I. DISEASES OF CEREAL CROPS

WHEAT

ALTERNARIA BLOTCH (A. tenuis) was prevalent in some districts of Man. on Regent, Renown, and Redman, heavy infection occurring in some fields. The disease seems to have been favoured by a hot dry period followed by wet weather. Samples of affected heads were received from farmers and agricultural representatives when the wheat was in the early dough stage (W.A.F. Hagborg).

ERGOT (Claviceps purpurea). Traces of ergot were more prevalent than usual in wheat and barley at Indian Head, Sask. (R.C. Russell). Ergot was readily found on wheat and barley in Man. It was also recorded on oats at Gilbert Plains (A.M. Brown). A few affected heads were brought to the laboratory from a field in Queens Co., P.E.I. (R.R. Hurst).

ANTHRACNOSE (Colletotrichum graminicola). A trace was present in a field of winter wheat at Port Hope, Ont. (I.L. Conners).

ROOT-GALL NEMATODE (Ditylenchus radicicola (Greeff) Filipjev). In Feb. 1947, wheat seedlings with nematode galls on the roots were received from Radisson, Sask. The seedlings had been grown in soil from a virgin meadow plowed in 1946. The identity of the nematode was confirmed by Dr. A.D. Baker. A light natural infection was found on wheat at Radisson in June. This nematode has not been previously recorded outside Northern Europe. For a fuller report see Sci. Agric. (T.C. Vanterpool).

POWDERY MILDEW (Erysiphe graminis) infection was light on Red Bobs, Kharkov, and Ridit and a trace on Jones Fife in the University plots, Vancouver, B.C. (I.C. MacSwan). There was little powdery mildew on the general crop in Alta., infection being 4-tr. 1-mod./135 fields; in the plots, however, infection was light to heavy on winter wheat, heavy on Federation, and light to moderate on other spring varieties at Lethbridge, moderate to heavy at Edmonton, and virtually nil at Olds and Lacombe. Powdery mildew, found on Agropyron repens at Edmonton by A.W. Henry, caused infection on wheat. (J.D.G.). Powdery mildew was moderate to heavy about Guelph, Ont., (J.D. MacLachlan). These local observations are almost identical with those made by Johnson et al. on the rust nursery material (see Table 3).

HEAD BLIGHT (Fusarium spp.). Two species of Fusarium have been isolated from the 10 specimens of head blight so far examined: F. avenaceum from Normandin, Que., and Kentville, N.S.; F. Poae from Alexandria and Appleton, Ont., and Macdonald College and Lennoxville, Que. (W.L. Gordon). A light infection was observed on winter wheat at Guelph (J.D. MacLachlan) and Chatham, Ont. (W.C. Broadfoot).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage from common root rot was similar to last year in spring wheat in Alta., being 27-tr. 20-sl. 8-mod./55 fields (J.D.G.). The disease was prevalent in most of the 37 fields of winter wheat examined in southern Alta. and the Peace River District (L.E. Tyner).

In Sask., 226 fields of wheat were sampled shortly before harvest and the root-rot data recorded. The mean disease rating for all fields was 9.80, which is less than in 1946 (10.68), but the difference was scarcely significant at the 5% level. The standard deviation was 4.31, indicating less vairability between fields than last year (5.36). As is usually the case there was a fairly high negative correlation between yield and root-rot ratings (Sci. Agric. 28(1):6-20. 1948). The first published estimate of wheat yields for crop districts 1 to 9 were respectively 19.5, 18.0, 13.9, 8.1, 23.0, 8.8, 8.3, 11.5, and 5.7 bu. per acre. The corresponding common root-rot ratings were 8.0, 10.0, 11.2, 12.5, 7.6, 9.8, 12.3, 10.5, and 8.3. A very severe drought in the Rosthern area caused marked stunting and premature ripening of the plants in large patches of the fields. There was some indication that the common root-rot organisms contributed to the condition (B.J. Sallans). In a sample of durum wheat from Laporte, Sask., received Aug. 6, the heads were not filling and the plants were turning white. Many culms showed mechanical bruises about 1 in. above the base with complete lack of any basal discoloration. Helminthosporium sativum only was isolated from the 'bruises' (T.C. Vanterpool). Common root-rot infection was a trace to light in nearly every field of winter wheat observed in Ont. (W.C. Broadfoot).

