II. DISEASES OF FORAGE AND OTHER FIELD CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta). A specimen received from Fort St. John, B.C., was severely infected; some of the current season's shoots were killed and bore an abundance of pycnidia (E. J. Hawn). Infection was 42-tr. 20-sl. 7-mod. 2-sev./159 fields examined in w. central and n. Alta. (J. B. Lebeau). Black stem was of minor importance in the irrigated area of s. Alta.; infection was 29-tr. 8-sl./60 fields examined. Tr.-sl. infection was observed in the plots at Lethbridge (E. J. Hawn). Early infection of the leaves was observed in the Big River and White Fox areas in Sask. on 25 June. Infection on leaves and stems built up at a mod. rate so that by 15 July over 90% of plants in the 48 fields examined were infected. Killing of the first growth was mod., but less than in 1951 (H. W. Mead).

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 26-tr. 61-sl. 27-mod. 7-sev./159 fields examined in n. and w. central Alta. and 11-tr. 24-sl. 17-mod. 3-sev./68 fields in the Clover Bar district east of Edmonton (J. B. Lebeau). The disease was found in 15 of the 22 fields examined in the Hudson Bay, Pas Trail and Big River areas in Sask. In most fields, single plants were infected, but in some, 80% of the plants were killed in large patches. Average infection was about 10%, slightly higher than in 1951 (H. W. Mead).

ANTHRACNOSE (Colletotrichum destructivum) was first isolated from alfalfa in a field at Ottawa, Ont., in July 1951. Affected plants showed smooth sunken lesions on the lower stems which were not unlike those of black stem. This year it was destructive to red clover (q. v.) (R. J. Baylis). See reports from Que. in 1950 and 1951 (P. D. S. 30:26 and 31:21).

BACTERIAL WILT (Corynebacterium insidiosum). Infection was 1-tr. 2-sl. 1-mod./159 fields examined in n. and w. central Alta. and was 9-tr. 7-sl. 4-mod. 6-sev./68 fields in the Clover Bar district. The greater prevalence and intensity of the disease is attributed to the more abundant moisture during the last 2 years (J. B. Lebeau). The progress of infection in representative fields of different ages in s. Alta. is shown in the tabulation below:

Year Observed	Percentage of Infected Plants Year of Planting			
	1951	1950	1949	1948
1951	--	4.0	23.6	33.7
1952	1.7	8.3	25.0	65.3

Infection was abnormally severe in 2 fields seeded in 1951 in the Brooks and Lethbridge districts. It was especially evident in the vascular tissues of the previous season. Wilt development was also unusually rapid in recently

established variety plots in which the resistant varieties Ranger and Buffalo are already showing symptoms. The disease was apparently favoured by the abnormal amount of moisture in the soil in the fall of 1951 (E. J. Hawn, M. W. Cormack).

Wilt was found affecting 0.1% and 0.5% of plants in two fields at Hudson Bay and Snowden, Sask., respectively (H. W. Mead). Bacterial wilt was prevalent in Essex and neighboring counties in Ont.; 90% of the fields, 2 or more years old, were infected; damage ranged from 5 to 75%, increasing with the age of the stand (W. G. Benedict). A sl. infection was again observed at the Station and the School of Agriculture, Ste. Anne de la Pocatiere, Que., but it was rarely seen in other districts surveyed -- St. Jean, Iberville, St. Hyacinthe, Chateauguay, Joliette, Three Rivers, Quebec, Sherbrooke, and the Eastern Townships (R. O. Lachance).

STEM NEMATODE (Ditylenchus dipsaci). A tr. infestation was found in 2 fields out of 60 examined in Alta., one near Turin and another near Lethbridge. Tr.-sl. infestations were present in 3 experimental stands at Lethbridge. (E. J. Hawn).

CROWN ROT (Fusarium spp.). In July, single plants or groups of plants in 8 fields at Saskatoon and at other points in n. Sask. turned yellow, wilted and the affected stems died. Regrowth from the affected plants was vigorous. Portions of the affected tissue from the base of the stems and from the crowns were plated on agar. Fusarium oxysporum was the predominant isolate (H. W. Mead).

STAGONOSPORA LEAF SPOT (Leptosphaeria pratensis). Infection was 4-tr./159 fields in n. and w. central Alta. and 2-tr./60 fields examined in s. Alta. (J. B. L., E. J. H.).

DOWNY MILDEW (Peronospora aestivalis) A sl. infection was recorded on Grimm at Cowichan, B. C. (R. Turley). Infection was 4-tr. 1-sl./60 fields examined in s. Alta. and sl. in the plots at Lethbridge (E. J. Hawn). A sl.-mod. infection was observed at Edmonton and Barrhead (A. W. Henry). A tr. infection was seen at St. Gregoire, Nicolet, Co., Que., where downy mildew was severe in 1951 (P. D. S. 31:22) (R. O. Lachance).

ROOT ROT (Plenodomus meliloti). Some 11 varieties including Grimm were sev. damaged at the Substation, Whitehorse, Yukon. Medicago falcata was only slightly affected (G. B. Sanford).

ROOT ROT (cause various). Infection was 2-sl. 2-mod./159 fields in n. and central Alta. (J. B. Lebeau).

BACTERIAL STEM BLIGHT (Pseudomonas medicaginis). Sl. infection was found on a specimen from Fort St. John, B. C. (M. W. Cormack).

YELLOW LEAF BLOTCH (Pseudopeziza jonesii). A tr. infection was observed in 2 fields at Brooks, 2 at Lethbridge (E. J. Hawn) and in one near

Nampa, Alta. (J. B. Lebeau). Infection was tr. -mod. in the 6 fields found infected in Sask. Blotch appears first in mid-July, increasing in severity as the growing season progresses; it causes some defoliation (H. W. Mead). Yellow leaf blotch was found in all 10 fields examined in Essex Co., Ont.; about 3% of leaves were destroyed (W. G. Benedict). Infection was 5-tr. 4-sl. 1-sev./47 fields examined in Que. (R. O. Lachance).

