I. DISEASES OF CEREAL CROPS

WHEAT

BLACK MOULD (Cladosporium herbarum and Alternaria tenuis). The standing crop of spring wheat was affected in many fields in s. Alta. in September; heads, culms, and leaves were darkened (M. N. Grant). Fields similarly affected were observed in Sask., but it was attributed primarily to adverse weather conditions (q. v.) during the growth of the crop and later (H. W. M.). Adverse weather after the crop was ripe caused much weathering and mouldiness in both standing and swathed grain in Man. A large proportion of the kernels of wheat, oats, and barley were found to be darkened upon threshing. In wheat, discoloration was confined mostly to the brush as a result of accumulated spores and mycelium of Alternaria and Cladosporium. In oats and barley the discoloration was more diffused over the whole seed. Grain containing such discoloured kernels was described as "mildewed" by the grain inspectors and degraded. The loss to the farmers is expected to be heavy (J. E. Machacek).

ERGOT (Claviceps purpurea) infection was 26-tr. 1-sl. 2-mod. / 496 fields of spring wheat examined in Alta. (T. R. D., M. N. G.). Ergot was reported to have affected 10% of the heads in a field at Rhein, Sask. About Unity, farmers reported severe and general ergot and claim its absence before the advent of 2,4-D. Tr.-sl. infections were recorded from Laird and Dalmeny. The relatively high percentage of ergot in wheat, especially in the park belt, is an interesting problem. It was much more severe in the University plots than usual (T. C. Vanterpool). Infection was 2% in Redman and R. L. 2573 and traces in Regent, R. L. 2607 and 2622 (A. Payette); and 10% in Red Bobs in the smut trials at Ste. Anne de la Pocatiere, Que. (R. O. Lachance).

ANTHRACNOSE (Colletotrichum graminicola). A trace was found on Thatcher at Russell, Man.; a sl. discoloration of the glumes was caused by rows of fruiting acervuli (W. A. F. Hagborg).

POWDERY MILDEW (Erysiphe graminis). Infection was: 11-tr. 2-sl. 2-mod. / 496 fields of spring wheat and 4-tr. /38 fields of winter wheat in Alta. (T. R. D., M. N. G.); mod. on the winter wheats Cornell 595, Rideau, and Dawson's Golden Chaff and on several spring wheats in the plots at Ottawa, Ont. (R. V. Clark). See also under Rust Nurseries.

HEAD BLIGHT (Fusarium spp. and Helminthosporium sativum). Infection was moderate in the samples examined. The organisms isolated from each variety and place were: Ont. - St. Catharines, Lee, F. culmorum and Redman, F. poae and F. equiseti. N.S. - Pictou, Little Club, F. avenaceum; Marquis, F. avenaceum, H. sativum; Redman, F. avenaceum, F. Poae, H. sativum; Thatcher, H. sativum; Nappan, Marquis and Mindum, F. avenaceum, H. sativum; and Thatcher, H. sativum (W. L. Gordon). Sl. infection at Edmonton (A. W. Henry).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 231-tr. 115-sl. 12-mod. 6-sev. /501 fields of spring wheat and 11-tr. 12-sl. 1-mod. 1-sev. /38 of winter wheat examined in Alta. (T. R. D., M. N. G.).

Common root rot was as prevalent in Sask. as in 1949 and was more severe than in 1950. The mean disease rating for 186 fields in 1951 was 13.66. The standard deviation, 8.56, was much greater than usual, indicating widely varying degrees of infection from place to place. The coefficients of variability were particularly high for crop districts 1, 5, 8, and 9, which are in the park belt or black soil zones. The disease ratings for crop districts 1 to 9 were 13.9, 15.9, 16.9, 18.8, 11.0, 13.6, 14.3, 10.5, and 9.9. First estimates of yield for the respective districts were 20, 17, 15, 15, 24, 22, 22, 26, and 22 bu. per acre. The usual strong negative correlation between disease rating and yield, which was -0.901 in 1951, is evident from the data (B. J. Sallans). A trace was present in several varieties in the plots at Ottawa, Ont. (R. V. Clark).

R. D. Tinline (Can. Jour. Bot. 29:467-478. 1951) reports the development of Cochliobolus sativus (Ito & Kurib.) Drechsler ex Dastur in appropriately paired cultures of Helminthosporium sativum. Monoconidial isolates are hermaphroditic and self-sterile and fall into two groups that are intrasterile and interfertile. Pairing of isolates from Sask. to N. S. in Canada and from Wisconsin with test strains proved the two groups to be widely distributed. As only single monoconidial isolates were tested from each place, it is not known whether the two groups occur in the same plant or field or the isolates regularly tend to belong to one or other group (see W. L. Gordon under Fusarium Dry Rot of Potato) (I. L. C.).

