II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta). Leaf and stem infection was tr.-sl. in all fields examined in s. Alta. during July. It was less prevalent after the second cutting (M.W. Cormack). A mod. infection was observed in a seed crop at Gordondale (A.W. Henry). Infection was 2-tr. 1-sev./84 fields examined in central Alta. and 1-tr. 1-sl. 6-mod./30 fields in the Faller district (J.B. Lebeau, D.A. McTavish). Every field was infected in central and w. Sask. Damage was mod.-sev. from heavy defoliation and killing of stems and branches. The disease was favoured by the cool and moist weather. Several mod. infected fields were seen in the irrigated areas in s.w. Sask. (H.W.M.). The disease caused some damage to fields left for seed in Man. (W.C. McDonald). A trace was found in the east field, C.E.F. Ottawa, Ont. (R.J. Baylis).

WINTER CROWN ROT (low-temperature basidiomycete) was not found in most areas in s. Alta.; sl. damage occurred in one field at Pincher Creek and in the plots at Lethbridge (M.W. Cormack). Damage was 9-tr. 15-sl. 2-mod./30 fields examined in the Peace River district. In central Alta., it was 20-tr. 23-sl. 31-mod. 4-sev./84 fields examined (J.B. Lebeau, D.A. McTavish). Winter crown rot was found causing sl. damage in all fields entered in n. Sask. It was also present in the irrigated areas in s.w. Sask. (H.W. Mead).

ANTHRACNOSE (Colletotrichum destructivum O'Gara). A trace to slight infection of what appeared to be typical leaf hopper injury was found at Ste. Anne de la Pocatière, Que. From material sent to M.W. Cormack he isolated from black lesions that were more or less girdling the stem a fungus, which he tentatively identified as C. destructivum, a fungus already known on alfalfa in the United States (cf. F.R. Jones and J.L. Weimer. U.S.D.A. Pl. Dis. Reporter 24:30-31. 1940) (R.O. Lachance).

BACTERIAL WILT (Corynebacterium insidiosum). Diseased material was received from the Salmon Arm district, B.C., from which bacterial wilt has not previously been reported (G.E. Woolliams).

Damage from bacterial wilt in Alta. was estimated as follows (M.W. Cormack, J.B. Lebeau, D.A. McTavish):-

District	Fields Examined	Fields Damaged Tr.	Sl.	Mod.	Sev.	Total
		%	%	%	%	%
Peace River	30	2	0	0	0	2
Central Alta.	84	2	3	1	1	5
Southern Alta.	50	14	36	26	10	86

In a detailed survey of 24 fields representing different districts of s. Alta., the average percentage of infected plants was 24 in stands seeded in 1948 and 7 in those seeded in 1949 (M.W. Cormack, E.J. Hawn).

In a survey of irrigated fields in s.w. Sask., on 18-19 July the older fields (5-7 years old) at Swift Current contained 60% of infected plants and were becoming unproductive; younger fields on higher ground were free of wilt. At Val Marie, old fields contained 50% of infected plants and were thin and weedy. At Eastend, older fields were unproductive and many had been seeded to wheat and oats. Alfalfa plants along the irrigation ditches were infected. On unirrigated land, a single infected plant was found in an old field at Snowden (H.W. Mead).

A survey of 24 fields was made the week of 14 August in s.w. Man. Bacterial wilt was prevalent in most fields, 5 years old, or older, resulting in distinct dwarfing of the plants and reduction of yield (W.C. McDonald). In one field in Simcoe Co., Ont., 60% of the plants were infected, causing 20% damage to the crop. In a second field in York Co., 5% of the plants were affected (W.G. Benedict). Summer and fall surveys in the Ottawa valley indicated that the symptoms of yellowing and wilting were absent this year on account of the cool wet weather. No new areas were identified and spread in the fields previously found infected appeared negligible (R.J. Baylis).

Bacterial wilt was found for the first time in Que. in 1950. The disease was in the Lower St. Lawrence district appearing to be quite common in Kamouraska Co., particularly at Ste. Anne de la Pocatière and St. Pascal. It was observed in 11 of the 72 fields examined. It is present both in the plots and fields at the Ste. Anne Station. The organism was isolated, identified, and its pathogenicity established in greenhouse tests. The smear technique as modified by R.J. Baylis was used in making the field diagnoses (R.O. Lachance).

ROOT ROT (Cylindrocarpon ehrenbergi) was common in Sask. as a secondary parasite in fields which had been injured by low winter temperatures (H.W. Mead).

Crown and root rots were present in most of the older fields among the 24 surveyed in s.w. Man., but the reduction of top growth of the infected plants was not as marked as in those attacked by bacterial wilt. The cause or causes of the rots were not determined (W.C. McDonald).

STEM NEMATODE (Ditylenchus dipsaci). An infestation of the alfalfa stem nematode, discovered in August in the plots at Lethbridge, Alta., by Dr. O.S. Aamodt, was confirmed by Dr. O.F. Smith of Nevada and by Dr. A.D. Baker at Ottawa. Scattered plants infested in varying degrees were found in both dry and irrigated plots. In a late fall survey of 45 fields in s. Alta., a sl. infestation was found in 2 fields both in the Lethbridge district (M.W. Cormack, W.D. McGinnis).

ROOT ROT (Fusarium spp.). A mod. general infection was found in all areas examined in Sask. It caused considerable killing of single plants at Saskatoon. F. scirpi var. acuminatum was isolated from stem bases and roots (H.W. Mead).

LEAF SPOT (Leptosphaeria pratensis (Stagonospora meliloti) was common and caused sl. damage in fields in the Snowden and White Fox areas, Sask. (H.W. Mead). Leaf spot occurred in many of the 24 fields examined in s.w. Man. (W.C. McDonald). A sl. infection occurred in one field examined in York Co., Ont. (W.G. Benedict).

DOWNY MILDEW (Peronospora aestivalis) was general in 1 field at Duncan, B.C. (W. Jones). Infection was mod. in the plots at Snowden, Sask., causing distortion and defoliation (H.W.M.). The disease occurred in several fields examined in s.w. Man. (W.C. McDonald).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii). Infection ranged from tr.-sl. in the variety nursery at Lethbridge, Alta., in mid-June (J.E.J. Thomson). Infection was mod. in a field near Beaverlodge and a trace in one field in central Alta. (J.B. Lebeau, D.A. McTavish). The disease is favoured by hot, dry weather and for this reason was less prevalent this year in Sask. than for several years. It was present in 50% of the fields entered (H.W. Mead).

