1. DISEASES OF CEREAL CROPS

WHEAT

"MILDEW" (Alternaria tenuis and Cladosporium). A crop of standing wheat in a field at Meath Park, Sask., was already mod. mildewed on 23 Aug.; it had apparently matured early (T.C. Vanterpool). A. tenuis was heavy on dying leaves of wheat in a field in Queens Co., P.E.I., in August (R.R. Hurst).

EYE SPOT (Cercosporella herpotrichoides). Traces were observed to be quite general in low spots in winter wheat fields particularly in south Simcoe Co., Ont., in July (R.J. Baylis, R.A. Shoemaker).

ERGOT (Claviceps purpurea) was noticeable in Redman in the plots at Normandin, Que. (D. Leblond). Examination of two large sheaves of Acadia grown at Charlottetown, P.E.I., revealed a single head affected by ergot (J.E. Campbell). For its occurrence in Western Canada see Ergot Survey.

The root-inhabiting fungus, Cryptoascus graminis, caused a tr. infection on Thatcher in the plots in Queens Co., P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis). Infection was 5-tr. 3-sl./46 fields of winter wheat and 13-tr. 5-sl. 1-mod. 1-sev./164 fields of spring wheat in s. Alta.; the sev. affected field was in Lehmi (J.T. Slykhuis). Out of 328 fields of wheat surveyed in central and n. Alta., 5 were affected; infection was 1-sl. nr. Thorhild, Alta., and 1-sl., 2-mod., and 1-sev. nr. Fort St. John, B.C. (W.P. Campbell). Out of 178 fields of winter wheat examined in Kent Co., Ont., powdery mildew was observed in 7 (S.G. Fushtey). See also Rust Nurseries.

HEAD BLIGHT (Fusarium spp.). Out of 254 fields examined, a sl. infection was recorded in 2 fields, one at Moose Jaw and one of durum wheat at Elrose, Sask., (H.W. Mead). Isolations were made from 2 samples: Common wheat, tr. infection, from Winkler, Man., and Mindum wheat, mod. infection, from Normandin, Que. (W.L. Gordon). A trace was observed in Mindum at Normandin on 16 Aug.; sporodochia of the fungus were present (D. Leblond).

SPOT BLOTCH (Helminthosporium sativum).* Infection was 5-sl. 1-mod./164 fields of spring wheat in s. Alta. (J.T.S.). Affected plants received from Maymont, Sask., 19 July (T.C. Vanterpool). A sev. infection occurred in patches in a field at Teulon, Man. (J.E. Machacek).

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* E.S. Luttrell (Am. J. Botany 42:57-68. 1955) presents convincing evidence for considering H. sativum Pamm., King & Bakke to be a later synonym of H. sorokinianum Sacc. ex Sorokin, Proc. Biol. Soc. Imp. Univ. Kazan 22(3):15. 1890; Sacc. Syll. Fung. 10:615-616. 1892; abstr. in Z. Pflkrank. 1:238-239. 1891. In 1924, Mourashkinski (Trans. Siberian Agric. Acad. 3:87-120. 1924)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). In winter wheat, damage was 10-tr. 17-sl. 1-mod./46 fields examined in s. Alta. (J.T.S.) and a tr. was found in a single field nr. Fort St. John, B.C. (W.P.C.). In spring wheat, damage was 91-tr. 29-sl. 2-mod./164 fields in s. Alta. (J.T.S.)and 79-tr. 69-sl. 8-mod. 3-sev. in central Alta. and the Peace River area. It was less prevalent in 1955 than in the two previous years (W.P.C.).

Common root rot was less sev. in Sask. in 1955 than in 1953 and was less evident than in the wet season of 1954. A prolonged period of dry weather during late May and throughout June over most of the province appears to have provided conditions unfavorable for infection. Moreover, it would appear that generally there was an ample reserve of moisture in the soil to maintain good crop growth, which was reflected in the excellent yields of grain obtained. A notable feature of the yield and disease data given below is the degree of uniformity between crop districts. This uniformity suggests unusually uniform growing conditions over the province. An analysis of data from 166 fields gave an average disease rating of 7.5 for the province. The ratings for crop districts 1 to 9 were 7.6, 8.0, 7.8, 7.1, 7.6, 8.3, 6.3, 6.1, and 7.5 respectively. Corresponding wheat yields according to the August estimate were 22.7, 22.8, 22.5, 22.1, 24.6, 22.2, 23.4, 22.1 and 22.7 bu. per acre (B.J. Sallans).

Dr. Sallans has drawn my attention to an unfortunate omission in giving the ratings by crop districts in 1954 (P.D.S. 34:2); the sentence should read, "The ratings for the crop districts 1, 2, 5, 6, 7 and 8 were 9.3, 9.1, 12.3, 11.5, 6.2 and 6.6 respectively." (I.L.C.).

Seedlings of Chinook wheat sent from Lucky Lake, Sask., on 3 May were affected by common root rot. On a short survey trip to the west of Saskatoon and return on 11 Aug. symptoms of common root rot were unusually inconspicuous for that time of year. Samples of Pelisier durum wheat received from Lanigan and Webb in mid-August were affected by this disease (T.C. Vanterpool).

LEAF BLOTCH (Helminthosporium tritici-repentis). A sl. infection was found in a few fields in w. and s.-w. Sask. on 9 July. Leaf blotch was much less common than in 1954, when the weather was more favorable for the disease (H.W. Mead).

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*reported H. sorokinianum as the cause of black point of wheat in Siberia. In the paper, "details of the spore measurements and septations are given and H. sativum is regarded as a synonym" (Abstr. in Rev. Appl. Myc. 4:273-275. 1925). Later he (Trans. Siberian Agric. Acad. 6, 4 pp. 1926; abstr. in R.A.M. 6:293-294. 1927) reported it as a leaf spot of Agropyron tenerum. Although Charles Drechsler (J. Agr. Research 24:641-740. 1923) recognized the probability "that the Russian fungus is identical with the American form", he merely treated "it as a probable synonym." Luttrell has removed any remaining doubt that "the American form" is distinct; accordingly the correct name for the imperfect state of Cochliobolus sativus (Ito & Kurib.) Drechsl ex Dastur is Helminthosporium sorokinianum Sacc. ex Sorokin (I.L.C.).