TAKE-ALL (Ophiobolus graminis). Infection was 29-tr. 15 sl. 6-mod. 3-sev./499 fields of spring wheat examined (T. R. D., M. N. G.). Take-all, which was found in 34% of the fields examined, was more prevalent than usual, infections being tr-sev. The pathogen also fruited more freely than usual (A. W. Henry). Infection was 3-tr. 1-sl. 1-mod. 1-sev./34 fields of winter wheat examined in southern Alta.; the sev. infection was found at Del Bonita on 16 Aug. (P. M. Halisky). Infection was 6-tr./186 fields in Sask. on the regular survey (H. W. M.). Additional records in the field or from specimens showed tr.-sl. infection. Specimens from Mildred were from a third consecutive crop of wheat after breaking (T. C. V.). Affected fields were mostly in w. central, but some in s. w. Sask. (I. L. C.).

J. A. von Arx and Dorthea L. Olivier (Trans. Brit. Myc. Soc. 35:29-33. 1952) report that the take-all pathogen is not a true Ophiobolus, but belongs in the Diaporthaceae-Gnomoniaceae, of which Linospora is a well-known genus, whereas Ophiobolus belongs in the Pseudosphaeriales. They therefore have erected the genus Gaeumannomyces and propose the new binomial G. graminis (Sacc.) v. Arx & Olivier (I. L. C.).

BASAL GLUME ROT (Pseudomonas atrofaciens). Tr. infection in single fields at Beaty (n. e.), and Rama (e. central), Sask. (H. W. M.). Infection tr. at Portage la Prairie, and sev. at Pulp River, the latter being the severest infection ever observed in Man. In this field every kernel was infected in some heads. The pathogen was also isolated from lemmas and empty glumes (W. A. F. Hagborg).

STRIPE RUST (Puccinia glumarum). Sl. infection in one field in s. Alta. (M. N. Grant).

STEM RUST (Puccinia graminis) was not found until late in the season in Alta. The first infection was found on 7 Sept. on Jones' Fife at Cardston. Infection was 5-tr. 1-sl./34 fields of winter wheat and 18-tr. 8-sl. 5-mod. 3-sev./511 fields of spring wheat examined. At Barons, in s. Alta., infection was tr. on Red Bobs on 12 Sept. and mod. on Lehmi at Brooks. A mod.-sev. infection developed on winter wheat and several susceptible varieties of spring wheat in the Univ. plots at Edmonton and tr.-sl. infection in a few fields of Red Bobs, 15 mi. e. of the city. Elsewhere east to the Sask. boundary and south to Drumheller only a tr.-sl. infection was present in a few fields of Red Bobs. One of Canus and another of Red Bobs near Drumheller were moderately infected. Thatcher, the common variety in the area, was free from infection (G. B. Sanford, M. N. Grant).

Stem rust infection was 21-tr. 21-sl./186 fields in Sask. Almost all the fields were in s. central and s. e. areas and a few in e. central Sask. Both durum and common wheats including Thatcher were affected (H. W. M.).

Stem rust infection was very light throughout Que. (R. O. Lachance). Only traces of stem rust were found on a survey from Salmonhurst to Fredericton, N. B. (J. L. Howatt). For general review of stem rust, see under Rust Nurseries.

LEAF RUST (Puccinia triticina) infection was 5-tr. 5-sl. 2-mod./34 fields of winter wheat in s. Alta. Rust was also sev. at Creston, B. C., on 27 July (M. N. Grant). Infection was 98-tr. 88-sl. 76-mod. 47-sev./509 fields of spring wheat in Alta. (T. R. D., M. N. G.). Traces were present by mid-August in s. Alta., increasing to mod. infection by September (M. N. Grant). In central Alta. infection was sev. in quite a few fields (A. W. Henry). Infection was 22-tr. 43-sl. 29-mod. 23-sev./186 fields in Sask. Leaf rust was widespread and probably caused some loss in yield (H. W. M.).

Infection was sl. on winter wheat and mod.-sev. on spring wheat in the plots at Ottawa, Ont. (R. V. Clark). Leaf rust was tr.-sev. depending on the variety in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). See also under Rust Nurseries.