COMMON LEAF SPOT (Pseudopeziza medicaginis). Infection was sl. in the plots at Lethbridge and in most fields examined in s. Alta. It was mod. in one field near Monarch (M.W. Cormack). Infection was 8-tr. 8-sl. 8-mod./30 fields examined in the Peace River district and 12-tr. 1-sl. 1-mod./84 fields in central Alta. (J.B. Lebeau, D.A. McTavish). Common leaf spot was very prevalent in Sask., especially in the northern areas. It was found, frequently along with black stem, in over 60% of the fields visited, but it caused little defoliation (H.W. Mead). The disease occurred in many fields visited in s.w. Man. and appeared to be most destructive of the leaf spots (W.C. McDonald). Infection was heavy on first growth and light on the second in a field in Wellington Co., Ont. (W.G. Benedict). A sl. infection was seen in the east field, Division of Forage Plants, C.E.F. Ottawa (R.J. Baylis). A trace was noticed in a field in Queens Co., P.E.I. (R.R. Hurst).

WILT (Sclerotinia sclerotiorum). Infection was sl. on Grimm, Viking, Buffalo, Canauto, and Chartainvilliers in the rod rows at the Station, Saanichton, B.C. (W. Jones).

LEAF SPOT (Stemphylium botryosum). Sl. infection in a field at Westholme, B.C. (W. Jones).

RUST (Uromyces medicaginis). A trace was present in a field, C.E.F., Ottawa, Ont. (R.J. Baylis).

WITCHES' BROOM (virus). A trace infection was observed in 4 fields in central and n. Alta. (J.B. Lebeau, D.A. McTavish).

What appears to be witches' broom of alfalfa was found affecting 15% of the Astragalus mortoni plants growing in a small area on a dry rocky hillside at Soda Creek, B.C. The plant has no commercial or fodder value (N.S. Wright).

CROWN ROT (cause undetermined). Rotting of the crown buds occurred during the growing season in many fields in s. Alta. In a detailed survey of 7 fields seeded in 1949, the average percentage of infected plants increased from 1.3 in May to 75.6 in October. All plants examined in fields seeded in 1948 or earlier were damaged to varying degrees. Various fungi associated with the damage are being studied (M.W. Cormack, E.J. Hawn).

POTASH DEFICIENCY. Unmistakable symptoms of potash deficiency, i.e. leaflets with yellow edges and white dots, were found scattered throughout a 5-acre field in P.E.I.; significant damage resulted (R.R. Hurst).

WINTER KILLING (low temperatures) caused sev. damage about Saskatoon and in exposed fields in other areas of Sask. Ladak was hardier than Grimm (H.W. Mead). Five fields of alfalfa in the Avalon peninsula, Nfld., suffered considerable reduction in stand on account of heavy frost and very little snow cover last winter (G.C. Morgan).

YELLOWS (boron deficiency) was found in many localities in B.C., but was especially noticeable in the Salmon Arm district (G.E. Woolliams). Out of 72 fields examined in the Lower St. Lawrence valley, Que., 21 were found to be suffering from boron deficiency. All were on gravelly or sandy soils and the district also experienced a severe drought this season. Tr.-sl. amounts of a yellowing, reddening and bronzing quite similar to that caused by boron deficiency were also found in fields in this same area but no histological abnormalities typical of boron deficiency were observed. These symptoms corresponded quite closely with the description of leaf hopper injury given by W.E. Colwell and Chas. Lincoln (J. Am. Soc. Agron. 34:495-498. 1942). Also the irregular thickening of the stunted stems was observed (J.G. Dickson, Diseases of Field Crops 1947, p.293) (R.O. Lachance). Traces of yellows were found in a field in Queens Co., P.E.I.; according to the farmer he had never applied boron to this field (R.R. Hurst).

YELLOWS (cause undetermined). Tr. amounts were seen in a field in central Alta. (T.R.D.). Yellows was common on single plants or in patches in n. Sask. Soils in the area are deficient in some respects and respond well to sulphur-containing fertilizers (H.W. Mead).

YELLOWS (undetermined virus). A trace was found in 2 fields in Sunbury Co. and 3 in York Co., N.B.; 1% of the plants showed yellows in a field in Carleton Co. (cf. P.D.S. 28:18.) (D.J. MacLeod).

COMMON CLOVER

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 1-tr. 2-sl./7 fields examined in the Sangudo district, Alta. (J.B. Lebeau, D.A. McTavish).

LEAF SPOT (Cercospora zebrina). A slight infection in a field of red clover in Kent Co., Ont. (W.G. Benedict).

SOOTY BLOTCH (Cymadothea trifolii). Slight infection in first season plants of alsike clover in a field in Norfolk Co., Ont. (W.G. Benedict). Infection was mod. on alsike clover in a low lying part of a meadow in St. John's West, Nfld. (G.C. Morgan).

POWDERY MILDEW (Erysiphe polygoni). Infection was 2-tr./18 fields of red clover examined in central Alta. (J.B. Lebeau, D.A. McTavish). Powdery mildew was heavy on first season plants of red clover in August in a planting in Essex Co., Ont. (W.G. Benedict). Tr. infection in a field of red clover in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Kabatiella caulivora). Infection was 2-tr./18 fields of red clover examined in central Alta. (J.B. Lebeau, D.A. McTavish). Anthracnose was present in most fields in n. Sask., infection being sl.-sev. (H.W. Mead).

ROOT ROT (Plenodomus meliloti). The organism was isolated from alsike clover in a field showing a trace of root rot (J.B. Lebeau, D.A. McTavish).

LEAF SPOT (Pseudopeziza trifolii) was common on red clover in the Duncan district, B.C. (W. Jones). Infection was heavy on white clover on the river bank at Saskatoon, Sask., but damage was sl. (E.T. Reeder). Sl. infection on current-season and one-year old plants of red clover in a field and on one-year old plants of alsike clover in a "permanent pasture" in Essex Co., Ont. (W.G. Benedict).

