoon; at first the disease was confined to the tips of the seedling plants and was thought to be caused by frost. Damping-Off (Rhizoctonia Solani) was not observed. (T.C. Vanterpool)

PASMO (Septoria linicola (Speg.) Garass., formerly (Phlyctaena linicola Spog.) was severe on most varieties in the plots of the Cereal Division, Central Experimental Farm, Ottawa, Ont., following heavy rains and high winds in late July and early August. Plants nearing maturity were most severely affected. (F.S. Thatcher)

The transfer of the pathogen to Septoria was made by Garassini (cfr. R.A.M. 15:441. 1936) and confirmed by Rost (cfr. R.A.M. 16:676-77. 1937).

SEED DISCOLORATION (Phytomonas atrofaciens). A sample of seed was submitted by the Seed Laboratory, Winnipeg on account of the discoloration of the seed coat and its poor germination. The seed was found to be severely infected by P. atrofaciens. (W.A.F. Hagborg)

HEAT CANKER (non-parasitic). Affected samples were received from Dollard, Yellow Grass, and Saskatoon, Sask., at the Saskatoon Laboratory. In other samples received the Pasmo disease was also present.

MANGEL

CERCOSPORA LEAF SPOT (C. beticola) was fairly heavy in a field of Yellow Intermediate in York Co., N.B., but the damage was slight (D.D. Dolan). This leaf spot caused some reduction of yield in a severely infected field of Laurentian mangels in Queens Co., P.E.I. (R.R. Hurst)

CROWN GALL (Phytomonas tumefaciens) was found on a single plant in P.E.I.

SOFT ROT (Erwinia carotovora) destroyed two plants in a field near Charlottetown, P.E.I.

DAMPING-OFF (Rhizoctonia Solani). Affected plants were received from Deep Brook, N.S.; the amount of damage was not stated.

?CURLEY TOP (virus). In York Co., N.B., mangels were affected with a trouble where the middle and top leaves were rugose with the veins showing a faint clearing and the basal leaves were dead. The basal leaves first developed an interveinal foliar necrosis, the necrotic areas being circular and from 5 to 20 mm. in diam. These areas frequently coalesced resulting in the destruction of the leaves. During the latter part of the season the symptoms gradually disappeared and the plants appeared to continue their normal growth. The leaves of seedling mangels became strikingly rugose and the margins of the top leaves curled downward when leaf hoppers. (?Thamnotettix sp.) were confined on the seedlings after feeding on diseased plants. The leaves also showed a marked veinal mottle. The petioles and blades later developed a brown rusty appearance and a number of leaves died. The virus was successfully transmitted by grafting, but its transmission by sap inoculation to Datura Stramonium, Nicotiana Tabacum, Solanum nodiflorum, Lycopersicon esculentum, Capsicum annuum, Lycium barbarum and mangel was unsuccessful. It is concluded that the rugose symptoms and veinal mottle are due to a virus and that the foliar necrosis is due to some other cause. (D.J. MacLeod)

FERN LEAF (?virus). An unusual condition was also found in White Prince mangel in York Co., N.B. All the leaves of the affected plants were spindling and filiform, varying from 10 to 12 in. in length by ½ to 2 in. in width. The production of new leaves was stimulated to form a compact bunch. Over 200 leaves were found on one plant. Besides the marked reduction in the width of the lamina, the leaves were twisted round in a loose spiral and their margins were irregularly rolled upwards. In young leaves the laminae were quite uneven and chlorotic. The basal leaves developed a diffused veinal mottle and died prematurely. The affected plants were extremely dwarfed and the roots were about two-thirds the normal size; 3% of the plants were affected in a test plot. Attempts to transmit a virus by sap inoculation to standard differentials were unsuccessful. (D.J. MacLeod)

CROWN or DRY ROT (non-parasitic) causes a necrosis of the petioles and leaf veins and occasionally an internal breakdown of the roots. The leaf symptoms were particularly prevalent in York Co., N.B., this year during a dry period in August and early September. During the latter part of September, when heavy rains fell, the mangels recovered (J.L. Howatt). A few affected plants were seen in one field in Queens Co., P.E.I. The trouble may be due to lack of boron. (R.R. Hurst)

ORACH or HUNGARIAN SPINACH

LEAF SPOT (Cercospora dubia) was moderate on Atriplex hortensis at Brandon, Man. (J.E. Machacek and W.L. Gordon)

SORGHUM

BACTERIAL LEAF SPOT (Phytomonas Holci) moderately infected Japanese Amber, Early Amber, Wheatland Milo and Sudan grass at Brandon, Man.; while infection was slight on Sudan grass, and severe on Early Amber Cane, Rhodesian Sudan grass, White Kaffir corn, and Doff's Kano at Morden.