SPECKLED LEAF BLOTCH (Septoria avenae var. triticea). Infection was 135-tr. 134-sl. 49-mod. 14-sev./505 fields in Alta. (T. R. D., M. N. G.). This infection is noticeably heavier than last year (I. L. C.). On winter wheat, infection (S. ?tritici) was 5-tr. 3-sl./38 fields (M. N. G., T. R. D.). Infection was 11-tr. 11-sl. 14-mod. 11-sev./186 fields in Sask.; it was widespread over e. Sask., the western boundary being through Prince Albert, Davidson, Kennedy and Alameda. Mod.-sev. infections centred about Whitewood, Yorkton, Canora, Wadena, Vonda, Star City and Smeaton (B. J. Sallans). Sl. infections were found at Portage la Prairie, Lena, Pine River and Dauphin, Man. (G. J. Green).

GLUME BLOTCH (Septoria nodorum). A tr. was found in a field at Rimby, Alta., in winter wheat. Infection was 112-tr. 27-sl. 17-mod. 3-sev./370 fields of spring wheat in central and n. Alta. The disease was much more prevalent than usual in 1951 (T. R. D.). Tr.-sev. infection was present from Dundurn to Unity and north to Mildred and Snowden (H. W. M.). A sl. infection was noted at Kenville, Man.; the pathogen was isolated from discoloured heads (W. A. F. Hagborg, G. J. Green). See also under Rust Nurseries.

BUNT (Tilletia caries and T. foetida). The data here presented (Table 1) were obtained from the records of the Board of Grain Commissioners. The percentage of cars graded smutty during the first quarter of the present crop year is unusually low, and the figure for the previous crop year is lower than was to be expected from the data for the first quarter, reported last year.

Table 1. Wheat Bunt in Western Canada

Class of Wheat	Aug. 1, 1950 to July 31, 1951			Aug. 1, to Oct. 31, 1951		
	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	172,161	277	0.16	62,029	55	0.09
Amber Durum	9,418	16	0.17	2,146	4	0.19
White Spring	299	0	0.00	31	0	0.00
Alberta Red Winter	710	34	4.79	237	7	2.95
Garnet	1,794	0	0.00	308	0	0.00
Mixed Wheat	563	2	0.36	174	0	0.00
All Classes	184,945	329	0.18	64,925	66	0.10

F. J. Greaney, in Seedtime & Harvest No. 270, 28 Feb. 1952, points out the need for more seed treatment. Out of 11,993 wheat samples of the 1950 crop tested by the Line Elevators Farm Service, 46% were found to be contaminated with bunt spores, of which 1% contained bunt balls. The corresponding figures for oats were: carrying smut spores 73.5%, with smut "balls" 6%; barley: with spores 89.2%, with smut "balls" 24.2%. There has been some improvement in the percentage of samples free from smut since 1946 (see P. D. S. 27: 6), but the figures for the three crops are still very high. The high percentage of barley samples carrying undispersed masses of spores points to the need of most careful cleaning and treating of barley seed if a crop free from smut is to be harvested (I. L. C.).

Bunt infection was 2-tr. 9-sl. 1-mod. 2-sev./34 fields, or 41% of those examined, in s. Alta. In spring wheat, 4 carried 1-5% and one 10% out of the 126 fields examined (M. N. Grant). Infection was tr.-4% in the 15 affected out of 187 fields examined in Sask. (H. W. M.). No bunt was found in the 75 fields examined in Man. during the 1951 cereal smut survey (W. J. Cherewick, W. Popp). A trace of bunt (T. caries), was found in a field at Luceville, Rimouski Co., Que. (R. O. Lachance).

LOOSE SMUT (Ustilago tritici). Infection was 5-tr. 3-sl./496 fields of spring wheat examined in Alta. (T. R. D., M. N. G.). As usual, loose smut was rarely seen in wheat (4 out of 187 fields) in Sask. and usually only a trace was present (H. W. M.). In 75 fields surveyed in Man. infection was 0-3%, av. 0.13% (W. J. Cherewick, W. Popp). A trace was recorded in a few varieties of winter wheat in the variety plots at Ottawa, Ont. (R. V. Clark) and 12% infection in Huron at Ste. Helene, Kamouraska Co., Que. (R. O. Lachance).

BACTERIAL BLACK CHAFF (Xanthomonas translucens). Infection was 16-tr. 1-sl./126 fields of spring wheat examined in s. Alta. (M. N. Grant). The disease was common in fields of Thatcher and Saunders in central Alta. (A. W. Henry). Long water-soaked streaks were observed on the leaves in a field at Dodsland, Sask. (T. C. Vanterpool).

GLUME BLOTCH (non-parasitic). Injury was 4-tr. 3-sl./126 fields of spring wheat in s. Alta. (M. N. Grant).