RUST (Uromyces trifolii). Sl. infection on volunteer plants of alsike clover at Ladner, B.C. (H.N.W. Toms). Mod. infection on current season plants in a field in Middlesex Co., Ont. Sl. infection of rust (U. fallens) on second growth in one-year-old stand of red clover in Lambton Co. (W.G. Benedict). Trace of rust on red clover in a field in Queens Co., P.E.I. (R.R. Hurst). Rust (U. Trifolii) caused rather sev. defoliation in 2 fields of alsike clover in the Burin peninsula and a sl. infection in 2 in the Avalon peninsula, Nfld. (G.C. Morgan).

YELLOWS (virus, undetermined). A trace was found in 3 counties in N.B.: in 2 fields in Sunbury, 4 in York and one in Carleton (Cf. P.D.S. 28:21.) (D.J. MacLeod).

WINTER KILLING (freezing and thawing) affected an average of 22% of the plants in 14 fields surveyed in Queens Co., P.E.I. (R.R. Hurst). Clover fields were severely damaged by frost during the winter of 1949-50 everywhere in Que. In fact the loss was so great that there was distinct lack of pasturage and hay for feeding on many farms. The honey harvest was also greatly reduced (O. Caron).

SWEET CLOVER

ROOT ROT (Aphanomyces euteiches). A trace was found on seedlings of white sweet clover from fields in Essex Co., Ont. (W.G. Benedict). This pathogen caused sev. damage to peas in Essex Co. in 1948 (P.D.S. 28:45); it is also reported as the cause of a seedling root rot of white sweet clover and root rot of alfalfa in Wisconsin (F. Weiss. Check List in U.S.D.A. Pl. Dis. Reporter 30:41 and 37. 15 Feb. 1946) (I.L.C.).

BLACK STEM (Ascochyta meliloti). Infection was sl. in one field in s. Alta. and mod. in a roadside stand near Lethbridge (M.W. Cormack). The disease was common and sev. on many lines in the breeding nursery at Saskatoon; also common, causing mod. damage in all fields entered in n. Sask. (H.W. Mead).

LEAF SPOT AND ROOT ROT (Leptosphaeria pratensis (Stagonospora meliloti). A light infection both as a leaf spot and root rot was observed in a field in Lambton Co., Ont. (W.G. Benedict).

ROOT ROT (Phytophthora cactorum) caused sl. damage in a field at Hillspring and in several roadside stands in s. Alta. (J.E.J. Thomson). About 40% of the one-year-old stands of white and yellow sweet clover were affected in Essex Co., Ont., on 23 May and most of the plants succumbed to the disease in the affected fields (W.G. Benedict).

SEEDLING BLIGHT (Pythium spp., Rhizoctonia solani, and Fusarium spp.). Sweet clover was again a failure in seeded plots at Saskatoon, Sask. Chemical treatment of the upper soil with Arasan, etc., failed to check the blight (H.W. Mead).

DAMPING-OFF and ROOT ROT (Pythium spp.). About 4% of the seedlings were affected and died in a field of white sweet clover in Essex Co., Ont. Pythium irregulare, P. ultimum and P. ?spinosum were isolated (W.G. Benedict).

ROOT ROT (Rhizoctonia solani) caused stunting of 12% of the seedlings, killing some of them, in a field in Essex Co., Ont. The isolate proved to be the common brown strain when grown on P.D.A. (W.G. Benedict).

STEM ROT (Sclerotinia sclerotiorum) caused sl.-sev. damage in 50% of the fields in n.e. Sask. The disease caused white banding of stems at almost any point up to 4-5 ft. above ground. The sclerotia were present in most stems (H.W. Mead). A trace was found in bundles of cut sweet clover in a field in Sask.; sclerotia were present in the stem from which isolations were made. For pathogenicity trials with different isolates see under Rape (T.C. Vanterpool).

BLACK ROOT ROT (Thielaviopsis basicola). A trace infection was present on seedlings and chlamydospores were located on one-year-old plants in a field in Essex Co., Ont. To my knowledge this is the first time that T. basicola has been reported on sweet clover in Canada (W.G. Benedict).

MOSAIC (virus) is widely distributed throughout Interior B.C., being present in most areas; up to 10% of plants were affected in different stands (G.E. Woolliams).

CROWN ROT (cause unidentified). A trace-10% of the plants were infected in different parts of a field of yellow sweet clover at Poplar Point, Man. (T. Johnson).

BIRD'S-FOOT TREFOIL

STEM ROT (Sclerotinia trifoliorum) destroyed 10% of the plants of Lotus corniculatus and 75% of those of L. tenerum (?) in the rod rows at the Station, Saanichton, B.C. (W. Jones).

BROOMCORN MILLET

SMUT (Sorosporium panici-miliacei) affected 18% of the plants in a planting at Carman, Man. (W.A.F. Hagborg).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was severe on tartarian buckwheat in Carleton, York, Sunbury and Queens counties, N.B.; infection being 30-65%. A trace also occurred on Silver Hull common buckwheat at the Fredericton Station (D.J. MacLeod).

CORN

EAR ROTS (Diplodia zeae, Fusarium graminearum and F. moniliforme) were present throughout Ont., but the infection was only a trace from D. zeae and F. graminearum and sl. from F. moniliforme (W.E. McKeen).

LEAF SPOT (Helminthosporum turcicum). A few lesions were present on most plants of all commercial varieties throughout Ont. on 31 July (W.E. McKeen). A specimen examined at Ottawa (DAOM 25062) agreed well with published descriptions and illustrations (D.B.O.S.).

RUST (Puccinia sorghi). All fields of commercial varieties were mod. infected throughout Ont., but damage was sl. Some inbred lines were resistant, whereas others were completely susceptible and were dead before they produced seed. In fact, certain inbreds were killed by mid-Aug. (W.E. McKeen). A mod. infection was observed at Centreville, N.S. 7 Aug.; the last sample taken was in 1938 (C.O. Gourley). The merest trace of rust was observed on fodder corn in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT (Pythium arrhenomanes) caused a marked stunting and dwarfing of corn plants in fields throughout Ont. and reduced the average yield by at least 5% (W.E. McKeen).