GLUME STREAK (Leptosphaeria sp.). During a survey from Winnipeg to Swan River, Roblin and return via Brandon, Man., 19-21 July, dark linear discolorations were found on the glumes in 13 of the 20 wheat fields examined. The dark brown to black streaks varied in length and occurred on one or both sides of one or more of the sclerenchyma strands in the glumes. Frequently as many as four streaks coalesced near the tip of the glume. Similar dark streaks when present on the lemmas were confined chiefly to the exposed portion. Isolations were attempted from the diseased glumes from four of the affected fields. These yielded a species of Leptosphaeria when the plates of corn-meal agar were incubated for five weeks at 0° to 34° C. No pycnidiospores were produced although cultures of Septoria nodorum incubated under the same conditions produced pycnidiospores. Cultures of the Leptosphaeria were buff-grey whereas those of S. nodorum were black. The ascospores of the Leptosphaeria resembled those of L. avenaria f. sp. triticea in size and shape.

What appeared to be the same fungus was isolated from samples of diseased heads of Redman wheat received from Palmer, Sask., and Minnedosa, Man., and from those of an unidentified variety from Prelate, Sask. (W.A.F. Hagborg).

TAKE-ALL (Ophiobolus graminis). Infection was 3-tr. 2-sl. 1-mod./46 fields of winter wheat and 4-tr./164 fields of spring wheat in s. Alta. (J.T.S.). In central Alta. and the Peace River district infection was 28-tr. 14-sl. 4-mod. and 1-sev./328 fields (W.P.C.). Diseased specimens were also received from the Fort Saskatchewan, Star and Edmonton districts; damage was mod. to sev. in at least one field in each district (A.W. Henry). Infection was 3-tr. 1-sl. 1-mod./256 fields examined in Sask. (B.J. Sallans).

BASAL GLUME ROT (Pseudomonas atrofaciens). A trace was observed in a field nr. Crossfield, Alta. (W.P.C.).

STEM RUST (Puccinia graminis). Infection was 15-tr. 5-sl. 2-mod./46 fields of winter wheat and 84-tr. 21-sl. 1-mod. 1-sev./164 fields of spring wheat examined in s. Alta.; the sev. affected field was one of Lemhi on irrigated land (J.T.S.). Infection was 92-tr. 49-sl. 25-mod. 3-sev./328 fields in central and n. Alta. Stem rust occurred widely throughout central Alta., the more heavily infected fields being in an area bounded by the Sask. border and a line through Consort, Lacombe, Wetaskiwin and Lloydminster (W.P.C.). Stem rust was first observed at Saskatoon, Sask., on 20 July, nearly a month later than in 1954. By late August, stem rust had spread as far as w. central Sask. and damage was sev. in late crops in s. and e. Sask. Out of 244 fields examined during the general survey, rust was found in 137 as follows: 88-tr. 45-sl. 3-mod. 1-sev. (H.W. Mead). For a resumé of its occurrence in the Prairie Provinces see Cereal Rusts in Western Canada.

A survey of 178 fields of winter wheat in Kent Co., Ont., when the crop was nearing maturity, revealed stem rust in 78 fields (S.G. Fushtey). See also Rust Nurseries for additional observations on its occurence in Eastern Canada.

LEAF RUST (Puccinia triticina). Infection was 5-tr. 14-sl. 3-mod./46 fields of winter wheat and 36-tr. 42-sl. 33-mod. 14-sev./164 fields of spring wheat examined in s. Alta. (J.T.S.). Infection was 32-tr. 85-sl. 56-mod. 19-sev./328 fields of spring wheat examined in central and n. Alta. Leaf rust was fairly general in central Alta., but a trace was noted in only one field in n. Alta. near the town of Peace River (W.P.C.). Leaf rust was widespread in most parts of Sask. It was recorded in 132/254 fields examined: infection 4-tr. 19-sl. 40-mod. 69-sev. It was first observed at Saskatoon on 6 July (H.W. Mead). See also Cereal Rusts in Western Canada.

Leaf rust was present in all 178 fields surveyed in Kent Co., Ont.; infection was usually sl. to mod. but in several fields it was rated sev. (S.G. Fushtey). For other observations in Eastern Canada see Rust Nurseries.

BROWNING ROOT ROT (Pythium spp.). Infection was 1-tr. 4-sl. 2 mod./51 fields examined in Sask. Affected fields were mostly between Regina and Moose Jaw (B.J. Sallans). Typical field symptoms were seen at Floral, Sask., on 25 June and although a few brown root tips were observed when the roots were washed out, no oospores were present. Also isolations yielded only P. debaryanum and not the typical lobulate types associated with the disease. It would therefore appear that the symptoms were the result of phosphate deficiency. Damage was very sl. (T.C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). A trace was seen in 2 fields of winter wheat and infection was 8-tr. 1-sl. 1-mod. in the 10 fields of spring wheat affected in s. Alta. (J.T.S.). Infection was 39-tr. 26-sl. 3-mod./328 fields examined in central Alta. and the Peace River district (W.P.C.). Diseased heads were also received from Strome (A.W. Henry). In Sask. infection was 7-sl. 4-mod. 2-sev./254 fields examined. In the Limerick area (s.w.), the sev. infections caused shrivelling of the kernels (H.W. Mead) and S. nodorum was also isolated from discolored head samples received from Assiniboia, Chaplin, Glentworth and Melavel, Sask., all w. or s.w. of Moose Jaw (W.A.F. Hagborg). Infection was mod. on Marquis and sev. on Redman in the plots at Normandin, Que. (D. Leblond) and sev. on Acadia in the plots at Charlottetown, P.E.I. (J.E. Campbell).