HEAT INJURY. The outstanding crop trouble in 1951 was the poor filling of wheat heads. The disorder was general and extended from Man. across Sask. to Alta., causing widespread damage. In some areas, whole fields were more or less affected; in other districts, the injured plants occurred in irregularly-shaped patches in the field. Yields of affected fields were sharply reduced; in one field, where careful measurements were made, the yield in the affected areas was but one half that of the normal crop.

The trouble was caused by a complex of factors, the chief of which was the weather. Subnormal temperatures and evaporation rates and above-normal rainfall in June and July favoured a lush growth of the crop. However, a hot spell with long periods of sunshine 22-28 July caught the succulent growth at a critical stage in its development. The individual plants lost water rapidly and they suffered a set-back or retardation of growth. The injury was first noticed as a premature ripening of the plants, but the young developing ovaries had been damaged so that the heads were not filling properly. However other factors were operating. Firstly, in many of the affected fields, the injured plants were suffering more severely from root rot than the plants that had escaped. Secondly, in many fields, glume blotch and speckled leaf blotch (q. v.) were also active. Thirdly, in some fields, where excessive amounts of 2,4-D had been sprayed on the plants, the injury had been greatly intensified. Root rot may well have been present before the dry spell, the 2,4-D injury was already present, and blotch infections appeared soon after. Of the supplementary causes, root rot was the principal one. Areas with thin surface soil or with subsoil of poor structure were badly affected. In some localities, late-sown wheat was less affected than early-sown, probably because the former had not reached the critical stage of development before the dry spell.

After the injured plants began to show up, the weather continued moist and cool. In consequence the heads, leaves, and stems of plants already ripe or dead became covered with black mould.

Glume blotch caused much of the blotching and black streaks on the glumes. The disease was commoner and extended further south in Sask. this season than usual. Some growers confused the purple pigmentation of the culms, most pronounced in Saunders wheat, with this trouble. Heavy application of 2,4-D increased the purple coloration (T. C. Vanterpool, P. M. Simmonds).

Samples of wheat heads, in which kernel development had been arrested prematurely and which were later invaded or overgrown by weakly parasitic fungi, chiefly Alternaria tenuis, were received from Carman, Belleview, Russell,

Crandall and Oak River, Man. Where whole plants were submitted, rust and root rot did not appear to have been sufficiently severe to account for the damage. Examination of weather records for Cypress River, Brandon and Russell, located in the above area revealed that the daily maximum temperatures were almost continuously 90°F. or higher 23 July-1 Aug., reaching 103°F. at Brandon on 28 July. The mean precipitation 1 April-1 Aug. was 4.62 in., only 45% of the normal value. Drought and heat may well be the primary cause of the trouble (W. A. F. Hagborg).

OATS

ANTHRACNOSE (Colletotrichum graminicola) was fairly common on oats in central Alta. in 1951 (A. W. Henry).

POWDERY MILDEW (Erysiphe graminis). See under Rust Nurseries.

HEAD BLIGHT (Fusarium spp.). Beaver oats from Nappan, N.S., were severely infected; isolations yielded F. avenaceum, F. culmorum, and F. equiseti (W. L. Gordon).

COMMON ROOT ROT (Fusarium spp.). Infection was 15-tr. 2-sl./292 fields examined in Alta. (T. R. D., M. N. G.). Seedling blight was observed at Quill Lake, the soil being highly alkaline (T. C. Vanterpool.).

ROOT NECROSIS (Gloeosporium bolleyi Sprague, Phytopath. 38:135. 1948). The pathogen was isolated from specimens of several varieties in the plots at Ottawa, and its identity checked by Sprague. In his book, "Diseases of Cereals and Grasses in North America", pp. 289-292, he reports the fungus on 120 cereals and grasses over a wide area in the United States and, in Canada, on wheat in Man. "It is most prevalent on roots of grasses and cereals growing in crowded conditions in poor soils, especially sandy soils deficient in nitrogen" (R. V. Clark).

LEAF BLOTCH (Helminthosporium avenae). Infection was seldom more than a trace in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). In the Que. Seed Board Plots at 13 places, the average infection was 4-tr. 7-tr. 7-tr. plus, 1-sl. and 1-sl. plus; Erban seemed the most susceptible of the 16 varieties in the test (D. Leblond).

HALO BLIGHT (Pseudomanas coronafaciens). Infection was 154-tr. 61-sl. 14-mod. 1-sev./292 fields examined in Alta. (T. R. D.). Tr.-sl. infections were found at Brandon, Marquette, Poplar Point, and Rosenfeld, Man. The organism was isolated from the Marquette collection and its pathogenicity tested (W. A. F. Hagborg, A. M. Brown). Infection was a tr. in a field in Prince Co., P. E. I. (R. R. Hurst).