COMMON LEAF SPOT (Pseudopeziza medicaginis). Infection was 40-tr. 55-sl. 17-mod. 2-sev./159 fields examined in n. and w. central Alta. and 14-tr. 10-sl. 2-mod. 1-sev./60 fields in s. Alta. This leaf spot was much more common than in 1951 and infection was fairly general in the affected fields. Damage was mod. -sev. on the lower leaves of alfalfa in the laboratory plots at Lethbridge (J. B. Lebeau, E. J. Hawn). Infection was sl. -mod. throughout the n. alfalfa growing area of Sask. Up to 50% of the leaves may be destroyed (H. W. Mead). A sl. infection was found on Variegated in the plots at Ottawa, Ont. The usual amount of the leaf spot was present; there was no defoliation except in fields that had not been cut in June or July (R. J. Baylis). Infection was 10-tr. 36-sl. 1-mod./47 fields examined in Que. (R. O. Lachance). A mod. infection was seen at Fredericton, N. B. (S. R. Colpitts).

CROWN BUD ROT (Rhizoctonia solani, Fusarium spp., etc.). Both development and progress of infection were more rapid in stands one and two years old this year than in 1951. The tabulation below indicates the difference in the two years:

Year Observed	Percentage of Infected Plants Year of Planting			
	1951	1950	1949	1948
1951	--	50.7	93.6	100.0
1952	80.1	98.9	99.3	--

Field plot studies on one-year-old stands showed that most of annual disease build-up occurred between 5 May and 2 June. During this period the average area of crown per plant destroyed rose from 2.0% at the beginning of the period to 27.1% at the end (E. J. Hawn).

STEM ROT (Sclerotinia sclerotiorum) was found affecting a heavy stand at Hudson Bay, Sask. Mycelium and sclerotia were present on the outside and within the stems 1-2 ft. above the ground. The weather had been showery and the lower parts of the plants were wet (H. W. M.).

WILT and ROT (Sclerotinia trifoliorum). An occasional plant with sclerotia at the base was found in fields at Oka and Lennoxville, Que.; the damage was nil (R. O. Lachance).

RUST (Uromyces medicaginis) affected half the fields examined for rust in Essex Co., Ont. In one, the foliage had a distinct yellow cast noticeable from the edge of the road; damage was estimated to be 5% (W.G. Benedict).

WITCHES' BROOM (virus). Infection was 2-tr. 1-mod./159 fields examined in w. central and n. Alta.; a tr. was also observed in the plots at Edmonton (J.B. Lebeau).

WINTER INJURY was 2-sl. 1-mod./159 fields examined in n. and central Alta. (J.B. Lebeau). Winter injury was observed in 15 out of 20 fields examined in n. Sask. Single plants or groups of plants were affected especially in exposed locations, where snow cover had been light (H.W. Mead). Damage was severe in several counties s. of Three Rivers, Que., but winter killing was almost nil about Quebec and along the Lower St. Lawrence, where there was no rain and a heavy snow cover persisted throughout the winter (R.O. Lachance).

YELLOWS (cause undetermined). Symptoms were rated 3-tr. 13-sl. 5-mod. 2-sev./159 fields examined in n. and w. central Alta. (J.B. Lebeau).

YELLOWS (boron deficiency). Out of 47 fields examined in Que., 24 were supporting a crop of alfalfa deficient in boron. These fields were in several counties and significently were almost exclusively located on light gravelly or sandy soils (R.O. Lachance).

COMMON CLOVER

WINTER CROWN ROT (low-temperature basidiomycete). Infection was 3-tr. 1-sl. 1-mod./22 fields of red clover examined in n. and central Alta. (J.B. Lebeau).

LEAF SPOT (Cercospora zebrina). Infection was sl. on white clover in the laboratory plots, Lethbridge, Alta. (E.J. Hawn).

ANTHRACNOSE (Colletotrichum destructivum). Infection was sev. and the symptoms were unusually prominent on red clover in the Forage Division plots at Ottawa. There was no evidence of Kabatiella caulivora. The organism is quite distinct from the next (R.J. Baylis).

ANTHRACNOSE (Colletotrichum graminicola) caused sev. damage to Siberian red clover in the experimental plots, Ste. Anne de la Pocatiere, Que., killing much of the above ground parts of the plants. Other varieties were not severely affected (R.O. Lachance, Ruth Mackay).

SOOTY BLOTCH (Cymadothea trifolii). Infection was sl. on alsike clover in the plots at Lethbridge, Alta. (E.J. Hawn). The disease was common on alsike clover in fields in Kings Co., N.S.; 50% of the leaves were affected (D.W. Creelman).

POWDERY MILDEW (Erysiphe polygoni) was observed on red clover several times in the Lillooet district, B.C. (G.W. Woolliams). Infection was 4-sl. 9-mod. 2-sev./22 fields of red clover examined in n. and w. central Alta. (J.B. Lebeau). A mod. infection was general in a field of Altaswede red clover at Brooks (M.W.C.); sl. infection was noted on red clover at Upton, P.E.I. (J.E. Campbell).

ANTHRACNOSE (Kabatiella caulivora). Infection was 6-tr. 5-sl. 2-mod./22 fields of red clover examined in n. and w. central Alta. (J.B. Lebeau). The disease was widespread and destructive on red clover throughout Kings Co., N.S. (D.W. Creelman.)

DOWNY MILDEW (Peronospora trifoliorum). A sl. infection was found in one field near Sylvan Lake, Alta. (J.B. Lebeau).

LEAF SPOT (Pseudopeziza trifolii). Infection was 3-tr. 1-sl./22 fields of red clover examined in n. and w. central Alta.; a sl. infection was also seen in one field of alsike (J.B. Lebeau). The disease causes sl. defoliation of red clover in midsummer in Kings Co., N.S. (D.W. Creelman).