SPECKLED LEAF BLOTCH (Septoria spp.). Infection was 11-tr. 12-sl. 2-mod. 1-sev./26 fields of winter wheat and 23-tr. 32-sl. 8-mod. 2-sev./164 fields of spring wheat examined in s. Alta. Leaf blotch was also sev. on several durum and winter wheat varieties in the plots at Lethbridge (J.T. Slykhuis). Leaf blotch was found in 264 or 80.5% of the 328 fields examined in central Alta. and the Peace River district; infection was 48-tr. 184-sl. 31-mod. and 1-sev. The disease was first noted in the plots at Edmonton on 20 July (W.P. Campbell).

Leaf blotch was recorded in 44 out of 254 fields examined in Sask.; infection was 5-tr. 20-sl. 18-mod. 1-sev. In many fields infection was sufficiently heavy to kill the leaves by mid-season (H.W. Mead). In general, damage caused by plant diseases was much lighter than usual in Sask. this past season. However, the summer of 1955 will be remembered by both farmers

and plant pathologists because of the severe outbreaks of glume blotch and leaf blotch that occurred over the whole province. These diseases came as a surprise to the farmers as indicated by the number of enquiries. Between 22 July and 5 August 24 enquiries were received, more than the number made during the 1954 rust epidemic. These enquiries came from all parts of Sask. and from a comparison of the dates and points of origin it was clear that these diseases appeared first in the south and then later in the central and northern areas. The outbreak was not unexpected because these diseases appeared to have been increasing in recent years (T.C. Vanterpool).

Septoria avenae f.sp. triticea was generally distributed throughout Man. in 1955 and contributed considerably to the premature dying of leaves and leaf sheaths in both common and durum wheat. The destruction of these plant parts was most conspicuous in s. Man., particularly in the Red River Valley, and proceeded at a rapid rate during the hot weather that lasted from about mid-July to the end of August. In n.w. Man. infection caused by this organism was general, but the damage was less conspicuous.

The varieties Selkirk and Lee, which accounted for most of the wheat acreage in s. Man. appeared to be highly susceptible to damage of leaves and sheaths. On Lee, pycnidial production was abundant in large, confluent blotches on these plant parts. On Selkirk, pycnidial production was less conspicuous; the impression of the observer was that the leaves and sheaths frequently withered before the organism had time to produce abundant pycnidia. On durum wheat, the destruction of plant tissue was at least as noticeable as on the above-mentioned varieties of common wheat.

In the absence of experimental data, the loss caused by the disease cannot be estimated. A strong impression, however, was created that Septoria infection, in conjunction with hot weather, led to widespread premature killing of leaves and sheaths, which affected the filling of heads, especially in Selkirk wheat in s. Man.

The only definite record of glume blotch caused by Septoria nodorum came from Winnipeg where several varieties in the experimental plots were affected to a mod. extent (T. Johnson). Some additional observations are given under Rust Nurseries.

COMMON BUNT (Tilletia caries and T. foetida). The data obtained from the records of the Board of Grain Commissioners for the last twelve months are presented in Table 1. There was again a slight drop in the percentage of cars graded smutty in the past year. Bunt has been comparatively scarce in Hard Red Spring and durum wheats but continues to be abundant in Alberta Red Winter (W. Popp).

Infection was 1-tr. 2-sev./46 fields of winter wheat in s. Alta. No bunt was observed in fields of spring wheat in Alta. (J.T.S., W.P.C.). No bunt was seen in the 194 fields examined in Sask.; it was somewhat less prevalent than in most years and its greater rarity is attributed to the fact that most of the wheat was sown late and did not lie in a cold soil as long as usual (R.C. Russell). A survey of 106 fields in Man. and e. Sask. revealed no cases of bunt (W. Popp). During a survey for dwarf bunt (q.v.) in two counties in Ont., common bunt (T. foetida) was found in a few fields. In Simcoe Co., infection was 4-tr. 1-10%,

Table 1. Common Bunt in Wheat in Western Canada

Class of Wheat	August 1, 1954 to July 31, 1955 Cars Inspected	Cars Graded Smutty	% Graded Smutty	Aug. 1 to Oct. 31, 1955 Cars Inspected	Cars Graded Smutty	% Graded Smutty
Hard Red Spring	170,450	124	0.07	32,538	22	0.06
Amber Durum	3,291	3	0.09	2,729	1	0.03
White Spring	153	0	0.00	27	0	0.00
Alta. Red Winter	828	10	1.20	99	7	7.07
Garnet	2,489	1	0.04	253	0	0.00
Mixed Wheat	82	2	2.43	26	0	0.00
All classes	177,293	140	0.07	35,672	30	0.08

1-15%/70 fields examined (R. J. Baylis). In Kent Co., out of 178 fields examined common bunt was found in 3 fields (S. G. Fushtey).

DWARF BUNT (Tilletia contraversa). An intensive survey of winter wheat fields was carried out in two counties in Ont. In Kent Co., where the presence of dwarf bunt was suspected from an examination of samples for spores of the fungus, no dwarf bunt was found in 178 fields examined (S. G. Fushtey). In Simcoe Co., where it was found without difficulty in 1953 and 1954, dwarf bunt was recorded in 17 (24%) of the 70 fields examined. In 14 fields it was found in trace amounts, in 2 fields infection was 5%, and in one about 25% of the crop was bunted. In this 8-acre field of Cornell 595, near Stayner, winter wheat had been sown about 5 times in 10 years. The field had been sown in late September with the owner's uncleaned seed, which was also carrying a heavy load of dwarf bunt spores. In general the acreage sown to winter wheat was reported to be much smaller than usual and most growers in whose fields dwarf bunt was found reported seeding under difficulty in late September. All dwarf bunt infected fields were on clay loam (R. J. Baylis).

LOOSE SMUT (Ustilago tritici). A trace was found in one field of winter wheat in s. Alta. and in 7 fields out of 492 of spring wheat examined in Alta. (J. T. S., W. P. C.). Loose smut was recorded in 12 out of 194 fields examined in Sask. Because of its greater incidence in Lee than in other varieties commonly grown, loose smut is now more prevalent than formerly (R. C. Russell). In a survey of fields selected at random in the major crop districts in Man. and e. Sask., loose smut was found in 35 out of 106 fields examined. The level of infection was about the same as in 1954. Also, as in that year, loose smut occurred mostly in Lee, in fields of which infection averaged 4.3% and in some was as high as 15%. The average for all fields examined was 1.2% (W. Popp).