CROWN RUST (Puccinia coronata). A sl. infection was found in only a single field at Wadena, e. central Sask. (H. W. M.). Crown rust was virtually absent along the Lower St. Lawrence, the Gaspé and Lake St. John district, Que., although up to 75% was observed in a few varieties under test at Ste. Anne de la Pocatiere (R. O. Lachance). Infection was rarely more than a trace in the Q. S. B. plots (D. Leblond).

Early-sown oats escaped infection, but some late sowings were heavily rusted in N. B. (J. L. Howatt). Tr. infection recorded in one field in Kings Co., P. E. I. (J. E. Campbell). See also Rust Nurseries.

STEM RUST (Puccinia graminis). A very light infection was observed in 3 fields in s. e. Sask. (H. W. Mead). Stem rust infection was very light, if present, in e. Que. (R. O. Lachance), but it was mod. heavy on some varieties at Lennoxville (D. Leblond). At Nictaux, N. S., infection was very light in 2 fields of Ajax, but sev. in one of an unknown variety (J. F. Hockey). See also Rust Nurseries.

LEAF SPOT (Selenophoma donacis (Pass.) Sprague & Johnson var. stomaticola (Baeuml.) Sprague & Johnson, Mycologia 37:639. 1945). A single panicle of Avena fatua collected at Harptree, Sask., by B. Boivin shows linear discolorations, which were quite heavy on the panicle branches and here and there on the glumes. Examination revealed a Selenophoma which agreed closely with the above species. (See R. Sprague, Diseases of Cereals and Grasses, New York 1950, pp. 201-211). It should be noted the author of the trinomial is Bäumler (I. L. Conners).

SPECKLED LEAF BLOTCH (Septoria avenae). Infection was 52-tr. 24-sl. 11-mod. 2-sev./292 fields in Alta. (T. R. D., M. N. G.). Infection was mod. on several varieties at Kapuskasing and in the plots at Ottawa, Ont. The disease was severe about Kemptville, lesions on the culms apparently causing much of the crop to lodge (R. V. Clark). In the Q. S. B. plots infection was sl. -mod.; it was the most prevalent disease on oats in Que. (D. Leblond). See also Rust Nurseries.

SMUTS (Loose Smut, Ustilago avenae, and Covered Smut, U. kolleri). Infection was 19-tr. 18-sl. 8-mod. 3-sev./292 fields examined in Alta. (T. R. D., M. N. G.). In a limited survey, covered smut was present in 13 out of 29 fields examined in Sask.; infection was 0-25%, av. 2% (H. W. M.). In Man., 105 fields of oats were examined in the main grain-growing districts west of the Red River; infection of oat smuts was 0-6%, av. 1.0% (W. J. Cherewick, W. Popp). The oat smuts were common throughout e. Que., but infection was not as severe as usual (R. O. Lachance).

Infections ranging up to 5% were noted in Victoria, York, Sunbury, Kings, Albert and Westmorland Counties, N. B. Only traces were seen in Carleton Co., where a seed cleaning and treating plant is located (J. L. Howatt). Loose smut was recorded as sl. in a field in Kings Co., N. S. (R. G. Ross) and tr. in 11 fields examined across P. E. I. (R. R. Hurst).

BLAST (non-parasitic) was 137-tr. 113-sl. 22-mod. 4-sev./292 fields examined in Alta. (T. R. D., M. N. G.); 1-tr. 4-sl. 1-mod./28 fields in Sask. Blast was scarcer in 1951 than in other years (H. W. M.). Blast was a trace to sl. plus in the Q. S. B. plots (D. Leblond).

CHLOROTIC BANDING. Oat seedlings collected about 31 May at Mont Laurier, Que., showed on examination a single white lesion in the centre of the primary leaf (D. Leblond, I. L. Conners).

GREY SPECK (manganese deficiency). What appeared to be grey speck was observed in specimens received from Edmonton and the Peace River district, Alta. (A. W. Henry). Grey speck was severe in one large field at Spalding, Sask., near to one that was affected in 1949 and 1950 (T. C. Vanterpool). The disorder was severe in single fields at Portage la Prairie and Elm Creek, Man., with considerable loss in yield as a result. It should be noted no survey was made for the disorder in 1951 (W. A. F. Hagborg). Grey speck(?) was general in a single field at Cullodin, P. E. I. (R. R. Hurst).

PHOSPHORUS DEFICIENCY (?). Plants were found stunted and purple in a field near Watson, Sask.; soil was probably alkaline (T. C. Vanterpool).