ROOT ROT (Sclerotinia sp.) destroyed about 3% of plants in four-fifths of the fields of red clover examined in Huron Co., Ont., but the disease was not seen in Essex Co. (W.G. Benedict).

LEAF SPOT (Stemphylium sarcinaeforme). A sl. infection was found in red clover at Upton, P.E.I. (J.E. Campbell, I.L. Conners).

RUST (Uromyces spp.). Rust (U. fallens) sl. infected the foliage of red clover in rod rows at Saanichton, B.C. (W. Jones); 60% of the leaves of alsike were injured by rust (U. trifolii) in a field in Essex Co., Ont. (W.G. Benedict); a sl. infection occurred on red clover in fields at the Station, Kentville, N.S. (D.W. Creelman); and in a field at Upton, P.E.I. (J.E. Campbell).

MOSAIC (virus). Infection was 2-tr. 2-sl./8 fields of alsike clover examined in central and n. Alta. (J.B. Lebeau). Mosaic (Trifolium virus 1) ranged from a tr. to 2% in 7 fields of clover examined in York, Carleton, Sunbury and Queens Counties, N.B. (D.J. MacLeod).

WITCHES' BROOM (?virus). A tr. infection was found in a field of clover in York Co., N.B. (D.J. MacLeod).

YELLOWS (virus) was common in clover fields in Carleton, York, Sunbury, Queens and Victoria counties, N.B.; infection was tr.-4% (D.J. MacLeod).

WINTER INJURY was less severe in Alta. than in 1951 (G.B. Sanford). Damage was severe in the Montreal district, Que., while it was nil about Quebec and along the lower St. Lawrence. See under Alfalfa (R.O. Lachance).

YELLOWS (boron deficiency). Observations indicated that red clover growing about Ste. Anne de la Pocatiere, Que., is suffering from boron deficiency. This finding was confirmed experimentally; it was found that boron-deficiency symptoms were visible on plants of both red and alsike clover receiving 0.25 p.p.m. of boron or less, whereas plants receiving 0.50 p.p.m. or more were healthy (R.O. Lachance).

SWEET CLOVER

BLACK STEM (Ascochyta meliloti). Infection was mod. on plants bordering an irrigation ditch near Brooks, Alta. (E.J. Hawn), and sl. in a field near Fort St. John, B.C. (J.B. Lebeau). In n.e. Sask. sweet clover is grown to be ploughed down during the first year and also as a seed crop. Black stem was found on all second year stands causing mod. defoliation and relatively sev. lesions on the stems (H.W. Mead).

ROOT ROT (Cylindrocarpon sp.) affected 2% of the plants of yellow blossom sweet clover in a 30-acre field in Essex Co., Ont.; damage sl. (W.G. Benedict).

ROOT ROT (Phytophthora cactorum) caused sl. damage in a field near Lethbridge, Alta. (M.W. Cormack). Some 55-85% of plants were affected in all the fields surveyed in Essex Co., Ont., and about 50% were destroyed in some fields. The acreage for hay, silage, and seed has been much reduced. This disease was also found in Huron Co., The symptoms were visible as early as 26 April (W.G. Benedict).

ROOT ROT (Plenodomus meliloti) caused sev. to sl. damage to white and yellow blossomed varieties at the Substation, Whitehorse, Yukon. The decumbent type of the yellow blossomed species appeared to be most resistant (G.B. Sanford).

LEAF SPOT (Stagonospora meliloti). Tr. infection was seen in two fields, one near Onoway and the other near Peace River, Alta. (J.B. Lebeau).

2,4-D INJURY was observed at Saskatoon, Sask. It resulted in sterility in older plants, and dwarfing and curling of the leaves, intensification of the chlorophyll and reduced flowering in younger plants (T.C. Vanterpool).

VETCH

ANTHRACNOSE (Colletotrichum viciae) caused mod. damage to the lower leaves and stems in a block of hairy vetch at Kentville, N.S. (D.W. Creelman). First reported in Canada in 1951 (P.D.S. 31:26).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was found on tartarian buckwheat in N.B. as follows; Carleton Co., 4 fields, 1-14% of plants infected; Sunbury Co., 3 fields, tr.-22%; York Co., 4 fields, 3-41% (D.J. MacLeod).

CORN

EAR ROTS (Diplodia zeae, Fusarium graminearum and F. moniliforme). Infection caused by these pathogens in hybrid corn in Essex Co., Ont., was 5, 3, and 10% respectively; damage was sl.-mod. (N. J. Whitney).

ROOT ROT (Fusarium graminearum isolated) severely infected hybrid corn in Essex, Kent, and Lambton counties, Ont.; damage was mod. (N. J. Whitney).

STALK ROT (Fusarium graminearum isolated) affected up to 5% of the stalks in hybrid corn in Essex Co., Ont.; damage was sl. (N. J. Whitney).

LEAF SPOT (Helminthosporium turcicum). Infection was up to 10% in some fields of hybrid corn in Essex and Kent counties, Ont., but it was 75% in one field of White Cap in Elgin Co., causing mod. damage. Infections of 1-2% were found also e. of Brantford and at Guelph (N. J. Whitney).

RUST (Puccinia sorghi). Infection was about 5% in hybrid corn in Essex, Kent, and Lambton counties, Ont. All the rows of inbreds were heavily rusted at the Harrow Station. Rust was found at least 2 weeks earlier on corn in 3 widely separated marshes than on corn on high ground. The marshes were located e. of London, at Thedford and between Thamesville and Highgate. The corn on the fine granular muck of the Thedford Marsh was short, with poor ear development, which suggested a lack of available nitrogen (N. J. Whitney). A tr. of rust was seen in Queens Co., P. E. I. (R. R. Hurst).

SMUT (Ustilago maydis) affected up to 10% of the plants in fields of hybrid corn in Essex, Kent, and Lambton counties, Ont. (N. J. Whitney).