In the survey for dwarf bunt in Kent Co., loose smut was found in 139 of the 178 fields of winter wheat examined (S. G. Fushtey). In Simcoe, out of 70 fields examined, traces were present in 5 fields and an estimated 10% infection in one (R. J. Baylis).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). A trace was recorded in one field each of winter and spring wheat in s. Alta. (J.T.S.). A mod. infection was seen in one field in a low area e. of Saskatoon, Sask. (H.W.M.) A mod. infection was present on all the plants examined in a field of Thatcher at Swan River, Man., and a tr. was seen on a few plants of Mindum at Ste. Agathe. In 20 other fields, mostly Selkirk, examined in Man., no infection was observed (W.A.F. Hagborg).

STREAK MOSAIC (virus). Infection was 17-tr. 15-sl. 9-mod. 6-sev./47 fields of winter wheat and 3-tr. 1-mod. 2-sev./164 fields of spring wheat examined in s. Alta. (J.T. Slykhuis). This disease was first observed in s. Alta. in spring wheat in 1948 when it was reported as "Chlorosis" (P.D.S. 28:5) (M.W. Cormack).

HEAD DISCOLORATION (physiological) was mod. in 3 fields of Rescue and was reported in several others in s. Alta. (M.W. Cormack).

MELANISM (physiological). Traces were seen in single fields at Moose Jaw and Piapot, Sask., (H.W. Mead).

OATS

ERGOT (Claviceps purpurea). A trace infection was collected on Garry oats at Homewood, Man., 1 Aug. (E.G. Anderson, D.B.O. Savile).

ANTHRACNOSE (Colletotrichum graminicola). Heavily infected specimens received from Stony Plain, Alta. Its presence associated with low grain yield on at least one farm (A.W. Henry).

POWDERY MILDEW (Erysiphe graminis). A sl. infection observed at Rocky Point, P.E.I., on 18 July (W.L. Seaman).

HEAD BLIGHT (Fusarium spp). Occasional spikelets were affected in a sheaf of Abgeweit grown at Fredericton, N.B.; F. avenaceum isolated (W.L. Gordon, G.J. Green). A few kernels showing a pinkish mycelial growth observed on Abgeweit in the plots at Charlottetown, P.E.I. (J.E. Campbell).

COMMON ROOT ROT (Fusarium spp.). Infection was 15-tr. 2-sl./42 fields in s. Alta. and 17-tr. 7-sl. 1-mod./248 in central Alta. and the Peace River district (J.T.S., W.P.C.).

LEAF BLOTCH (Helminthosporium avenae). Infection was 12-tr.4-sl. in s. Alta. (J.T.S.). It was not observed elsewhere in Alta. (W.P.C.). Observed twice in Man.: sl. infection at Neepawa and Wawanesa, the latter on Rodney (T. Johnson). During a survey of 40 farms in 6 townships in Temiscouata Co. in late June, a seedling blight believed to be caused by H. avenae was recorded as follows: infection 2-tr. 19-sl. 10-mod. 4-sev. (D. Leblond). A

rapid survey of oat fields in P.E.I. on 25 Aug. revealed that H. avenae was present in every field visited, infection varying from a trace to sev. Only traces of Septoria avenae were visible at that date (R.R. Hurst). Leaf blotch was causing sl. damage to Abegweit in the Experimental Farm plots at Charlottetown on 30 Aug. (J.E. Campbell).

ROOT ROT (Helminthosporium victoriae). In P.D.S. 33:9, H. victoriae was reported causing a root rot of Beaver oats at Notre Dame du Lac, Que. Evidence obtained at Ottawa and elsewhere has shown that Beacon, rather than Beaver, is susceptible to H. victoriae. It would seem that the two varieties have been confused. Only varieties with Victoria in their parentage have proved susceptible to H. victoriae (R.A. Derick).

HALO BLIGHT (Pseudomonas coronafaciens). Infection was 39-tr. 35-sl. 2-mod./248 fields examined in central Alta. and the Peace River district (W.P.C.) and 1-tr. 1-sl. 3-mod. 1-sev./8 fields examined in Man. (W.A.F. Hagborg).

STRIPE BLIGHT (Pseudomonas striafaciens). A mod. infection was recorded in one of the 42 fields examined in s. Alta. (J.T.S.).

CROWN RUST (Puccinia coronata). Infection was 2-tr./42 fields examined in s. Alta. and 5-tr. 4-sl./248 in central Alta. (J.T.S., W.P.C.). Crown rust was unusually widespread and sev. in Sask. and was found as far west as Scott in w. central Sask.; infection was 7-tr. 9-sl. 5-mod. 13-sev./43 fields examined (H.W. Mead). A heavy infection of crown rust was observed on Rodney at Kemptville, Ont. No other heavy infections were noted on this variety (J.A. Dawson). Infection was 8-tr. 6-sl. 9-mod. 17-sev. on the 40 farms visited in late August in Temiscouata Co., Que. (D. Leblond). Infection was generally light (tr.-5%) in most fields in Kings and Lunenburg counties, N.S., in July (D.W. Creelman). A 10% infection was recorded on Abegweit in the plots at Charlottetown, P.E.I., on 30 Aug. (J.E. Campbell). See also Cereal Rusts in Western Canada and Rust Nurseries.

STEM RUST (Puccinia graminis). Infection was 8-tr. 9-sl. 2-mod./42 fields examined in s. Alta. (J.T.S.). Infection was 34-tr. 40-sl. 50-mod. 41-sev./248 fields examined. The rust was confined to central Alta. and the heavily rusted fields were mostly e. and s.e. of Edmonton. It was particularly severe in mature fields of Victory (W.P.C.). Stem rust was unusually prevalent in central Alta. causing appreciable losses in some fields. Numerous specimens and reports received from points around Edmonton, Bretona, Stony Plain, etc. (A.W. Henry). Stem rust was recorded in 39/43 fields in Sask. as follows: 11-tr. 10-sl. 12-mod. 6-sev. Some late fields were destroyed by stem rust in late August. The rust was very severe on wild oats in many areas (H.W. Mead). See additional reports on wild oats in Section II under Avena fatua, also Cereal Rusts in Western Canada.