TAKE ALL (Ophiobolus graminis). Damage was recorded in spring wheat (1-tr. 1-sl. 2 mod./98 fields) in Alta. (J.D.G.) and in winter wheat (5-tr. 15-sl. 6-mod. 4-serv./37 fields) surveyed in southern Alta., and the Peace River District (L.E. Tyner). Take all caused slight damage in small patches in 8 fields in southeast Sask. (H.W.M.). A moderate infection occurred on winter wheat at Guelph, Ont. (J.D. MacLachlan). Damage varied from a trace to slight in fields observed at widely scattered points in Ont. In a field of Cornell 595 near Newmarket, damage was moderate in patches; perithecia were abundant on 25% of the diseased plants (W.C. Broadfoot, I.L. Conners). Traces were observed in the plots at Ste Anne de la Pocatière, Que. (A. Payette).

BASAL GLUME BLOTCH (Pseudomonas atrofaciens). A sample was received from Berwyn, Alta. (A.W. Henry).

STRIPE RUST (Puccinia glumarum). A widespread, but light infection was present in winter wheat in southern Alta. (L.E. Tyner).

STEM RUST (Puccinia graminis) was first observed in Alta. on 21 Aug. as a local primary infection on Red Bobs in the Lacombe plots. Heavy local infections were present on the same variety by 1 Sept. in the Edmonton plots. A trace of stem rust was found on Lembi at Lethbridge on 2 Sept. (J.D.G.). A light scattered infection (9-tr. 3-sl. 1-mod.) was noted in east-central and southeast Sask. (H.W.M.). Stem rust was fairly heavy on several varieties including Red Bobs, Kubanka, and Reward at Indian Head (R.C. Russell).

In 1947, scattered stem rust infections began to appear on susceptible barley and wheat varieties in southern Man. during the first week in July. The rust infections on susceptible wheats increased gradually throughout the remainder of the season and at harvest time, in mid-August, infection on these varieties averaged 70-80%. Barley

varieties, although more heavily rusted than usual, carried very much lighter infections than the susceptible wheats, owing chiefly to rust escape through earlier ripening. Most of the stem-rust inoculum present in Man. this year consisted of race 56 to which most durum wheats are resistant and for that reason durums became only lightly infected. The stem-rust resistant wheats, Thatcher, Regent, and Renown, which now comprise nearly all the bread-wheat acreage in Man., carried only very slight traces of rust or none at all and suffered no stem-rust damage (B. Peturson).

Traces of stem rust were observed on winter wheat at a few places in Ont. 10-18 July (I.L. Conners). Traces also developed on wheat in the plots at Ste Anne de la Pocatière, Que. (A. Payette). Stem rust varied from a trace to 15% and averaged 5% in the 3 counties of P.E.I. (R.R. Hurst).

LEAF RUST (Puccinia triticina). Infection was a trace on Red Bobs and light on Ridit and Jones Fife in the University plots, Vancouver, B.C. (I.C. MacSwan). Leaf rust was in general very light in Alta., infection being 15-tr. 5-sl. 1-mod./135 fields. A trace occurred on winter wheat at Lethbridge. It was observed at Edmonton on 31 July and a severe infection later developed in the late-sown plots of winter wheat (J.D.G.). Leaf rust was very general in east-central and southeast Sask., infection being 8-tr. 12-sl. 27-mod. 34-sev./226 fields. Yields were reduced considerably in the area east and south of Indian Head (H.W.M.).

Leaf rust of wheat was generally quite severe throughout Man. and susceptible varieties (Thatcher, Apex and Saunders) carried infections ranging upwards of 75%. The leaf rust inoculum present was composed very largely of races to which varieties having the Hope type of leaf-rust resistance are susceptible and these varieties, Regent, Redman, and Renown, became almost as heavily rusted as the leaf-rust susceptible ones. The damage caused by leaf rust is difficult to appraise. This year the amount of damage caused was greatly moderated by the fact that leaf rust, owing to dry weather which prevailed during most of July, was slow in developing and did not reach maximum intensity until shortly before harvest and, therefore, the actual yield reductions were no doubt less than indicated by the rust percentages observed. However, that substantial losses occurred owing to the action of leaf rust was indicated by the results of a controlled experiment carried out at Winnipeg. In this test naturally occurring leaf rust infection reduced the yield of Thatcher by 23%, its bushel weight by 2.8 pounds, and its grade by one commercial grade. Lower but substantial reductions were also recorded for Saunders and Redman in this test. As the varieties tested were sown on 22 May, about 10 days past the average seeding date in the Winnipeg district, the yield reductions here indicated no doubt exceeded the losses actually suffered in commercial fields in this area. Slight traces of leaf rust were general on durum wheat (B. Peturson).