STALK ROT (complex of organisms). During recent studies on the diseases of corn in Ont., W.E. McKeen (Phytopathology 41:25. 1951) has found that a root and stalk rot of corn, previously attributed to Gibberella zeae on account of the pink to red discoloration of the infected tissues, was present in every field throughout Ont. in 1950. The disease has a markedly deleterious effect on the quality of the corn and yields may be reduced by 50-60%. Hybrids show a wide range of resistance; in fact, inbred Lc 19 proved completely susceptible. Infection begins when the ears are in the milk stage. First

indications of infection are watersoaking of some of the roots, blackening of the lower nodes and frequently of the bundles. These symptoms are followed by browning and watersoaking of the first and sometimes of the second internode above the crown and simultaneously a sudden drying of the leaves is noticed. A pink to red discoloration usually moves up the stem slightly back of the brown watersoaked zone and soon the pith is retted away leaving the bundles covered only by mycelium. A white, rod-shaped, Gram-negative, non-acid fast, motile bacterium was the first organism present, Pythium arrhenomanes followed in the brown, watersoaked area and Fusarium sp. was found in the reddish zone and externally on the epidermis of the lesioned area of the stem (I.L.C.).

SMUT (Ustilago zeae) was present in all varieties throughout Ont. in 1950, but the average damage was very slight (W.E. McKeen). One case of smut in fodder corn was brought to the laboratory from Queens Co., P.E.I. (R.R. Hurst).

RING SPOT (virus). One block of an inbred line in Essex Co., Ont., was completely affected by ring spot (W.E. McKeen).

FLAX

Prof. T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask., has prepared the following account on "Flax Diseases in Saskatchewan in 1950".

The relatively cool, bright growing season with good moisture up to the early frost of 17 August, appears to have been favourable for flax. The few fields that were examined in the north and east just before the frost were markedly free from leaf and stem spotting, even the basal leaves being quite green. The same was true for the flax plots at the Melfort Station. With the low inoculum potential, it is unlikely that there would have been any significant damage from disease if the frosts had not occurred.

RUST (Melampsora lini). A light infection except in some thick stands in low areas where it was moderate.

SEEDLING BLIGHT (Rhizoctonia solani). There was a heavy reduction in stand, amounting to 10% in some rows, on all varieties (Dakota, Redwing, Rocket, Royal and Victory) in the Illustration Station plots at White Fox. Phosphate fertilizer had no observable effect on the disease. Flax after fallow is more liable to this disease than flax after stubble. A sample was received from Lake Valley.

BROWN STEM ROT (Alternaria linicola, etc.). Isolates from typical lesions on the middle and upper parts of stems at Saskatoon yielded a higher percentage of A. linicola than in former years. Most of the other isolates

were A. tenuis. From the brown-stem lesions on the lower parts of the stem, Fusarium spp. and Alternaria spp. were isolated in about equal proportions. The difficulty of obtaining spores of A. linicola in culture is well known; in general, sporulating strains are more frequently obtained from stem lesions than from infected seed. Stem lesions on a sample from Wadena yielded Fusarium spp. and Alternaria spp. about equally, and one from Indian Head yielded A. linicola and A. tenuis on culturing. This trouble, however, was generally light.

HEAT CANKER (physiological). Observed in one plot on the west slope of ridges where the drill over-lapped. Damage was severe on such ridges, though a trace only was present in rows on the level or in the V-shaped furrows near by. The rows ran north and south.

2,4-D INJURY. Definite 2,4-D injury was observed on Rocket flax at Tisdale on 22 August. The tip of the main stem of the young plant had been killed and usually two side shoots had taken its place. Thus the maturity of the crop as a whole was delayed. This difference greatly increased damage from the early frost of August. Double or fused leaf of flax, thought to be caused by 2,4-D spray drift, was observed in several plots (cf. P.D.S. 29:28).

FROSTED SEED. Frosted flax frequently contains a high percentage of HCN which renders it poisonous to livestock. The content of HCN in the stem is higher than what in the seed. A preliminary test was carried out to determine whether the HCN in frozen seed would inhibit the growth of seed-borne fungi. Two samples of flax seed containing 210 and 350 p.p.m. of HCN respectively, and one sample free of HCN were plated on malt agar. The HCN content at these concentrations had no effect on the fungus colonies developing from the seed.

MISCELLANEOUS. Browning and Stem Break (Polyspora lini), and Pasmo (Septoria linicola) were not found in central and n.e. Sask. in our survey before the early frost. These diseases were also absent in the Irrigation Nursery at the University. In recent years pasmo has been present in this nursery and scattered through the e. and s.e. park-belt. A large sample of flax received from Indian Head on 19 October, showed a trace of pasmo, some die-back or top browning probably caused by heat or frost, and a browning and blackening of the peduncle reaching to slightly below the top axil. Bacteria only were isolated from these darkened peduncles; frost injury is suspected. A strain of Helminthosporium sativum (cf. W.L. Gordon P.D.S. 20:23; I.W. Tervet. U.S.D.A. Pl. Dis. Reporter 28:675-676. 1944; and I.W. Tervet. Phytopath. 27:531-546. 1937.) was isolated from a stem lesion on a specimen from Wadena. It proved to be moderately pathogenic on flax seedlings. Late Root Rot (Fusarium spp. and Rhizoctonia solani) was present in a sample received from Milden on 18 July.

The observations of W. E. Sackston were also summarized in a special report, "Flax Diseases in Manitoba in 1950".

The spring of 1950 was cold and wet in Man. and seeding was accordingly very late. This fact may in part account for flax acreage increasing from 134,000 acres in 1949 to 300,000 acres in 1950 (Qtly. Bull. Agr. Statistics 43(3):177, July-Sept. 1950). The weather continued relatively cool during July and August and precipitation was plentiful. Growth was good throughout the season. The frosts that killed much of the crop in Sask. affected only a small part of the flax-growing area in Man. Most of the flax crop continued to develop until the end of September. Individual growers harvested extremely good yields per acre and the provincial average was estimated at 10 bu. per acre.

Two main disease surveys were made; 66 fields were examined in s.w. and central Man. 31 July-4 August, when the plants varied from the pre-bud stage in some fields to full bloom in others. Seventy fields were examined in the major flax areas of Man. and e. Sask. 5-9 September. In most of the fields the bolls were green or just turning colour at this time, although in some the flax was ripening or ripe.