DIGITALIS

LEAF SPOT (Colletotrichum fuscum Laubert) caused considerable damage and loss of commercial value to the leaves of a drug planting of D. lanata at Keating, B. C. Spores 14-20 x 2.8-3.7 microns; setae to 90 microns long by 5-7 microns wide at base, 1-2.5 microns at rounded apex. Lesions small but very numerous, brown with deep purple border. Agrees reasonably well with the lengthy but vague original description (R. Laubert. Die Gartenwelt 31:674-675. 1927). Reported by Weiss (U. S. D. A. Pl. Dis. Reptr. 33:56. 1949) from Conn., Mass. and Ore. on D. purpurea (W. Jones, D. B. O. Savile).

CROWN ROT (Pythium sp.) destroyed 1-10% of the plants, usually scattered, in 3 plantings of D. lanata at Keating, B. C. Leaves of affected plants became brown and necrotic and thus were worthless for picking and drying. This drug plant has been grown successfully for some time by this grower (W. Jones).

FLAX

Prof. T. C. Vanterpool, University of Saskatchewan, contributed a special study on "Flax Diseases in Saskatchewan in 1952", which is summarized below.

Flax rust was epidemic in 1952 in Sask. However, the heavy infections appeared in most instances to have reduced yields only slightly. Rhizoctonia seedling blight on fallow crops was the only other flax disease of any importance. Diseases caused by seed-borne fungi were unimportant as might be anticipated from last year's report that the 1951 seed was carrying an unusually low percentage of these fungi (P. D. S. 31:28).

The 1952 growing season was not typical for the Prairie Provinces. A striking difference was the above normal atmospheric humidity (low evaporation rate) throughout the growing season. At the same time mid-summer temperatures were normal or below normal. In consequence, the crops were able to make full use of the available soil moisture, which was average in most areas. Hence some 4,300,000 bushels of flax were reported on 379,700 acres, giving an average yield of 11.3 bu. per acre, which is good for this province.

RUST (Melampsora lini) infection was mod.-sev. despite the fact that good rust-resistant varieties are available. Heavily rusted fields were widely distributed, occurring even in the brown soil zone at such places as around Leader and Kindersley and from Eston to Elrose. The growing of the susceptible Royal is no longer recommended and Rocket and Victory have been substituted.

For the last two years in cooperation with Dr. B. Peturson, attempts to transmit flax rust to the crop from bits of rusted straw sown with the seed have been made in a small field test at Saskatoon. In both years the weather was dry for some time after seeding and the attempts failed.

RHIZOCTONIA SEEDLING BLIGHT (Rhizoctonia solani) was widespread in the large plots of the Field Husbandry Department, Saskatoon, affecting 10-25% of the plants in most varieties. No outstanding or consistent differences in resistance were found among the common commercial varieties. The general, uniform distribution of the blight was striking. This disease has been present in the flax tests at Saskatoon in other years, but it has never been quite so conspicuous or destructive. As the plots are on fallowed land, it has been recommended on several occasions that the trials be conducted on cereal stubble land. On 30 May, there was found at Saskatoon a flax field that was affected by a slight amount of blight generally distributed over the field except at one end, where the disease was much lighter. Enquiry revealed that this end of the field was on sweet clover stubble, while the rest of the field had been in fallow. These observations provide further evidence that rhizoctonia seedling blight is more severe on flax on fallow than on flax on stubble land. No farm survey was conducted for seedling diseases.

WILT (Fusarium oxysporum f. lini) and ROOT ROT (Rhizoctonia solani and F. spp.). Every year isolations are made from the roots of flax plants in the 'Wilt Nursery'. These plants die about 3 weeks before the rest of the crop is mature. It has been found that Rhizoctonia solani and Fusarium spp. are isolated more frequently than F. oxysporum f. lini from these older plants. Late Root Rot was lightly, but generally, distributed in most flax fields. No true wilt was observed in farm fields.

LATE SEASON STEM BROWNING. Alternaria linicola was obtained more frequently than usual from lesions on stems and leaves. The fungus was also the one most commonly associated with telia of Melampsora. In the absence of rust, the point of infection is commonly a leaf scar. A. tenuis can be isolated from practically any flax plant at harvest, but it has never proved pathogenic. Fusarium spp. were rarely associated with rust lesions this year and when they were found the lesions were confined to the lower part of the stem.

BROWNING and STEM BREAK (Polyspora lini). No survey was made in n. Sask., where the disease is usually found. It was not observed in fields around Saskatoon. Polyspora-infected seed from the 1951 crop sown at Saskatoon developed sl. stem break, but no brown lesions were observed on stems, leaves, or balls. A dry period when the cotyledons were green probably prevented the disease from becoming established.

PASMO (Septoria linicola). In late August, a trip was made from Regina to Estevan, Sask., and then on to Minot and Fargo, N. D., and St. Paul, Minn. No pasmo was observed in Sask., but the disease was found in some fields in e. N. D. and in Minn. Its severity increased from West to East.

ALKALI BURNING. Every year low lands with a pH well above 7.0 are ploughed up and sown to flax. This year, two such areas, one at Asquith and another at Grandora, showed severe leaf-tip burning (1/3 to 1/2 of leaf affected) from mid-season on. Growth was good although the plants were a pale green on 30 July. Moderate yields were obtained because of the relatively cool and moist conditions.

MISCELLANEOUS. After a few years' absence, Selenophoma linicola was collected again in tr. amounts on the peduncles and finer branches of flax here and there in the Saskatoon area. In two fields, where wireworms and seedling blight had caused severe thinning of the stands, Wind Injury was conspicuous. Abnormal enlargement of the stems occurred at ground level followed by snapping off of the many-branched plants towards the end of the season. One report of Heat Canker was received from Marengo in the brown-soil zone on 5 July.

Dr. W. E. Sackston has also summarized his observations in a special report, "Flax Diseases in Manitoba 1952".