COVERED SMUT (Sphacelotheca Sorghi) was reported as slight on Early Amber at Brandon, Man., and common on Early Amber and Sooner Milo at Morden. (W. Popp)

SOY BEAN

BACTERIAL BLIGHT (Phytomonas glycinea) was general but moderate at Brandon and Morden, Man. All varieties were mildly affected at the Harrow Station, Ont.

MOSAIC (virus). Traces of mosaic were present in the test plot at the Charlottetown Station, P.E.I.

SUGAR BEET

ROOT ROT was destructive in patches killing many plants in a field at Lethbridge, Alta. Fusarium culmorum was isolated from the diseased roots. (R.A. Ludwig)

SUNFLOWER

WILT (Sclerotinia sclerotiorum) had affected less than 1% of the plants at Saskatoon, Sask. The head rot, which was so conspicuous last year appeared to be entirely absent. There was a trace of infection in some patches and severe in others at Morden, Man.

RUST (Puccinia Helianthi) was moderate at Paradise Valley, Alta. (S.B. Clay). Rust was again present in the University plots, Saskatoon, Sask., infection ranging from a trace to severe. Rust was severe in the plots at both Brandon and Morden, Man.

CULTIVATED GRASSES

AWNLESS BROME GRASS (Bromus inermis)

Leaf Blotch (Septoria bromigena) was moderate at Sedgewick, Alta. (W.C. Broadfoot)

CRESTED WHEAT GRASS (Agropyron cristatum)

Stripe Rust (Puccinia glumarum). Infection was slight at the Agassiz Farm, B.C. (W. Jones)

Barley Covered Smut (Ustilago Hordei). Smut was detected in a sample of seed from Spruce Holm, Sask., by Mr. Nobles, Dominion Plant Products Laboratory, Saskatoon. The sample was communicated by Dr. P.M. Simmonds. Examination revealed that the spores agreed with Ustilago Hordei, which G.W. Fischer (Mycologia 30:385-389. 1938) found on this host at Pullman, Wash., and Bozeman, Mont., rather than Ustilago bullata also reported by Fischer (Mycologia 29:408-425. 1937) on Agropyron cristatum. He has also been able to show by infection experiments that the smut on crested wheat grass would infect barley (Phytopathology 29:490-494. 1939). (I.L. Conners)

ORCHARD GRASS (Dactylis glomerata)

Purple Leaf Spot (Mastigosporium rubricosum (Dearn. & Barth.) Sprague) was general and caused slight to moderate damage on Vancouver Island and the Fraser River Valley, B.C. It appears to be the commonest leaf spot of orchard grass throughout the season (W. Jones). R. Sprague (Jour. Agr. Res. 57:287-299. 1938) describes the species in some detail. He recognized it to be distinct from M. album and proposed the name M. calvum (Ellis & Davis) Sprague. Later he found the name untenable and proposed the new combination M. rubricosum (Mycologia 32:43-45. 1940). (I.L. Conners)

Brown Stripe (Scoletotrichum graminis). A general slight infection occurred on Vancouver Island and in the Fraser River Valley, B.C. (W. Jones). The fungus was fruiting freely on leaves received from the Forage Crop Division, Ottawa. (I.L. Conners)

Powdery Mildew (Erysiphe graminis). A slight infection was observed in the pastures at the Stations at Agassiz and Sidney, B.C.

PERENNIAL RYE GRASS (Lolium perenne)

Eye Spot (Ovularia Lolii) was general, but caused slight damage on Vancouver Island and the Fraser Valley, B.C.

TIMOTHY (Phleum pratense)

Rust (Puccinia graminis). A trace to slight infection occurred on strains O 1818, O 1601, O 1602, while it was moderate to severe on others at Agassiz, B.C. (W. Jones). Infection was slight to moderate in

the plots at Edmonton and Lacombe, Alta. Some selections were free from infection, while others were heavily rusted at Macdonald College, Que. The II and III stages were found both in the field and greenhouse. The teliospores could not be induced to germinate (I.H. Crowell). Infection varied from a trace to very heavy on wild plants and in the nursery at Charlottetown, P.E.I. The selections were classified into hay, hay-pasture and pasture types. Some highly resistant strains were present in each class, while others were severely infected. (R.R. Hurst)

Leaf Spot (Heterosporium Phlei). Infection was general but slight on Vancouver Island and the Fraser River Valley, B.C. The disease caused the death of a large proportion of the leaves in several plots at Ottawa, Ont. (F. S. Thatcher). Infection was heavy on several seedling selections at Charlottetown, P.E.I. (R.R. Hurst)

Brown Stripe (Scoletotrichum graminis) was general but the damage was slight in the Fraser River Valley and on Vancouver Island, B.C. (W. Jones)

Anthracnose (Colletotrichum graminicola) was heavy in a patch of timothy as a leaf spot at Naicam, Sask.

Ergot (Claviceps purpurea). Traces were found in the plots at Charlottetown, P.E.I.

WESTERN RYE GRASS (Agropyron tenerum)

Smut (Ustilago bromivora). A 20% infection was recorded at Saskatoon, Sask.