Stem rust was recorded on 30/40 farms visited in Temiscouata Co., Que.; infection was 23-tr. 7-sl. (D. Leblond). Infection was generally light in

Kings and Lunenburg counties, N.S.; a 10% infection was noted in a field at New Germany, Lunenburg Co. (D.W. Creelman). Stem rust caused mod. damage to Abegweit in the plots at Charlottetown, P.E.I.,; it was also heavy on Clinton. The red stage was noticeable on the leaves in a field at Sherbrooke, Prince Co., on 3 Aug.; damage would probably be sl. (J.E. Campbell, R.R. Hurst). See Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria avenae). Infection was 29-tr. 92-sl. 11-mod. in 132/248 fields examined in central Alta. and the Peace River district (W.P.C.). A sl. infection was recorded in 2 fields in the Bethune area out of 43 examined in Sask. (H.W.M.). The disease was recorded in 3 fields in Man.; tr. infection at Macdonald, sl. at Winnipeg, and mod. at Swan River (T. Johnson).

The leaf blotch and black stem phases of the disease were quite prevalent on oats in the Ottawa area, Ont. in 1955. The very dry weather during July and August tended to retard the development of the black stem phase and less lodging occurred than in 1953 or 1954. The seed blight phase was also quite prevalent, resulting in conspicuous darkened areas on the lemma and palea of the seed. Very sev. infections were noted on Rodney and Roxton particularly where the stand was luxuriant as on soils high in nitrogen. In some fields 50-80% of the leaf area was covered by disease lesions.

Septoria leaf blotch was also widespread in other provinces in Eastern Canada including the Maritimes. Leaf lesions were found in every field visited in early August. Fields in potatoes the previous year were frequently observed to be more sev. infected than those in hay or grain in 1954. No estimate of damage was attempted (F.J. Zillinsky).

In Temiscouata Co., Que., where 40 farms were visited, infection was 4-sl. 22-mod. 14-sev. (D. Leblond). This disease caused mod. damage to Abegweit in the plots at Charlottetown, P.E.I. A few other fields were seen in Queens Co., where infection was mod. to sev. and some lodging had occurred (J.E. Campbell, R.R. Hurst). See also Rust Nurseries.

The observations of Zillinsky confirm the findings of an earlier survey by R.A. Derick (Plant Dis. Reptr. 38:85-87. 1951). However, neither author mention the occurrence of leaf blotch (Helminthosporium avenae). The leaf symptoms of these two diseases can be readily confused as I know from personal experience. However, in 1939, after careful scrutiny of a wealth of specimens, it was concluded (P.D.S. 19:19) that, "In Que. and P.E.I. both diseases were fairly prevalent but leaf blotch was in general more severe than speckled leaf blotch. In N.B. and N.S. both diseases were about equally prevalent, being quite sev. in some fields in the former province." The situation, no doubt, has radically changed but these early observations in the Maritimes suggested that H. avenae may be an important seedling blight pathogen in cool wet springs and on one occasion (P.D.S. 22:8) its occurrence as a seedling pathogen was demonstrated (I.L.C.).

SMUTS (Loose Smut, Ustilago avenae and Covered Smut, U. kolleri). Smut infection was 7-tr. 3-sl./42 fields in s. Alta. Out of 248 fields examined in central Alta. and the Peace River district 36 were infected, 8 with infections

of 10-40%, av. infection o.8% (W.P.C.). Loose smut was observed in a single field in Sask., whereas covered smut was found in 9/43 with av. infection 1.5%. Covered smut appeared to be slightly less prevalent than last year (R.C. Russell). In Man. and e. Sask. a tr. of loose smut was recorded in 10 fields and tr.-1% of covered smut in 4 of the same fields out of 68 examined, with av. infection of 0.03%. The oat smuts have become relatively scarce in recent years as a result of the increased acreage of smut-resistant varieties (W. Popp). About 10% of the heads were affected by covered smut in a field at Marieville, Que. (R. Crete). A 1.5% infection of covered smut and a trace of loose smut were seen in a 2-acre field of Shefford at Ste. Anne de Bellevue (H. Genereux). In a survey of 40 farms in Temiscouata Co., covered smut infection was 5-tr. 17-sl. 3-mod. 2-sev. (D. Leblond). Tr. infections of loose smut were observed at Cambridge and Bridgetown, N.S. (D.W.Creelman), and at Sherbrooke, P.E.I. (J.E. Campbell).

BLAST (non-parasitic). Damage was 63-tr. 89-sl. 23-mod. 4-sev./290 fields examined in Alta.; it was less prevalent than last year (J.T.S., W.P.C.). Sl. damage was reported in 8/43 fields in Sask.; less blast was present than usual (H.W.M.). Damage was 13-sl. 18-mod. 9-sev./40 farms in Temiscouata Co., Que. (D. Leblond). Blast caused sl. damage at Sherbrooke and Charlottetown, P.E.I. (J.E. Campbell).

RED LEAF (virus). What was believed to be this disease affected several plants in a field near Holdfast, Sask. (H.W. Mead). Plants bearing purple-colored leaves were received from a farmer at Leask. Whether the coloration was due to phosphorus deficiency or the presence of a virus is unknown (T.C. Vanterpool).

RED LEAVES (associated with aphid injury). Infection was 2-tr. 3-sev. in s. Alta. (J.T. Slykhuis).

BARLEY

ERGOT (Claviceps purpurea). A sl.-mod. infection occurred in the varieties Brant, Fort, Herta, Len. 19, M.C. 5540, Montcalm and O.A.C. 21 in the Quebec Seed Board plots at St. Ambroise, Chicoutimi Co., Que. (D. Leblond). A tr. was observed in one field in Queens Co., P.E.I. (R.R. Hurst). See Ergot Survey.