The flax crop in Man. in 1952 was retarded by drought in May and June, but weather conditions during the rest of the growing season and at harvest were sufficiently favourable that the yield for the province averaged 9.6 bushels per acre. The drought caused irregular emergence, and stands were patchy in many fields until after the late June rains. Cutworm damage was general, and in some cases severe. Sixty-nine fields were examined during an intensive survey made 6-13 August in Man. and south-eastern Sask. Flax diseases were of minor importance.

RUST (Melampsora lini) was fairly well controlled in Man. by the widespread use of resistant varieties. There was no rust in 36 fields, traces in 22, and 5-10% in 3. The light infections occurred in most cases on admixtures of susceptible varieties in fields of rust-resistant flax, and in fields of Victory, which contains some rust-susceptible lines, but which does not suffer sev. damage. A 25% infection was found in 2 fields, 50% in 1, 75% in 4, and 100% in 1 field, all Dakota flax. The heavy infections on Dakota indicated the losses that might have been experienced if resistant varieties had not been so widely grown. Farm fields and experimental plots of Sheyenne, Redwood, and Rocket flax near heavily rusted Dakota remained free of rust.

PASMO (Septoria linicola). Tr. infections were seen in 6 fields, and 1-5% in 3 at widely separated points in Man. and Sask. Pycnidia of the pathogen were numerous on affected stems in a field of Victory flax on 7 August. Despite this early development, the spread of pasmo later in the season was apparently hindered by unfavourable weather conditions. Pycnidia were found on flax stubble n. e. of Lake Dauphin in October. As flax is not grown generally in the area, the presence of pasmo there indicates that it is coextensive with the flax crop in Man.

BOLL BLIGHT (cause unknown). Many of the flax fields examined during the survey were not sufficiently advanced for boll blight to be observed, but it was found in 25 fields. Trace to 10% blight was seen in 20 fields, 20% in 4, and 50% in one, in which the loss of bolls was caused by sev. rust infection on the pedicels. The observed low incidence of the disorder again seems to fit the hypothesis that non-parasitic blighting of bolls is induced by unfavourable environmental conditions following weather that favours the formation of numerous flowers.

MISCELLANEOUS. Seedling Blight was present, but not important, in six fields examined in mid-June. Rhizoctonia solani was isolated from affected plants. Traces of Heat Canker were seen in several fields, and one field with 30% heat canker was reported from the Carman area. Traces of Wilt (Fusarium oxysporum f. lini) were found in 1 field in s. e. Sask. Hail Damage was severe in one district s. w. of Winnipeg. Some striking symptoms of 2,4-D Injury were seen in a number of fields. Stunting, chlorosis, and necrosis of leaves and growing points of stems were seen on some soils, which were found to contain extremely high concentrations of salts.

Other Observations

RUST (Melampsora lini). Infection was 18-tr. 5-sl. 5-mod. 1-sev./ 56 fields examined in Alta. Rust was more prevalent and more sev. in s. Alta. than elsewhere (P. M. H., T. R. D.). Rust was prevalent in several fields in the Tisdale district late in July (H. W. M.). See also Rust Nurseries.

BROWNING and STEM BREAK (Polyspora lini). A tr. infection was observed in one field near Spirit River, Alta. (T. R. D.); and a mod. infection was reported from Grande Prairie (A. W. Henry).

MANGEL

MISCELLANEOUS DISEASES observed in Queens Co., P. E. I., included: Single roots received at the laboratory, one sev. affected by Crown Gall (Agrobacterium tumefaciens), and a second with a tr. of Scab (Streptomyces scabies); a mod. infection of Leaf Spot (Cercospora beticola); a 0.5% infection of Damping-Off and tr. -10% of Strangle, the affected plants being severely injured presumably by a soil-borne organism (R. R. Hurst).

RAPE

DOWNY MILDEW (Peronospora ?parasitica). Distorted heads of Polish rape (Brassica ?campestris) received from Shellbrook, Sask., were found to contain oospores in the affected tissues; the severity of infection is unknown (H. W. M.). Examination of the material revealed oogonia 37-65 microns in diameter, wall 1.3-2.0 microns, smooth, hyaline, irregularly folded. Oospores 32-55 microns in diam., globose, wall of 3 yellowish layers, innermost clear, middle radially striate, outer clear with large hemispheric warts. The fungus seemed closer to P. parasitica than P. brassicae (D. B. O. Savile).

SAFFLOWER

RUST (Puccinia carthami). Infection was sev. in most varieties in the plots at Lethbridge, Alta. Sl. resistance to rust was recorded in the Nebraska varieties N-3, N-6, N-10 and N-852. Infection was sl. -mod. in the plots at Brooks, Rosemary, and Taber (F. R. Harper).

ROOT ROT (Pythium sp.). Damage varied from 0 to 100% in different varieties in the irrigated plots, Lethbridge, Alta. The susceptible variety N-852 was mod. damaged on irrigated land at Rosemary, but was not infected in a similar planting at Taber. Dry land plots at Lethbridge were free from infection (F. R. Harper).

HEAD BLIGHT (Sclerotinia sclerotiorum). Tr. -sl. infections were noted on the different varieties at Lethbridge and Rosemary, Alta. (F. R. Harper). After the 1951 epidemic of head rot on the safflower varieties at Saskatoon, Sask., (P. D. S. 31:32), not a single infected head was found this year (T. C. Vanterpool).

SOYBEAN

Dr. A. A. Hildebrand has prepared a special report on "Diseases of Soybeans in southwestern Ontario in 1952".

As in previous years, observations were made on the disease situation in soybeans in s. w. Ont., not only in commercial plantings but also in the experimental plots of the Harrow laboratory, where the plants were artificially inoculated or the organisms had been introduced into the soil.