BARLEY

ERGOT (Claviceps purpurea). Infection was 20-tr. 6-sl./289 fields examined in Alta. (T. R. D., M. N. G.). Out of 85 fields examined in central Alta., infection was tr.-10%. Reports from Camrose and Calgary indicated that infection was severe in those districts and resulted in considerable loss (A. W. Henry). Infected heads found in 3 fields in Sask. Although not common in farmers' fields, it is present in most experimental plots (H. W. M.).

POWDERY MILDEW (Erysiphe graminis). A trace was found in one field in Alta. (T. R. D.). See also Rust Nurseries.

STRIPE (Helminthosporium gramineum). Infection was 3-tr. 5-sl. 1-mod./228 fields examined in Alta. (T. R. D.). Stripe was rare in central Alta., but 5% of the plants were affected in one field (A. W. Henry).

SPOT BLOTCH (Helminthosporium sativum). Infection was 12-tr. 6-sl./61 fields examined in s. Alta. and 2-tr. 3-sl. 1-mod./228 fields in central and n. Alta. (T. R. D., M. N. G.). Infection was relatively light in a few fields (4/42 examined) in Man., where the disease was of little importance in 1951 (G. J. Green). A trace infection of spot blotch and root rot was observed in a field of Montcalm examined at Kapuskasing, Ont. The spots varied widely in size on the individual plants. In the variety plots at Ottawa infection was tr.-mod., symptoms varying widely (R. V. Clark). Infection varied from tr. to 35% in the plots at Ste. Anne de la Pocatiere, Que. (A. Payette). A sample of Hannchen sent 14 Sept. from Nappan, N. S., was found with very heavy infection on the nodes (R. V. Clark).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 88-tr. 46-sl. 6-mod. 2-sev./289 fields examined in Alta. (T. R. D., M. N. G.). A field at Stoney Plain was mod. infected by this disease and take-all, which apparently caused the grain to be shrivelled (A. W. Henry). Infection was 9-sl. 14-mod. 4-sev./27 fields examined in Sask. (H. W. M.).

NET BLOTCH (Helminthosporium teres). Infection was 69-tr. 52-sl. 23-mod. 20-sev./289 fields examined in Alta. (T. R. D., M. N. G.). Less common

than scald (q. v.) infection was tr. -mod. in central Alta. (A. W. Henry). Infection was 4-sl. 2-mod. /27 fields examined in Sask.; the disease was very common on all varieties at the Scott Exp. Sta. (H. W. M.). Recorded in 25 out of 42 fields examined, it was the commonest disease of barley in Man. in 1951; widespread and destroying up to 75% of the leaf area (G. J. Green).

TAKE-ALL (Ophiobolus graminis) caused sl. plus damage west of Paynton, Sask. (T. C. Vanterpool).

STRIPE RUST (Puccinia glumarum). A tr. infection was found in 2 fields near Falher, Alta. (T. R. D.).

STEM RUST (Puccinia graminis). Infection was 1-tr. /61 fields in s. Alta. and sl. -mod. in 2 fields at Creston, B. C. (10 Aug.) (M. N. Grant). A sl. infection was observed in a few fields and Hordeum jubatum was sev. infected at several points in central Alta. (A. W. Henry). Infection was 4-tr. 2-sl. 1-sev. /27 fields examined, the infected fields being in e. central and s. e. Sask. (H. W. M.). A tr. of rust was recorded on a single variety at Ste. Anne de la Pocatiere, Que. (A. Payette). See also Rust Nurseries.

LEAF RUST (Puccinia hordei). Infection was a tr. in one field and mod. in another, both in s. e. Sask. (H. W. M.). See also Rust Nurseries.

SCALD (Rhynchosporium secalis) was very common in Alta. in 1951; infection was 73-tr. 72-sl. 38-mod. 19-sev. /289 fields examined. In most fields all plants were affected (T. R. D., M. N. G.). Similar observations were made in central Alta. (A. W. Henry). Infection was 3-mod. /42 fields in Man. at Kenville, Santa Clara, and Roblin (G. J. Green). A sl. infection was found on Montcalm at Kapuskasing, Ont. (R. V. Clark).

SPECKLED LEAF BLOTCH (Septoria passerinii). Infection was 31-tr. 31-sl. 14-mod. 11-sev. /228 fields examined in central and n. Alta. (T. R. D.) and 17-tr. 5-sl. 2-mod. 4-sev. /42 fields in Man. (G. J. Green).