POWDERY MILDEW (Erysiphe graminis). Infection was 1-tr. 1-sl./59 fields examined in s. Alta. (J.T.S.).

HEAD BLIGHT (Fusarium spp.) was fairly common on several hybrid barley lines at the Farm, Charlottetown, P.E.I. (R.R. Hurst).

STRIPE (Helminthosporium gramineum). A trace was seen in a single field in s. Alta. (J. T. S.). Infection was 2-tr. 1-sl. 2-mod./241 fields in central Alta. (W. P. C.).

SPOT BLOTCH (Helminthosporium sativum) was recorded in only 4 fields in tr. amounts in Alta. (J. T. S., W. P. C.). A trace was present on half the leaves in a field at Swan River, Man. (W. L. Gordon).

When sheaves of barley and rye grown at Fort Chimo, Que., were examined in the Cereal Crops Division at Ottawa it was found that none of the varieties were fully mature when harvested and some superficial mold was present because of their green condition when packed. In addition, some leaf spotting was present particularly on the lower leaves. Representative material was collected for examination in the Botany and Plant Pathology Division. In the 9 samples examined a parasitic fungus, Helminthosporium sativum, was detected in one of Olli barley. Saprophytic species found were: Acremoniella atra, Alternaria tenuis, Cladosporium cladosporioides,* Mycosphaerella tassiana (=. M. tulasnei), Penecillium spp. and Tricothecium roseum (A. E. Hannah, Mary E. Elliott).

* Although this binomial has not appeared previously in the Plant Disease Survey, the fungus has been known for some time as C. herbarum. Bisby (Trans. Brit. Myc. Soc. 27:101-112. 1944) had carefully described the fungus under the latter name from his "standard" culture. However, G. A. de Vries (Contribution to the Knowledge of the Genus Cladosporium Link ex Fr. Baarn, 1952, pp. XVI and 121) has shown that there occur two distinct species, C. herbarum and C. cladosporioides (Fres.) de Vries (Hormodendron cl. (Fres.) Sacc.). "Cladosporium herbarum is together with C. cladosporioides the commonest Cladosporium on dead organic material. Both species often occur side by side or mixed together on the same substrate". The conidia of C. herbarum are "more or less verrucose, with usually low warts (sometimes only visible when the conidia are observed in air bubbles), pale brown to brown, 1-celled, (1)4.5-11(19) x (2)4-5(7) microns, 2-celled conidia (about 1%) (5)9-15(20) x (3)4-7(8) microns, oval, elliptical, oblong, with or without constrictions at the septa, more cylindrical and 3-4-celled towards the proximal end of the chain, with one or more hila." The conidia of C. cladosporioides are "smooth or very finely verrucose, which is only visible with an oil immersion lens, pale brown, 1-celled, ovate, oval, limoniform, elliptical, slightly tapering at one or both ends, more cylindrical and often 2- to 3-celled towards the bottom of the chain, with one or more hila."

(Footnote continued on p. 12)

HEAD BLIGHT (Helminthosporium sativum) was quite general in a field in Queens Co., P.E.I. (R.R. Hurst). In a head submitted some of the spikelets were discolored and numerous minute lesions occurred on the awns. When portions of the head were incubated in a moist chamber, H. sativum fruited on the lesions (Mary E. Elliott). About 20% of the heads were slightly affected in a plot of Charlottetown 80 at the Farm, Charlottetown, P.E.I. (J.E. Campbell).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 86-tr. 98-sl. 20-mod. 9-sev./300 fields examined in Alta.; it was slightly less prevalent in s. Alta. than in the rest of the province (J.T.S., W.P.C.). An average disease rating of 9.6 was obtained from an examination of 30 fields in Sask. (B.J. Sallans).

NET BLOTCH (Helminthosporium teres). Infection was 12-tr. 9-sl. 2-mod./59 fields in s. Alta. (J.T.S.) and 26-tr. 75-sl. 34-mod. 7-sev./241 fields examined in central Alta. and the Peace River district. The disease was present wherever barley was grown (W.P.C.). During a special survey of 84 fields n.w. of Edmonton 11-12 July about 80% of the fields were found affected (W.P. Skoropad). Infection was 1-tr. 9-sl. 4-mod. 6-sev./43 fields examined in Sask. The disease occurred in most areas where barley is grown and infection was heavier than 1954 despite the drier season (H.W. Mead). Diseased specimens were received from Prince Albert and Hudson Bay Junction and mod.-sev. infections were observed 12 Aug. on a brief survey w. and s.w. of Saskatoon (T.C. Vanterpool). Infection was 1-tr. 1-sl. 4-sev./12 fields examined in Man. (W.A.F. Hagborg, J.E. Machacek). A 25% infection was noted on Charlottetown 80 in the plots at Charlottetown, P.E.I. (J.E. Campbell).

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* He lists the differences between the two species as follows: "C. herbarum differs from C. cladosporioides by the following characters: 1. the much rougher conidial wall; 2. the larger measurements of the conidia, especially the larger diameter; 3. the greater number of 2- to more-celled conidia; 4. the presence of inflations on the conidiophore at the place where conidial chains arise; 5. the formation of prolongations of the conidiophore after 7 days; 6. the usually more abundant sterile aerial mycelium, especially when young cultures are compared; 7. the smaller diameter of the conidial heads (18-85 microns vs. 50-113 microns in diam.); 8. the smaller number of conidia per conidial head (100 vs. 300 densely crowded when head fully developed); 9. the usually less extensive branching of the chains." Cladosporium graminum Link is a later synonym of C. herbarum and Heterosporium maculatum Klotzsch is probably the same fungus.

It may be noted that Mycosphaerella tassiana (de Not.) Joh. (M. tulasnei (Jancz.) Lindau) has been shown by three authors to be the perfect state of C. herbarum. According to de Vries, Janczewski, the first to demonstrate the connection, stated that Hormodendron cladosporioides (C. cl.) "never produced any perfect stage in his culture experiments." M. tassiana is already known to be a common saprophyte on many plants in northern latitudes (cf. J. Lind, abstr. in R.A.M. 3:687. 1924) (I.L.C.).