STEM CANKER (Diaporthe sp.) continues to be the most important disease of soybeans in Ont. This year, the disease was somewhat less widespread in its occurrence and the resulting losses less serious than for several seasons. However the variety Lincoln, when grown on highly fertile soil, was especially susceptible to the disease, and, in three representative fields, yield losses were estimated at 30%. Reduced incidence and severity of stem canker this year may be attributed to prolonged periods of extremely dry weather in many parts of s. w. Ont.

Varietal test plots, located near Port Alma, Woodslee, and Paquette, were inspected on 11 Sept. and a comparison was made of the relative susceptibility to stem canker of five leading varieties. The results of the examination are as follows:

Percentage Incidence of Stem Canker

Variety	Port Alma	Woodslee	Paquette
Harman	8.7	---	---
Harosoy	5.7	3.7	3.5
Lincoln	18.5	2.2	2.0
Hawkeye	26.1	3.7	4.5
Blackhawk	54.7	9.2	7.0

It will be noted that Harman and Harosoy were the least susceptible, Lincoln intermediate, and Hawkeye and Blackhawk the most susceptible to stem canker. These varieties occupied the same relative position last year (P. D. S. 31:34). The higher disease incidence at Port Alma over that at Woodslee and Paquette is attributed to the nature of the soil. At Port Alma the soil is a porous, gravelly type whereas at the two other locations it is a clay of the Brookston series.

On 15 Aug. healthy plants of the variety A. K. Harrow growing in an outdoor plot were inoculated with four Diaporthe isolates, three of which had been obtained in Ont., the fourth in Indiana, from plants affected with stem canker. By 29 Sept. mortality of plants inoculated with the three Ont. isolates had reached 66.6, 55.5, and 47.0%. The high mortality caused by two of the Ont. isolates was correlated with a high incidence of unproductive pods, and a 30% reduction in the yield of seed, which was of small size and poor quality. The Indiana isolate was virtually non-pathogenic. Clearly the

organism is comprised of strains that may differ widely in their pathogenic capabilities. This fact is of importance in breeding for resistance to the disease. The writer is also of the opinion that the isolates mentioned above differ morphologically from that of Diaporthe phaseolorum var. batatatis, which is commonly regarded as the causal agent of stem canker. It is postulated that the disease as it occurs in Ont. and possibly elsewhere, is caused by an undescribed species of Diaporthe.

POD AND STEM BLIGHT (Diaporthe phaseolorum var. sojae). To date only the imperfect (Phomopsis) state of the pathogen has been found in Canada. In recent literature, the causal agent is described as a weak parasite which can attack plants only shortly before maturity, and the view is expressed that the disease is of negligible economic importance. Observational evidence accumulated by the writer was not in agreement with this view. Accordingly experiments were undertaken last summer to determine the effect of the pathogen on the productivity of the soybean.

At four different dates during August and September, plants of A. K. Harrow were inoculated under field conditions with isolates of Phomopsis which had been obtained locally from plants affected by pod and stem blight. Over 18% of the plants inoculated on 15 Aug. became severely infected and their yield, as compared with that of corresponding checks, was reduced by 12.4%. Plants inoculated on 29 Aug. showed 39.1% mortality and a yield reduction of 11.0%. Mortality of plants inoculated on 9 Sept. with 4 different isolates was 26.3-73.6% and yield losses were 11.2-14.5%. Only one isolate caused an appreciable reduction in yield, viz. 11.2%, in the final inoculation series of 17 Sept.

It will thus be seen that reductions of yield of 10-15% resulted when the plants were inoculated on various dates between 15 Aug. and 17 Sept., 2-6 weeks before the average maturity date of the variety. Moreover natural infection has been observed as early as 3 Aug. It is concluded that pod and stem blight may be regarded as a factor of some importance in the production of soybeans under Ont. conditions.

BROWN STEM ROT (Cephalosporium gregatum). In the laboratory experimental plots where the soil is now heavily infested with the causal organism, symptoms of the disease were detected on plants as early as 1 Aug. In commercial stands, the disease did not become conspicuous until early in September, and then only in a few widely scattered fields, particularly of the Blackhawk, Lincoln, and Adams varieties.

Other diseases noted this year included: Downy Mildew (Peronospora manshurica), Sclerotinia Stem Rot (Sclerotinia sclerotiorum), Brown Spot (Septoria glycines), Bacterial Blight (Pseudomonas glycinea), Soybean Mosaic (Soja virus 1), Yellow Mosaic (Phaseolus virus 2), and Bud Blight (virus of tobacco ring-spot group). They were relatively unimportant. Lightning Injury and Sun Scald (non-parasitic) were encountered as usual.

Other Observations

POD and STEM BLIGHT (Diaporthe phaseolorum var. sojae). Only a single plant of Capital was found affected in all the plantings observed at Ottawa, Ont. (R. J. Baylis).

BACTERIAL BLIGHT (Pseudomonas glycinea). Infection was tr. -sl. in the plots at Ottawa, Ont. Blight appeared in June on young plants, which, however, appeared to outgrow the infection by July with no further spread later in the season (R. J. Baylis).

MOSAIC (virus) occurred only in tr. amounts this year in the plots at Ottawa, Ont. (R. J. Baylis).

SUNFLOWER

A special report on "Sunflower Diseases in Manitoba in 1952" was contributed by Dr. W. E. Sackston.

Less than 5,000 acres were sown to sunflowers in Man. in 1952 as the result of unfavourable seasons from 1949 to 1951, and heavy losses caused by rust in 1951. The growing season in 1952 was the most favourable since 1948. The average yield was estimated at 670 pounds per acre, compared to the 1951 estimate of 300 lb. Twenty-six fields were examined 11-13 Aug., when most of the fields were in or a few days past full bloom, and 29 fields were examined 8-12 Sept., when most fields were still 5-10 days from maturity. Mr. I. Toews, Cooperative Vegetable Oils Ltd., assisted in the early survey.