COVERED SMUT (Ustilago hordei) infection was 18-tr. 32-sl. 5-mod. 7-sev. /289 fields examined in Alta. (T. R. D., M. N. G.) and tr. -sl. in 26/85 fields in central Alta. (A. W. Henry). In 14 out of 28 fields examined in Sask. infection averaged 1. 5%, the heaviest 15% (H. W. M.). Specimens affected by both loose and covered smut were received from Carrot River (T. C. Vanterpool). In the 1951 cereal smut survey in Man. the percentage of smut in barley was 0. 0-30. 5%, with the average for the 135 fields examined of 0. 7% covered, 1. 5% false loose (U. nigra) and 2. 2% loose smut, or an average for all smuts of 4. 4%. Limited observations this year only confirmed previous observations on the great importance of proper application of a disinfectant for the best control of smut. Fungicides that give complete control when properly applied fail to do so with less careful application (W. J. Cherewick, W. Popp).

LOOSE SMUT (Ustilago nuda) infection was 39-tr. 33-sl. 10-mod. 15-sev./ 289 fields examined in Alta. (T. R. D., M. N. G.). A tr.-mod. infection was observed in 30/85 fields in central Alta. A sl. infection of false loose smut (U. nigra) was also observed (A. W. Henry). Loose smut, including false loose smut, affected 15/28 fields examined in Sask.; 2 fields showed 15% of the heads smutted (H. W. M.). Traces occurred in the 21 fields examined across P. E. I. (R. R. Hurst).

L. E. Tyner (Sci. Agr. 31:187-192. 1951) reports good control of loose smut by soaking the seed for 6 hours in water and then in a 0.2% solution of Spergon-SF for 40 hours at room temperature (72-75° F.). Trials in 1951 have suggested that a somewhat longer soak is necessary to eliminate the last traces of smut (10 hours in water, 48 hours in Spergon are necessary for some varieties). Germination is reduced, but no more so than in the hot water treatment (I. L. C.).

BACTERIAL BLIGHT (Xanthomonas translucens). Only a sl. infection was observed in one field in s. Alta. (M. N. Grant) and a few trace infections in central Alta. (A. W. Henry).

FALSE STRIPE (virus). H. H. McKinney (U. S. D. A. Pl. Dis. Reporter 35(1): 48. 1951) reported that false stripe of barley was caused by a seed-borne virus that could be transmitted mechanically. The manual transmission of the virus was readily confirmed by using false stripe material collected in field plots of barley in July. The disease was tranferred to seedlings of wheat, barley and rye, but not to oats. It was later transferred readily from wheat to barley. It has been carried through several transfers on barley. On these seedlings the symptoms are mostly a whitening or yellowing in linear streaks or in a mosaic pattern, followed by a yellow or brown necrosis. When the collapse of the leaf is rapid the green colour may be retained as it dries.

The disease appears to be identical with that described by I. L. Conners (cf. Canada Dept. Agr. Bull. 71, n. s.:13. 1926), who found it affecting barley in the plots at Brandon in 1924, infection being 3.5% in Bark's Excelsior and 15% in O. A. C. 21. The disease was already known to the late Prof. W. P. Fraser. Specimens of Conners' collection do not appear to have been preserved, but there is one collected at Winnipeg 28 June 1925 (Bisby 2023) and also one on O. A. C. 21, at Indian Head, Sask., July 1926, leg. P. M. Simmonds, det. I. L. Conners (DAOM 164). 'False' stripe has been reported in small amounts in 16 of the 27 intervening years (cf. P. D. S. Reports) and also in B. C., Alta., Ont., and P. E. I.

In addition to its role in causing false stripe of barley this virus may be the cause of certain symptoms in wheat such as black chaff. In a greenhouse experiment, dark discolorations appeared on the internodes and leaf sheaths following the inoculation of headed wheat plants, not yet in flower, with the juice of barley seedlings affected by false stripe. A chlorotic mosaic appeared on the leaf sheaths with both chlorosis and necrosis of the leaf blades, resulting in the early death of the latter. Small necrotic areas in the glumes may provide infection courts for Alternaria tenuis (W. A. Hagborg).

HEAD BLIGHT (undetermined). Infection was 17-tr. 3-sl./228 fields examined in Alta. Tr.-sev. infections were observed in 35/85 fields in c. Alta. (A. W. Henry).

MANGANESE DEFICIENCY. Barley was found at Spalding, Sask., in a field which had severe grey speck on oats in 1949 and 1950. The barley was stunted and the leaf tips were yellowed, but no grey speck symptoms similar to those found in oats were present. The stunted, yellowed plants showed no more root-rot injury than the taller, normal-appearing plants (T. C. Vanterpool).