RUST (Melampsora lini) was the outstanding disease of flax in Man. in 1950. The wide distribution of races capable of attacking Dakota flax in 1949 (P.D.S. 29:28), indicated the rapidity with which inoculum of new races can increase and the prediction was made that damage might be severe in future years if weather conditions were favourable. Conditions were quite favourable for rust development this year, with consequent heavy infections on Dakota, now the main variety grown. No rust was found on Rocket and Sheyenne. Rust was present in 52 fields examined in the early survey. Leaf infection was trace in 39 fields; 1-5% in 10; 15-20% in 2; and 50% in 1 (plots of Dakota at the Morden Station). Rust pustules were found on a few stems. Rust was present in 58 fields examined in the late survey. Estimates of infection at this stage were based on the percentage of stem area bearing telia. There were traces of telia in 26 fields; 1-10% in 27; 15-20% in 4; and 50% in 1. In many fields telial infection was heavy on the pedicels.

STEM ROT (Fusarium spp. and Alternaria spp.) was seen in 13 of the fields in which rust was found in the late survey. Stem-rot infections were tr.-25%, although in some patches 80% of the stem area was affected. A. tenuis was isolated from most of the stem-rot tissues plated but Fusarium spp. also occurred. Alternaria and Fusarium colonies were also isolated from black seeds occurring in a field where stem rot was heavy.

PASMO (Septoria linicola). The pasmo pathogen was isolated from leaf spots collected in a field 4 August. There were traces of pasmo in 20 fields examined during the late survey; 2-5% in 6; 10-20% in 5; and 25%, 40%, and 50% in 1 field each. The flax was turning colour or beginning to ripen in most of the fields where light infections were found, but the crop was ripe in every field where infection was 10% or higher.

WILT and ROOT ROT (Fusarium oxysporum f. lini, etc.). Isolated plants showing root rot were collected in several fields. A. tenuis was plated out from some of the tissues, Fusarium spp. from others, and Verticillium, probably V. albo-atrum, from one plant. A trace of wilt was found in flax plots at Portage la Prairie. No wilt was encountered in the main surveys, but one case of wilt near Morris was reported by the Agricultural Representative there. When this field was visited 75% of the plants were affected by wilt, and at least 50% were dead. Pure cultures of F. oxysporum f. lini were isolated from affected roots, crowns, and stems. Greenhouse experiments with several varieties of flax and samples of soil from the wilt field indicated that the variety sown was crown, although the grower had believed it to be Certified or Registered Royal. The periodic occurrence of severe wilt damage when a susceptible variety of flax is sown indicates that wilt is controlled in Man. only by the use of resistant varieties. Wilt could become as important a problem here as it is in fibre flax fields in Que., which were visited with Dr. R.O. Lachance early in July. It will continue to be necessary to test all new varieties for wilt reaction before their distribution in Man., and to watch for the possible occurrence of new forms of the pathogen that may attack varieties that are currently resistant in the area. The wilt pathogen was isolated from specimens submitted for diagnosis from the breeding plots of the Cereal Division at the Central Experimental Farm, Ottawa.

BOLL BLIGHT (cause unknown). The close relationship between weather and boll blight was illustrated again in 1950. There were traces-10% in 43 fields, 15-20% in 9, and 30-40% in 8. In the two worst fields, insects and pasmo infection respectively were the cause of much of the blighting. It appears that the cool, moist conditions prevailing during the growing season permitted most of the bolls that were formed to develop normally. In seasons when the weather turns hot and dry after the flax has blossomed, the incidence of boll blight is much higher than in 1950.

MISCELLANEOUS. Traces of Seedling Blight were found in a few fields and in the plots at Headingly and Morden. Traces of Heat Canker were found in 4 fields, and 5% in 1. Leaf spots were seen in 23 of the fields during the early survey, affecting from a few up to 50% of the plants. Isolations in most cases yielded only Alternaria tenuis and other miscellaneous fungi, but two of three spotted leaves collected in one field yielded Septoria linicola and Colletotrichum linicola respectively. Traces of damage from 2,4-D were seen in several fields. Apparently less of this material was used on flax in 1950 than previously because of the late season, as fields were weedier than they have been for several years. Chlorosis of the leaves was seen in 12 fields in the early survey. In every case it was associated with low, presumably wet spots in the fields. It was severe in two fields, in one of which it was associated with stunting and death of the plants

Other Observations

WILT (Fusarium oxysporum f. lini) was found in fields of the flax fibre varieties Liral Prince, Liral Monarch, and Liral Dominion in Maskinonge, Chateauguay, and Soulanges counties, Que. Out of 15 fields examined infection was tr. in 4, 1% in 5, 5% in 1 and 10-15% in one. In some fields there were patches with 50% of the plants wilted (R.O. Lachance).

ROOT ROT (Fusarium spp.). Infection 1-tr./3 fields examined in s. Alta. (M.N. Grant).

RUST (Melampsora lini). Infection 2-sl./3 fields in s. Alta. (M.N. Grant). Six fields in central and n. Alta. were found free from any disease (T.R.D.).

HEAT CANKER (physiological). Trace present in 1 out of 3 fields examined in s. Alta. (M.N. Grant).

MANGEL

LEAF SPOT (Cercospora beticola). A very light infection was found in a field of Frontenac in Queens Co., Ont. (R.R. Hurst).

CROWN ROT (boron deficiency). An occasional root, quite seriously affected, was found in a field in Queens Co., P.E.I., as the roots were pulled (R.R. Hurst).

MUSTARD

STEM and POD SPOT (cause undetermined). A mod.-sev. infection was found on volunteer plants along the edge of a field near Milk River, Alta.; bacteria were very abundant in the diseased tissues (P.M. Halisky).

RAPE

STEM ROT (Sclerotinia sclerotiorum). About half the plants were lodged in a field of rape near Prince Albert, Sask. on 21 Aug. The lodged plants were attacked by stem rot; the stems were bleached, soft and many contained sclerotia. Sowthistle (Sonchus arvensis) was also attacked. The disease has already been reported from Man. by J.E. Machacek (P.D.S. 25:37).

Isolations were made from rape and the pathogenicity of the isolate was compared with isolates made from Sophia multifida Gilib. (= Descuraina sophia (L.) Webb.), and sweet clover (q.v.). In preliminary tests on filter paper in Petri dishes the Sophia and the sweet clover isolates completely inhibited the germination of Ladak alfalfa, Royal flax, Argentine rape, Sophia multifida, sowthistle and Arctic sweet clover; the rape isolate was lightly to moderately pathogenic to rape, Sophia, sowthistle and sweet clover, lightly to alfalfa and very lightly to flax; these findings were the results of 2 tests.