TAKE-ALL (Ophiobolus graminis). Damage was 4-tr. 2-sl. in n. central Alta. (W.P.C.).

STRIPE RUST (Puccinia glamarum). A trace was recorded in 2 fields in s. Alta. (J.T.S.).

STEM RUST (Puccinia graminis). Infection was 12-tr. 3-sl./59 fields in s. Alta. (J.T.S.); a trace was also noted in 10 fields in central Alta. (W.P.C.). Infection was 19-tr. 9-sl. 1-mod./43 fields examined in Sask.; damage was probably negligible. Common on barley at Saskatoon on 25 July (H.W. Mead). See also Cereal Rusts in Western Canada and Rust Nurseries.

LEAF RUST (Puccinia hordei). A trace was found in one field in s. Alta. (J.T.S.) and a sl. infection in one nr. Tofield in central Alta.(W.P.C.). Infection was 10-tr., 1-sl. 1-mod./43 fields examined in Sask.; the very light infection occurred mostly in w.-central Sask. (H.W. Mead). A sl. infection was noted on Charlottetown 80 in the Farm plots, Charlottetown, P.E.I., on 30 Aug. (J.E. Campbell). See Cereal Rusts in Western Canada.

SCALD (Rhynchosporium secalis). Infection was 7-tr. 5-sl. 3-mod./59 fields in s. Alta. (J.T.S.) and 40-tr. 36-sl. 28-mod. 17-sev./241 fields examined in central Alta. and the Peace River district. The disease appeared to be most sev. in fields on the black soils of the province (W.P.C.). In Sask. a trace was seen in 3/43 fields examined (H.W. Mead).

SPECKLED LEAF BLOTCH (Septoria passerinii). Infection was 2-tr. 3-sl./59 fields in s. Alta. (J.T.S.) and 18-tr. 108-sl. 65-mod. 37-sev./241 fields examined in central Alta. and the Peace River district (W.P.C.) This leaf blotch was only recorded in 5/43 fields examined in Sask.; infection was 5-sl. and 2-mod. (at Rosetown in w. central Sask.). It was also present in the Kelvington district (H.W. Mead). In 1955 barley in Man. was attached heavily by S. passerinii. This epidemic was probably more severe than any previous outbreak. The heaviest infections were observed in s. Man., especially in the Red River Valley, but heavily infected fields were found as far n. as Minnedosa and Russell. N. of the Riding Mountains infections were comparatively light. In the 29 fields examined in Man. infection was 3-tr. 2-sl. 10-mod. 10-heavy and 4-very heavy (G.J. Green).

COVERED SMUT (Ustilago hordei). Infection was 4-tr. 1-sl./59 fields in s. Alta. (J.T.S.). Covered smut was recorded in 18/241 fields examined in central Alta. and the Peace River district; maximum infection 15%, av. 0.8% (W.P.C.). Infection was 1-5% in fields examined around Fort Saskatchewan and about 25% of the heads were affected in a field nr. Stony Plain (A.W. Henry). Covered smut was observed in 12/40 fields examined in Sask.; average infection 0.5%. This smut appeared to be a little lighter than usual (R.C. Russell). In a survey of 95 fields in Man. and e. Sask. covered smut was found in 15; maximum infection 7%, av. 0.3% (W. Popp). A light infection was noted in barley in a field of mixed barley and oats at Grahams Road, Queens Co., P.E.I. (J.E. Campbell).

LOOSE SMUT (Ustilago nuda). Infection was 2-tr. 1-sl. 2-mod./59 fields examined in s. Alta. (J.T.S.). Loose smut was recorded in 110/241 fields examined in central Alta. and the Peace River district; in 9, infection was 10-40%. Average infection in all fields was 1.1% (W.P.C.). In several fields around Fort Saskatchewan 1% or more of the plants were affected (A.W. Henry). Loose smut was recorded in 20/41 fields examined in Sask. with an average infection of 0.6%. Despite several wet seasons recently, loose smut does not appear to be more prevalent than formerly (R.C. Russell). During a survey of 95 fields in Man. and e. Sask. true loose smut was found in 66 with maximum infection 12%, and av. infection 0.7%; false loose smut (U. nigra) was found in 20 with maximum infection 7%, av. infection 0.4%. One or more of the three smuts was found in 80% of the fields inspected. About half of the total infection was caused by true loose smut and the other half by the two seedling-infecting smuts, covered smut and false loose smut. Though widespread, loose smut infection was only about half as great as in 1954. This comparatively light infection was probably due to unfavorable weather conditions, as the highly susceptible varieties Montcalm and O.A.C. 21 are still widely grown (W.Popp). It should be noted that no attempt was made in Sask. or Alta. to distinguish between true and false loose smut; it is highly probable that some of the high infections of loose smut recorded in Alta. are the latter smut (I.L.C.)

BACTERIAL BLIGHT (Xanthomonas translucens). Infection was 1-tr. 1-sl./59 fields in s. Alta. and 5-tr. 4-sl. 2-mod. on heads and 1-tr. 1-mod. on leaves in fields in central Alta. (W.P.C.). Infection was 2-tr. 2-sl. 2-mod. 1-sev./9 fields in Man. (W.A.F. Hagborg).

FALSE STRIPE (virus) was found in 4/59 fields examined in s. Alta.; infection was 2-tr. 2-sl. The disease affected a few to over 50% of the plants in some lines of barley grown in the cereal crop nurseries at Lethbridge; several varieties that showed traces this year were apparently free from symptoms in 1954 (J.T. Slykhuis).