NITROGEN DEFICIENCY. Low fertility with resultant low yield, was evident in a field at Surrey, P. E. I. "Juno spots", dark green patches of vigorously growing plants where the ground had been fertilized by droppings, were noticeable. (R. R. Hurst).

RYE

ERGOT (Claviceps purpurea). Infection was mod. in a field of fall rye at Grand Forks, B. C., with up to 8 sclerotia in a single head (G. E. Woolliams). Infection was 8-tr. 4-sl. 3-mod./31 fields examined in Alta. (T. R. D.), but it was generally less than might be expected in a wet season (A. W. Henry). A tr. was present in winter rye at Kentville, N. S.; Agropyron repens growing along the edge of the field was heavily infected (D. Creelman). A specimen brought in from a field in Queens Co., P. E. I., showed tr. infection (R. R. Hurst).

POWDERY MILDEW (Erysiphe graminis). Infection was a tr. on Storm in the Univ. plots, Vancouver, B. C. (H. N. W. Toms); in one field at Bezanson, Alta. (T. R. D.).

ROOT ROT (Helminthosporium sativum and Fusarium spp.). Infection was 9-tr. 5-sl. 3-mod. 3-sev. in the 31 fields examined in Alta. (T. R. D.); and 1-sl. 1-mod. 2-sev./4 fields in Sask. (H. W. M.).

TAKE-ALL (Ophiobolus graminis). Tr. infection in one field in Alta. (T. R. D.).

STEM RUST (Puccinia graminis). A sl. infection was observed in a field near Drumheller, Alta. (T. R. D.).

The source of the annual stem rust infection in Western Canada is generally attributed to wind-borne spores from areas farther south rather than to locally overwintered urediniospores. It is, therefore, of some interest that a clear-cut case of overwintering of urediniospores was observed at Winnipeg on couch grass, Agropyron repens, in May 1951. On 1 May germination of overwintered urediniospores was 2-20%, depending on the location of the uredinia on the culms, and on 15 May it was tr.-17%. In greenhouse tests, the spores infected rye heavily, but not wheat or oats; thus the overwintered rust was rye stem rust of which couch grass is known to be a host.

On 22 May, 2 large stem rust pustules were found on the new growth of couch grass beneath stems bearing urediniospores of the previous year. Owing to the location of the pustules, coupled with the fact that they occurred a month prior to the usual appearance of stem rust derived from wind-borne spores, it seems certain that they arose from infections caused by overwintered urediniospores.

This observation of the overwintering of rye stem rust does not permit the inference that wheat stem rust likewise overwinters on its grass host. Only about 1% of the urediniospores on wild barley, Hordeum jubatum, a grass commonly infected with wheat stem rust, were germinable on 1 May and no viable spores were found in subsequent collections. The possibility exists, however, that this rust may also overwinter occasionally (T. Johnson).

A sev. infection of stem rust was found on Agropyron repens at Portage la Prairie on 9 Aug. No stem rust was present on adjacent Avena fatua or barley. The occurrence of a very heavy infection, partly as telia, on the couch grass suggested infection from overwintering (W. A. F. Hagborg).

LEAF RUST (Puccinia secalina). About half the plants showed light infection on Storm in the Univ. plots, Vancouver, B. C. (H. N. W. Toms). Infection was 2-tr./ 9 fields of rye examined in s. Alta.; first observed near Medicine Hat on 17 Aug. (P. M. Halisky). See also under Rust Nurseries.

SPECKLED LEAF SPOT (Septoria secalis). Infection was 12-tr. 4-sl. 1-mod./ 31 fields examined in Alta. (T. R. D.).

STEM SMUT (Urocystis occulta) was observed in 2 fields, infection being 2% at Lethbridge and 5% at Cardston (P. M. Halisky).

RUST NURSERIES IN CANADA IN 1951

T. Johnson, B. Peturson, A. M. Brown and G. J. Green

This report (November 1951) presents the results of the examination of varieties of wheat, oats, barley and rye, grown in 34 localities in Canada, for the presence of rusts and certain other fungous diseases. (Detailed observations on disease incidence were presented in seven tables but only the general summary given in the eighth table is here reproduced in Table 2).

Twelve varieties of wheat, six of oats, five of barley and one of rye were grown in the nurseries. The varieties were: wheat - McMurachy, Lee, Carleton, Little Club, Marquis, Mindum, Thatcher, Yaroslav Emmer, Norka, Redman, Exchange and Frontana; oats - Bond, Trispernia, Ajax, Vanguard, Garry and Clinton; barley - U. M. 43-1020, Peatland, Vantage, H. 106 (Wisconsin) and Montcalm; and rye - Prolific.