The affected Sophia multifida was growing in the same field in which the affected sweet clover was found; the pathogenicity tests indicate the isolates from these 2 hosts are the same. The large sclerotia formed in culture by both the rape and sweet clover isolates indicate that the species present is S. sclerotiorum (Cf. M.W. Cormack. Sci. Agr. 26:448-459. 1946) (T.C. Vanterpool). Subcultures of the isolates were sent to Ottawa for a check on their identity. They all appeared to be S. sclerotiorum; the isolate from rape differed from most cultures of the organism in producing abundance of spermatia (Constance A. Loveland).

SAFFLOWER

RUST (Puccinia carthami). Infection ranged from sl. to mod. in the variety plots under both dry land and irrigation conditions at Lethbridge, Alta. (M.W. Cormack, F.R. Harper). Infection varied from trace to heavy in the variety plots at Altona, Man., on 20 September; the readings were as follows:-

Line	Rust Infection	Claassen's Rating 1/
688-7-2	heavy 35%	
N-4	trace 1%	3
N-852	light 2-3%	3
Indian	heavy 30%	
N-5	light 5%	3
N-6	light 5%	3
N-10	light, 2-3%	
N-9	light+ 5-10%	4
N-3	scarce	2
2377	moderate 10%	
N-8	heavy 30-35%	4+

1/ C.E. Claassen. Neb. Agr. Exp. Sta. Circ. 87. 1949.

His ratings are: 4, very susceptible; 3, less susceptible than 4; 2, moderately resistant; 1, resistant.

No rust was found in an increase field of several acres, 2 miles from Altona (W.E. Sackston).

ROOT ROT or WILT (Pythium sp.), first reported in 1949 (P.D.S. 29:31) was more severe in the irrigated variety plots at Lethbridge, Alta., in 1950 than last year. Estimated damage ranged from 95% in one strain to 5-10% in several others which appeared to be markedly resistant. No apparent damage occurred in the same varieties when they were grown in the dry land plots. Although the symptoms are very similar to the root rot of safflower in Nebraska attributed to Phytophthora drechsleri (U.S.D.A. Pl. Dis. Reporter 34(10):306. 15 Oct. 1950), Miss G.M. Waterhouse, Commonwealth Mycological Institute, to whom a culture was sent, found the fungus to be a species of Pythium unknown to her and possibly undescribed, entirely distinct from Phytophthora drechsleri (M.W. Cormack).

SOYBEAN

Dr. A.A. Hildebrand has prepared a special report, "Soybean Diseases in Southwestern Ontario in 1950".

Again this season, as in the past several years, the incidence of disease and related troubles in soybeans in Kent and Essex counties was closely checked by periodic surveys. From early June until late September, MANGANESE DEFICIENCY was apparent in the field for the third year in succession and the cause of concern to many soybean growers over widespread areas in the two counties. While losses resulting from this cause are difficult to assess at all accurately nevertheless, it was evident that in many of the more seriously affected fields, stunting of plants and paucity of pods would result in yields far below those of comparable, unaffected stands.

During the first week in July, a late-planted, 15-acre field, variety Lincoln, near Leamington, was completely destroyed in the early seedling stage by Rhizoctonia solani. The destruction of seeds and seedlings by this pathogen, which apparently has not been reported heretofore on this host in Canada, was more extensive and complete in this field than in any individual stand of soybeans previously noted in s.w. Ont. According to M.F. Kernkamp (The Soybean Digest 9:54-55. 1949) root rots and damping off are potentially the most destructive diseases of soybeans in Minnesota and, of the various soil-borne pathogens involved, Rhizoctonia solani is one of the most important. Probably, significant predisposing factors in this initial occurrence of the disease in Ont. were not only the late planting-date, which coincided with hot, wet weather, but also the fact that the Rhizoctonia-susceptible crops, potatoes and spinach, had preceded the soybeans in the rotation.

POD and STEM BLIGHT, and STEM CANKER. During the current season, evidence has been steadily accumulating that not one but two fungi are causal agents of the disease previously regarded in Ont. as Pod and Stem Blight. Isolations from lesioned areas on stems have yielded in a few instances cultures of a fungus which forms pycnidia in culture, presumably a Phomopsis, but in most instances cultures of a fungus, which forms perithecia, presumably a Diaporthe. On steamed soybean stems mono-ascospore cultures of the Diaporthe produce only the perfect

stage, the perithecia being clustered in caespitose groups; consequently this fungus is homothallic. When monoconidial cultures of the Phomopsis isolates are grown in steamed soybean stems, only the pycnidia are produced. The latter fungus could be heterothallic, but appropriate pairings of different isolates have yet to be made to test this hypothesis.

Such an interpretation is supported by the results of recent investigations of soybean diseases in Iowa by A.W. Welch and J.C. Gilman (Phytopathology 38:628-637. 1948). They found two members of the genus Diaporthe that differed in pathogenicity and type of perithecial development. One was heterothallic with scattered single perithecia and the other was homothallic with caespitose clusters of perithecia. The former produced typical Phomopsis conidia; the latter lacked conidial stages. The heterothallic form was recognized as Diaporthe phaseolorum var. sojae; the homothallic as Diaporthe phaseolorum var. batatis. The latter variety, found to be capable of actively attacking soybean stems and of girdling them with resultant wilting and death of plants, causes the disease now referred to in the United States as Stem Canker. The former variety is less pathogenic, attacks mainly mature plants, produces linear rows of pycnidia on branches and stems, and causes the disease known under the old designation as Pod and Stem Blight.

On the basis of the evidence presented above, it seems highly probable that both D. phaseolorum var. sojae and D. phaseolorum var. batatis occur on soybeans in s.w. Ont. and may, upon investigation, be found to cause two distinct diseases as in the United States.

While the exact identity of the disease or diseases may, at the moment, be in doubt, there is no uncertainty as to the widespread occurrence of infected plants and the losses that are being incurred. Killing of plants, first noted on a limited scale about mid-July, became increasingly serious as the season progressed and during September the disease or diseases had reached epidemic proportions. Infection varied from a trace in some stands to virtually complete killing of plants over several acres in others. The variety Hawkeye was extremely susceptible and Lincoln, Monroe, and A.K. Harrow appeared only slightly less so. On Pelee Island, stands of Harman showed only scattered-plant infection while in closely contiguous plantings of Hawkeye and Lincoln over 30% of the plants were affected. In a number of instances soybeans have been grown in unbroken succession for 12 years or more. On both the island and the mainland, however, the severity of the disease or diseases seems to be more closely correlated with the stage of development and with the variety of the host than with repeated cropping or any other factor than can be determined at the moment.