YELLOW DWARF (virus). Symptoms similar to those described in the literature for yellow dwarf were observed on barley in s. Alta. in a number of fields where aphids had occurred in noticeable numbers. Out of 59 fields surveyed yellowed plants were observed, in 20 to the extent indicated: 9-sl. 6-mod. 5-sev. Ten experiments have been conducted to determine whether aphids collected from various barley fields were carrying the yellow dwarf virus. In 3 of these experiments, 2 of the barley varieties used as test plants developed symptoms comparable to those described for the barley yellow dwarf virus, but in the other 7 experiments there was no indication of barley yellow dwarf in the test plants (J.T. Slykhuis).

Besides the observations on leaf diseases recorded above and in the Rust Nurseries (q.v.) the results of a special survey by H.A.H. Wallace on "Barley Leaf Diseases in Western Canada in 1955" have been summarized.

A survey of 157 barley fields in Man., Sask. and Alta. for foliage diseases of barley revealed that 90, 65 and 56% of the fields in the respective provinces carried a light to heavy infection by one or more diseases. The lighter infection in Alta. may be due to the fact that the crop was sown later than elsewhere and was therefore at a less mature stage of development when the notes were taken. The leaf spots caused by Helminthosporium spp. (mostly H. teres) occurred in light to heavy amounts in 84, 53, and 11% of the fields in Man., Sask. and Alta., respectively. In Alta. 40% of the fields showed light to heavy infection by Scald (Rhynchosporium secalis), but the disease was difficult to find except in trace amounts in farmers' fields in Sask. and Man. Speckled Leaf Blotch (Septoria passerinii) occurred in traces everywhere but in light to heavy amounts only in 11% of the fields in Man.

The Western Barley Co-operative Test was marked for disease at 13 stations. Brown Spot, a physiologic condition, was light to heavy on Leth. 27 at all stations, indicating that this condition was carried by the seed and is probably a genetic weakness. Leth. 23 was also lightly affected. A light infection of Scott 169 by Xanthomonas translucens at most stations and a light infection of U. M. 256 with False Stripe (virus) indicated that these diseases were present in the seed used in the test. Although difficulty was encountered in differentiating the leaf spots caused by Helminthosporium sativum and H. teres, the latter organism appeared to predominate and account for the varietal reaction: Vantage, susceptible; Montcalm, mod. susceptible; O.A.C. 21 and Husky, fairly resistant. Br. 4417 and Herta showed greatest resistance.

Speckled Leaf Blotch was fairly sev. at Brandon, but a light infection occurred in the plots at Melita, Man., and Saskatoon, Melfort and Tisdale, Sask. Br. 4417 was susceptible, O.A.C. 21 mod. susceptible, while Montcalm, Husky and Vantage seemed to have some resistance; Leth. 27 showed appreciable resistance.

Scald was heavy at Lacombe, Alta., fairly heavy at Swift Current, Sask., and light infections were present as far east as Tisdale. U. M. 584 was most susceptible whereas Vantmore, Scott 169, Leth. 23 and Leth. 27 showed marked resistance to the disease.

Resistance to one or more diseases can often be traced to parental varieties. For example, Glacier, which is resistant to Scald is a common parent of Scott 169, Leth. 23 and Leth. 27. Light infections by Leaf Rust and Powdery Mildew at Morden indicated that Br. 3902 was susceptible to the former and U. M. 570 and Br. 3902 to the latter. Possibly on account of the large number of varieties and crops grown at experimental stations, it is possible to find more diseases and usually heavier infections at these stations than in farmers' fields.

RYE

ERGOT (Claviceps purpurea). Traces were recorded on winter rye at Kentville, Kings Co., and Hebbville, Lunenburg Co., N.S. (D.W.Creelman). A few heads bearing ergots were noted in Prolific in the rust nursery plots at Charlottetown, P.E.I. (J.E.Campbell). See Ergot Survey for its occurrence in the Prairie Provinces.

POWDERY MILDEW (Erysiphe graminis). A trace was seen in 1/8 fields of winter rye examined in s. Alta. (J.T.S.).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 5-tr./8 fields of winter rye in s. Alta. (J.T.S.). Infection was 2-tr. 4-sl. 1-mod./11 fields of rye examined in central Alta. and the Peace River district (W.P.C.).

STEM RUST (Puccinia graminis). A tr. was found in a single field nr. Alliance in central Alta. (W.P.C.). A very light infection was recorded in 3 fields in n.w. Sask. (H.W. Mead).

LEAF RUST (Puccinia secalina). A trace was found in 2/8 fields of winter rye in s. Alta. (J.T.S.). Infection was mod. to heavy in a field at Ste. Rose du Lac, Man.; a trace also occurred in one at Sidney (W.L. Gordon).

SPECKLED LEAF BLOTCH (Septoria secalis). A trace was recorded in 3/8 fields of winter rye in s. Alta. (J.T.S.). Infection was 2-tr. 5-sl./11 fields examined in central Alta. and the Peace River district (W.P.C.).

STEM RUST (Urocystis occulta). Infection was 1-tr. 1-mod./8 fields of winter rye in s. Alta. (J.T.S.).

CEREAL RUSTS IN WESTERN CANADA IN 1955

B. Peturson and T. Johnson

Cereal rusts overwintered abundantly in Texas during the winter of 1954-55, and subsequent spread during the early spring was rapid. The threat posed by this situation was reduced by severe frosts, which struck n. Texas and Oklahoma 20-26 March, and was further reduced by the disastrous drought that followed in much of the s. part of the winter wheat belt. Despite the rather slow spread of rust in April and May enough rust had developed in parts of Texas and in the e. parts of Oklahoma and Kansas to make possible a very considerable northward movement of rust spores by the end of May. These spores, brought in by persistent s. winds that blew from Texas northward across the Great Plains area of the U.S. and Canada, 30 May - 1 June were deposited chiefly over the eastern Dakotas, Man. and, to a lesser extent, e. Sask.

These spore showers, containing both stem rust and leaf rust, but principally the latter, initiated both stem and leaf rust, which became evident as scattered infections on wheat in s.-e. Man. during the third week in June. The initial spore shower in 1955, was relatively light as compared with the first important spore movement in 1954, which took place 4-8 June and deposited rust spores over large areas of Man. and Sask. Furthermore, the spore movement in 1955 was centered on Man. whereas, in 1954, the spore