II. DISEASE OF FORAGE AND OTHER FIELD CROPS

A. FORAGE LEGUMES

ALFALFA

Alfalfa Diseases in British Columbia in 1958

E.J. Hawn

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

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

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

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

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

Alfalfa Stem Nematode in Southern Alberta

E.J. Hawn

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

Other Observations

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

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

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

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

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

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

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

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

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

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

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

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

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

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

COMMON CLOVER

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

B. OIL-SEED CROPS

FLAX

Flax Diseases in Saskatchewan in 1958

T.C. Vanterpool

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Flax Diseases in Manitoba in 1958

W.E. Sackston and J.W. Martens

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

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

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

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

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

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

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

Other Observations

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

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

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

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

RAPESEED

Rape Diseases in Saskatchewan in 1958

T.C. Vanterpool

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

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

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

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

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

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

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

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

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

SAFFLOWER

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

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

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

Diseases of Soybeans in Ontario in 1958

A.A. Hildebrand

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

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

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

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

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

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

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

SUNFLOWER

Sunflower Diseases in Manitoba in 1958

W.E. Sackston and J.W. Martens

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Other Observations

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

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

C. ROOT CROPS

SUGAR BEET

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

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

D. MISCELLANEOUS CROPS

FIELD CORN

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

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

MUSTARD

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

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

TOBACCO

Tobacco Diseases

Z.A. Patrick and L.W. Koch

Seedbed Diseases

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

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

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

Field Diseases

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

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

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

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

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

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

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

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

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

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

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

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

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

Other Observations

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

E. CULTIVATED AND OTHER GRASSES

AGROPYRON REPENS

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

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

BROMUS INERMIS

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

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

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

DACTYLIS GLOMERATA

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

ELYMUS

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

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

PHLEUM PRATENSE

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

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

POA

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

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

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

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

TURF

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

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