BROWN STEM ROT (Cephalosporium gregatum). With a single outstanding exception, brown stem rot was not nearly so readily apparent in commercial stands this year as last. Small areas of infection were found during September in a number of fields. The exception was a field of the variety Adams, in which, by 22 September, almost all the plants were infected. Adams on the average matures one day earlier than Lincoln, (the latest maturing variety grown commercially in Ont.). The effect of the disease was to cause Adams to appear as if it were maturing very much in advance of Lincoln and, even, of A.K. Harrow, another later-maturing variety.

The readiness with which this disease can be spread by infested soil was convincingly demonstrated in the laboratory plots this year. Early this spring, infested soil from now-abandoned experimental plots was spread over the surface of the soil in a new location, on which soybeans had not been previously cultivated. Six different varieties were planted both on the infested area and on a contiguous plot of the soil. On the infested soil all 6 varieties became virtually 100% infected, while in the disease-free neighbouring plot only trace infection could be found.

Other diseases of sporadic occurrence noted in the course of the survey included: Mosaic (Soja virus 1); Bud Blight (virus of tobacco ringspot group); Downy Mildew (Peronospora manshurica); Brown Spot (Septoria glycines); an undetermined Powdery Mildew; Bacterial Blight (Pseudomonas glycinea); Fusarium Blight (F. oxysporum f. tracheiphilum); and Sun Scald (non-paresitic).

Other Observations

LEAF SPOT (Cercospora daizu). A trace of this leaf spot was observed in the plots, C.E.F., Ottawa, Ont. (R.J. Baylis).

POD and STEM BLIGHT (Diaporthe phaseolorum var. sojae). All soybean plantings at the C.E.F., Ottawa, were carefully examined in view of the reported high infections in s.w. Ont. At Ottawa, however, only 3 affected plants were found, 2 on 23 August and one on 29 August. The Phomopsis stage only was present. The disease was present in similar amounts in 1949 (R.J. Baylis).

MOSAIC (virus). About 1% of the plants of Early Blackeye were affected in the Horticultural plots, C.E.F., Ottawa, Ont. The affected plants were stunted and some showed an "etch" pattern on the leaves, which suggested that more than one virus was present (K.M. Graham).

SUGAR BEET

LEAF SPOT (Cercospora beticola) occurred sporadically throughout the sugar-beet area in s.w. Ont., but it was not a factor in limiting the quality or yield of roots (A.A. Hildebrand).

BLACK ROOT (various fungi) was much less prevalent in the sugar-beet areas of s. Alta. than in 1949. In samples taken from 48 representative fields before thinning in May, an average of 63% of the plants were infected and 6% were damaged or killed. Phoma betae predominated among the isolates and was obtained from diseased plants in all except 10 of these fields. Aphanomyces cochlioides was obtained from only 4 fields, mainly in low-lying areas. Most

of the infected plants were eliminated during the thinning operation and the remainder of the season was apparently unfavourable for disease development. In the second inspection in July, infection was tr.-sl. in 15 and mod. in one of the 48 fields. Root-rot damage was also negligible in the fields before harvest and in the storage piles (M.W. Cormack).

Black root was present as usual in s.w. Ont. this year but to a much more limited extent than in certain years. During the past 2 years the number of infected fields has not increased in proportion to the greatly expanded acreage. For this reason the disease has not attracted so much attention as formerly (A.A. Hildebrand).

BORON DEFICIENCY was noted in fields of sugar beets in s.w. Ont., especially in areas in Middlesex Co. (A.A. Hildebrand). All the sugar beets were affected in the Joliette district, Que., with a loss of half the crop. Fertilizer containing borax is generally recommended for sugar-beet fields in Que., but these recommendations had not been followed by these 3 growers (E. Lavallee).

SUNFLOWER

Observations in Man. were the subject of a special report by W.E. Sackston.

Cold, wet weather in the spring delayed seeding of sunflowers so late that only about 23,000 acres were sown. Cool, wet weather in July and August further delayed the development of the crop and reduced yields. Twenty-eight fields were visited in the third week of August, when the sunflowers varied from the early green bud stage to full bloom in different fields. In the third week of September, 2 crossing blocks, 5 commercial fields and 11 fields of Foundation stock were examined for disease. W.A. Russell, Dominion Experimental Station, Morden, assisted for part of the early survey and J.A. Fehr, Co-operative Vegetable Oils, Ltd., Altona, in the late survey.

RUST (Puccinia helianthi) was not as heavy on sunflowers as in 1949. Some of the outlying fields examined in the early survey were free of rust. Traces-5% of rust were present in 17 fields, 5%-20% (on the lower leaves) in 3; 30% on lower leaves of some plots at Morden, and 70% on lower leaves in 1 field. When Foundation fields were examined late in the season, infection was trace-5% in 4 fields of Sunrise, and traces-5% in 6 of the female inbred S37-388, and 70% in 1 field. Traces occurred in the 2 crossing blocks, both in outlying areas, and traces were found in 1 commercial field, and 5, 10, 15 and 50% respectively in the other 4 fields; all of them in the main sunflower area.

WILT (Sclerotinia sclerotiorum) was found in 12 fields in the early survey. Infection was tr. in 10 fields, 3% in 1, and up to 35% in the plots at Morden. In the late survey, traces were found in 7 Foundation fields, and 5% in 1. Traces were present in 1 of the 2 crossing blocks and in 4 commercial fields, and 20% in 1 other field, in which all the plants in large patches were dead. Previous crops in this field included sunflowers in 1946, oats in 1947, flax in 1948, and wheat in 1949. The grower had particular difficulty in controlling red root pigweed (Amaranthus retroflexus) in this field, and was under the impression that the presence of the weed was related to the severity of the disease.