RUST (Puccinia helianthi) caused relatively little damage in most of the fields examined. In the early survey, no rust was found in 7 fields, traces in 14, light rust(tr. -30% infection on the lower leaves, tr. on the upper leaves) in 4, and heavy rust (lower leaves killed, 50% on the middle leaves, 35% on the upper leaves) in one 2-acre field. The heavily rusted field was surrounded on three sides by trees. It was open on the side nearest to fields where sunflowers were grown in 1951. Pycnia of rust were found on a few plants in this field on 12 June. A 30-acre field 300 yards away, on the same farm, on the other side of the trees and the farmstead, had about 10% rust on the lower leaves of plants nearest the heavily-rusted field, and traces of rust at the far end of the field.

In the late survey, traces of rust were seen in 11 fields, traces on the upper leaves and 5-10% on the lower leaves in 6, tr. -15% on the upper leaves and 15-25% rust on the lower leaves in 7, 25% on the upper leaves and 35-50% on the lower leaves in 3, 50-75% on the upper leaves, and the lower leaves dead, in 1 field, and all leaves killed by rust in 1 field. Rust killed the plants in the 2-acre field where rust was heavy in August. The other very heavily rusted plants were at the Brandon Experimental Farm in a plot where sunflowers had been grown in 1951, but had shown only traces of rust.

The relative freedom from rust in 1952 may be attributed to the lack of inoculum in most areas when the new crop was emerging. Warm weather in April may have induced early germination of rust teliospores before susceptible new host plants emerged. The drought in May and early June delayed emergence of the sunflower crop, and may have terminated much of the teliospore germination. The small acreage devoted to sunflowers in 1952 made it fairly easy for most growers to sow the crop away from fields where sunflowers were grown in 1951. Heavy infections in the few fields where rust inoculum was plentiful, and extremely heavy rust in inoculated plots at Winnipeg, indicated that the rust outbreak might have been severe if inoculum had been as plentiful as in 1951.

WILT (Sclerotinia sclerotiorum). No wilt was seen in 15 fields and traces of wilt in 9 in the early survey. There was 20% wilt in a 50-acre field which was sown to flax in 1951 and was fallowed in 1950. In one 10-acre field there was 50% wilt in a portion which was manured heavily in 1950, and only 2% wilt in the rest of the field. In the late survey, no wilt was seen in 8 fields, traces in 17, and 5-10% in 2. There was 50% wilt in the field where 20% wilt was seen in August, and 75% in the small field where the infection was 50% in August. All the infections observed seemed to have originated at or near the soil line.

STALK ROT (cause unknown). The stalk rot recorded in 1949 and 1951 was not observed in 1952. Browning of stalks was seen in 13 fields during the late survey. Less than 1% of the plants were affected in 8 fields, 20-50% in 4, and 100% in one. The pith was clean and white in plants with brown stalks in most fields, and the external browning did not seem to be directly correlated with severity of stalk-borer infestation. The 100% stalk browning occurred in the field killed by rust. The stalks were hollow, but the pith seemed to have dried out rather than rotted away.

MISCELLANEOUS. Powdery Mildew (Erysiphe cichoracearum) was present in trace amounts in 7 fields, and on 50% of the leaves in one in the late survey. Leaf Mottle (cause unknown) was suspected on only one plant in a farm field. Frost Damage was seen on plants in a number of fields early in the season. 2,4-D Injury ranged from trace to sev. in several fields. Head Drop (cause unknown) was seen in two fields, with one plant affected in each. A high percentage of head drop was reported in certain of the genetic lines in Dr. E. D. Putt's nursery at Altona. Conspicuous distortion of the cotyledons and the first few leaves, in some cases associated with stunting of the plants, was observed in the greenhouse at Winnipeg and also in experimental plots and some farm fields. The symptoms were similar to those induced by 2,4-D, but occurred on some plants which could not have been exposed to 2,4-D fumes. It is possible that the disorder was caused by frost injury of ripening seed in the fall of 1951. Head and Neck Rot (Sclerotinia sclerotiorum and Botrytis cinerea) was not seen in farm fields. Some natural infections by S. sclerotiorum was found in heads of uninoculated, unwounded plants in plots at Winnipeg, where inoculations were made with Sclerotinia, Botrytis and other organisms. Downy Mildew (Plasmopara halstedii) affected a few plants in nursery plots at Altona, but it was not seen in farm fields.

Other Observations

WILT (Sclerotinia sclerotiorum) destroyed about 5% of the plants in small plantings at Lethbridge and Brooks (F. R. Harper, M. W. Cormack).

SUGAR BEET

BLACK ROOT (various fungi) was found in 42 representative fields examined in a pre-thinning survey in s. Alta. In samples from these fields, an average of 65% of the plants were infected and 2% were sev. damaged or killed. Thinning operations removed most of the infected plants and no further development was observed during the growing season. Phoma betae, the predominant isolate, was obtained from 86% of the fields. Aphanomyces cochlioides was obtained from only 17% of the fields compared with 51% in 1951, a year of moist conditions. A survey of beets in storage piles in November showed only a tr. of root rot, which was of no economic importance (F. R. Harper).

LEAF SPOT (Phomae betae). Tr. infection was found on the outer leaves in 8 fields out of 14 examined in s. Alta. (F. R. Harper).

ROOT ROT (Rhizopus sp.) caused sev. damage in a poorly drained area in one field near Lethbridge, Alta. (F. R. Harper).

BLACK HEART (boron deficiency) was reported by the grower to have affected about 2% of his crop, as well as that of his neighbors. The specimens were from Beloeil, Chambly Co., Que. (H. N. Racicot).

CULTIVATED and OTHER GRASSES

AGROPYRON - Wheat Grass

Ergot (Claviceps purpurea): Tr. infection on A. trachycaulum recorded in the plots, Lethbridge, Alta. (E. J. Hawn); heavy infection on A. repens at New Minas, N. S. (C. L. Lockhart).

Powdery Mildew (Erysiphe graminis). Heavy infection of the oidial stage on A. repens at Kentville, N. S. (D. W. Creelman).