MISCELLANEOUS. Downy Mildew (Plasmopara halstedii) was conspicuous in patches in the plots at Morden, early in the season, but it was not seen in commercial fields. The lower leaves of many plants in commercial fields were covered with small spots, which were apparently caused by drifting soil during a period of strong winds early in July. Leaf Mottle (cause unknown) was recognized on only 1 plant. Stalk Rot (cause unknown), which was conspicuous in 1949 (P.D.S. 29:35), affected only 1 or 2 plants. 2,4-D injury was observed in several fields adjacent to treated grain fields. One 6-acre portion of a commercial field, and one field of Foundation stock, had to be plowed down because of severe damage by 2,4-D. Traces of neck rot and head rot were found in the plots at Morden, and in 1 commercial field. Sclerotinia sclerotiorum was isolated from the Morden material, and a fungus, later identified by Miss C.A. Loveland as Botrytis sp. of the cinerea type, was recovered from the material. Septoria Leaf Spot (S. helianthi) was not found.

Other Observations

DOWNY MILDEW (Plasmopara halstedii) was observed in 3 separate fields on the farm, School of Agriculture, Ste. Anne de la Pocatiere, Que. In one large field where the disease was most severe sunflowers had not been grown for at least 15 years. In another field where the disease was severe no sunflowers had been grown since 1940 whereas in the third field the last crop of sunflowers was in 1945. Not a trace of downy mildew was found on any of the weeds growing in these fields. The rate of infection may be considerably augmented, when a second seeding is made in the same year in the same soil after the first crop is pulled out, if the results of a small test are indicative. Infection in the first crop was estimated to be 35-40%, whereas the second crop showed infection varying between 80-86% depending on the variety tested (C. Perrault).

RUST (Puccinia helianthi). A mod. infection was noticed in 2 fields of the School of Agriculture, Ste. Anne de la Pocatiere, Que. Traces were present in a third field owned by the School, but at some distance from the others (C. Perrault).

WILT (Sclerotinia sclerotiorum). An occasional plant was found wilted in one of the 3 fields of the School of Agriculture examined at Ste. Anne de la Pocatiere, Que. (C. Perrault).

CULTIVATED and OTHER GRASSES

AGROPYRON - Wheat Grass

Powdery Mildew (Erysiphe graminis) was fairly heavy on A. repens at Vernon River, P.E.I., on 8 Sept. (J.E. Campbell).

Leaf Rust (Puccinia clematidis). Infection was heavy on A. trachycaulon var. trachycaulon at Ladner, B.C., and on A. repens at Point Grey (H.N.W. Toms).

Stem Rust (Puccinia graminis) was sev. on A. repens at Guelph, Ont.; nearby common barberry had borne an abundance of pycnia and aecia (J.D. Gilpatrick).

Stem Smut (Ustilago hypodytes) was found on a few plants of A. repens in a low-lying area near Okanagan Lake, at Summerland, B.C. (G.E. Woolliams)

AGROSTIS

Stem Rust (Puccinia graminis) was general on A. stolonifera at Ladner, B.C., on 17 Aug. (H.N.W. Toms).

ARRHENATHERUM ELATIUS - Tall Oat Grass

Smut (Ustilago avenae) affected 10% of the plants of A. elatius in rod rows at the Station, Saanichton, B.C. (W. Jones).

BROMUS - Brome Grass

Ergot (Claviceps purpurea). Infection was 5-sl./12 stands of B. inermis examined in s. Alta. (M.W. Cormack).

Leaf Spot (Selenophoma bromigena). Infection was 5-tr. 5-mod./12 stands of B. inermis in s. Alta. (M.W. Cormack). Infection was general in all older fields of B. inermis in Sask., the damage being mod.; infection was light in younger fields (H.W. Mead).

CALAMAGROSTIS

Leaf Gall Nematode (Ditylenchus graminophilus). Mod. infestations were again present on C. canadensis in some of the localities in Kamouraska Co., Que., where the nematode was found for the first time last year (A. Payette).

DACTYLIS GLOMERATA - Orchard Grass

Purple Leaf Spot (Mastigosporium rubricosum) was general and caused considerable damage to the late foliage at Saanichton, B.C.; the fungus was sporulating on 6 March (W. Jones).

Brown Stripe (Scolecotrichum graminis) was prevalent on the leaves in the fall at Saanichton, B.C. In March no leaf infection was evident, but conidia and conidiophores were abundant on overwintered leaves (W. Jones). A sl. infection was present on clone plantings at the Agassiz Farm on 31 July (H.N.W. Toms).

ELYMUS - Rye Grass

Stripe Rust (Puccinia glumarum). Common on E. glaucus along roadside in North Saanich, B.C. (W. Jones).

HOLCUS LANATUS - Velvet Grass

Twist (Dilophospora alopecuri). Sl. infection in a low area at Sidney, B.C. (W. Jones).

Leaf Smut (Entyloma crastophilum). Only 2 leaves were found affected at the substation, Ladner, B.C.; this is a new record for Canada (H.N.W. Toms, D.B.O. Savile).

Leaf Rust (Puccinia coronata). Slight infection was found at Point Grey, B.C., 3 Aug. (H.N.W. Toms, D.B.O. Savile).

HORDEUM - Barley

Powdery Mildew (Erysiphe graminis). Mod. infection on a plant of H. jubatum near Lacombe, Alta. (A.W. Henry).

Smut (Ustilago bullata). Sev. infection found on H. jubatum on a farm at Vernon, B.C. (G.E. Woolliams).

LOLIUM PERENNE - Perennial Rye Grass

Ergot (Claviceps purpurea) infected 25% of the heads of some clones of L. perenne at the Farm, Agassiz, B.C. A trace was also present on volunteer plants in the grass plots, U.B.C., Vancouver (H.N.W. Toms).

PHLEUM PRATENSE - Timothy

Stem Rust (Puccinia graminis var. phlei-pratensis). Infection was sl., Ladner, B.C. on 7 Aug. (H.N.W. Toms); sev. on timothy at Guelph, Ont. (J.D. Gilpatrick); heavy late in the season in Queens Co., P.E.I. (R.R. Hurst).

Brown Stripe (Scolecotrichum graminis) was heavy on Climax timothy, C.E.F., Ottawa. No damage to seed set was apparent, but the plants were a very reddish yellow colour near maturity. When the seed was tested for disease it was found that the fungus was seed-borne, a finding nor previously reported (R.J. Baylis).

POA

Leaf Rust (Puccinia poae-sudeticae) was found on P. compressa on the range plots at Kamloops, B.C., on plants taken there from Vancouver (V.C. Brink, H.N.W. Toms).

LAWNS and TURF

Fairy Rings (Marasmius oreades) were found widely distributed this year in coastal B.C. (W.R. Foster).