Stripe Rust (Puccinia glumarum) caused sev. damage to the leaves of A. cristatum in the plots, Lethbridge, Alta. (E. J. Hawn).

Stem Rust (Puccinia graminis). Mod.-sev. infection on about 10% of the plants of A. trachycaulum in the plots, Lethbridge, Alta.; the rust was determined as race 56 at Winnipeg (M. W. Cormack, E. J. Hawn).

Leaf Rust (Puccinia rubigo-vera). Mod. infection observed on A. trachycaulum in plots at Lethbridge, Alta. (E. J. Hawn).

Head Smut (Ustilago bullata). Infection estimated at 5% on A. trachycaulum in the plots at Lethbridge, Alta. (E. J. Hawn).

Stem Smut (Ustilago hypodytes) was quite general on A. repens in a small area near Trout Creek Point, B. C. When first observed 2-3 years ago, only a few plants were affected; it seems to be on the increase, spreading from the first point of infection (G. E. Woolliams).

Bacterial Blight (Xanthomonas translucens f. sp. cerealis) sev. infected a patch of A. repens near Oak Lake, Man.; pathogenic isolates 4021 and 4060 were obtained (W. A. F. Hagborg).

AGROSTIS

Tar Spot (Phyllachora graminis) sev. infected A. palustris at Brooklyn, N.S. (D. W. Creelman).

Stem Rust (Puccinia graminis). A 50% infection was seen on A. scabra in one field at Hortonville, N.S. (D. W. Creelman).

Leaf Rust (Puccinia rubigo-vera). A 75% infection was observed at Prospect, N.S.; the small size of the spores suggests that this collection is P. rubigo-vera var. impatientis. The rust was also collected at Pembroke (D. W. Creelman).

BROMUS - Brome Grass

Leaf Rust (Puccinia rubigo-vera) was heavy on B. ciliatus at Lennoxville, Que., 29 July (D. Leblond).

CALAMAGROSTIS

Leaf Gall Nematode (Ditylenchus graminophilus). Traces were seen on C. canadensis at Petawawa, Ont., in June 1952. Infection was mod. on a small colony at Rupert, Gatineau Co., Que. in July. It was widespread and sometimes mod.-sev. at St. Anthony, Nfld., in 1951 (D. B. O. Savile).

Crown Rust (Puccinia coronata) was observed on C. canadensis at Casey's Corner, Kings Co., and at Pembroke, Yarmouth Co., N.S. (D. W. Creelman).

DACTYLIS GLOMERATA (Orchard Grass)

Powdery Mildew (Erysiphe graminis). Sl. infection in the rod rows at the Station, Saanichton, B. C. (W. Jones).

Purple Leaf Spot (Mastigosporium rubricosum) was common at North Saanich, B. C., on 20 April (W. Jones).

Brown Stripe (Scolecotrichum graminis) was common in the rod rows at the Station, Saanichton, B. C. (W. Jones). Heavy infections were noted in the fall of the year in many fields and orchards in Kings Co., N.S. (D. W. Creelman).

ELYMUS

Smother (Epichloe typhina) was collected on E. innovatus in good fruit at Christopher Lake, Sask. (T. C. Vanterpool).

FESTUCA - Fescue

Net Blotch (Helminthosporium dictyoides). A mod. infection was observed on F. elatior variety Ensign growing in rows in seed increase plots at Ottawa, Ont. Sl. damage was noted only after the seed was set, causing only the tips of leaves to die back. The pathogen proved to be seed-borne, some 12% carrying the fungus (R. J. Baylis).

Root Rot (Helminthosporium spp.). A tr. infection was observed in a field near Sexsmith, Alta. (J. B. Lebeau).

Brown Stripe (Scolecotrichum graminis). Sl. infection on creeping red fescue at the Station, Lacombe, Alta. (E. J. Hawn).

HOLCUS LANATUS

Crown Rust (Puccinia coronata). All clumps of this grass, which is widely distributed in s. w. N. S., were heavily infected wherever examined in Digby and Yarmouth counties (D. W. Creelman).

HORDEUM JUBATUM

Stripe Rust (Puccinia glumarum). Tr. -sl. infections were found in many locations from Edmonton to Lloydminster, Alta. (G. B. Sanford).

PANICUM

Tar Spot (Phyllachora punctum (Schw.) Orton). A tr. infection was found on P. subvillosum at Canning, N. S., where it was also collected in 1951 (D. W. Creelman).

PHLEUM PRATENSE

Rust (Puccinia graminis var. phlei-pratensis). A mod. infection was recorded at Wolfville and a sev. one at Acadia, N. S. (D. W. Creelman).

Brown Stripe (Scolecotrichum graminis). A mod. -sev. infection was present in one field at the Farm, Ottawa. For the third year the disease has developed in the same planting. It does not appear to be sev. until after the crop blossoms. As the plants mature, however, the discoloration caused by the coalescing stripes becomes very conspicuous. The disease was sev. in 1950, but it was less prevalent in 1951 than this year. The fungus was obtained from a large proportion of the 1950 seed by routine plate test after surface disinfecting with 2% chlorine solution. However when the seed was sown in soil in the greenhouse, only 1% of the seed gave rise to diseased seedlings (R. J. Baylis).

SPARTINA

Rust (Puccinia sparganioides) was observed on both S. patens and S. pectinata in Kings, Annapolis, Digby, and Yarmouth counties, N. S. (D. W. Creelman).

Rust (Uromyces acuminatus) was also collected on S. pectinata at Canning, Kings Co., N. S. (D. W. Creelman).

LAWNS

Fairy Rings (Marasmius oreades). Several fairy rings are present every year on one lawn of the University campus, Vancouver, B. C. (H. N. W. Toms).

Spot Blight (Pythium sp.). A new private lawn in Edmonton, Alta., showed 50% of its surface affected (A. W. Henry).