Leaf rust infection usually varied from 40 to 60% in fields of winter wheat observed in southern and central Ont. Cornell 595 appeared to be as susceptible as Dawson's Golden Chaff. However, a hybrid line, D.G.C. x Caldwell 11, apparently possesses considerable leaf rust resistance although the line is still segregating for resistance as the infection on individual plants varied at Guelph from 10 to 40% (I.L. Conners). Leaf rust did not appear until mid-August at Ste Anne de la Pocatière, Que.; although a moderate infection developed no well marked differences in infection were noted on the varieties under observation (A. Payette). Leaf rust was more prevalent throughout P.E.I. in 1947 than for some time; it was present in all

fields examined and caused severe damage in the occasional field (R.R. Hurst).

BROWNING ROOT ROT (Pythium spp.). In most parts of Sask. browning root rot was again light in 1947. Moderate infections were found on 17 June at Smuts and Aberdeen. Late frosts may have interfered in the detection of the disease in some instances. Moderate infections were present on 30 June at Rosthern and northwest, west and southwest of Hague. A severe case was observed south of Duck Lake in an old browning root-rot field, with 75% of its area affected (T.C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). Infections ranging from a trace to slight were reported in 4 fields in Alta. (J.D.G.). Affected heads were received from Weyburn, Sask. (T.C. Vanterpool). Further information is given on its distribution in Canada under the survey of nursery material (q.v.).

SPECKLED LEAF BLOTCH (Septoria spp.) was found in over half the fields examined in Alta., infection being 35-tr. 36-sl. 2-mod./135 fields. Infection was trace to light at Olds, light at Lacombe, and light to moderate at Edmonton (J.D.G.). The disease was common in the Kamsack-Humboldt area, Sask., infection being 1-tr. 2-sl. 2-mod. 4-sev. (H.W.M.). Infection by speckled leaf blotch was usually light to moderate on winter wheat in Ont., but it was even severe in the odd field (W.C. Broadfoot). It seems probable that most of the speckled leaf blotch reported above is caused by Septoria Avenae f.sp. triticea Johnson. A paper on this special form is in press (Can. Jour. Res. C.). From his survey of nursery material (q.v.), Johnson found that this fungus was generally distributed in the Prairie Provinces, Ont., and Que., in 1947. Moreover, a specimen collected at Rama, Sask., in 1947, was determined by him as S. Avenae f. sp. triticea (I.L.C.).

BUNT (Tilletia caries and T. foetida). In Table 1 are summarized the inspection records of the Western Inspection Division at Winnipeg for the crop year 1946-47 and for the first quarter of 1947-48 (W. Popp).

Table 1. Wheat Bunt in Western Canada

Class of Wheat	Aug.1, 1946 to July 31, 1947			Aug. 1 to Oct. 31, 1947		
	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	178,890	541	0.30	46,802	181	0.39
Amber Durum	4,807	198	4.12	3,150	47	1.49
White Spring	237	1	0.42	187	0	0.00
Alberta Red Winter	1,831	96	5.24	481	14	2.91
Garnet	3,074	3	0.10	275	0	0.00
Mixed Wheat	123	4	3.25	40	0	0.00
All Classes	188,962	843	0.45	50,935	242	0.48

The figures for the inspection year 1946-47 confirm those for the first quarter, Aug. 1 to Oct. 31, 1946. (P.D.S. 26:4), which indicated that the amount of bunt in the 1946 crop had increased sharply. The final

figures show that the percentage of cars grading smutty increased by a half, i.e., from 0.30% to 0.45%. This increase was mostly due to more smut in the Amber Durum and Alberta Red Winter classes, but a substantial increase of smut in Hard Red Spring Wheat also contributed to the all-over increase. If the figures for the first quarter, Aug. 1 to Oct. 31, 1947 of the current inspection year are indicative, there has been no improvement in the control of bunt in the 1947 crop of Hard Red Spring Wheat, while the amount of bunt in Amber Durum and Alberta Red Winter is less, but still high.

The amount of bunt in winter wheat appears to fluctuate widely from year to year. The problem of its control has become more important because the acreage in winter wheat has greatly increased in the last two years and because the currently grown varieties are susceptible to dwarf bunt. Seed treatment fails to protect the crop against this strain of bunt when the soil has once become infested. As dwarf bunt occurs in several of the neighboring States, a sharp look-out should be kept for this strain in winter wheat areas, particularly in Alta. and B.C. (I.L.C.).

In 1947, the Line Elevators Farm Service examined 12,288 farmers' seed samples for surface-borne smuts as part of its advisory service to farmers. When the seed was found to carry any smut spores, in accordance with recommendations of the Dominion Department of Agriculture seed treatment was recommended. The results are summarized in Table 2, which was supplied by Dr. F.J. Greaney, Director. It will be seen from these tests that over 70% of the wheat, almost 90% of the oat and over 95% of the barley samples carried some smut. A comparison of the findings for 1946 with those in 1945 offer no evidence of any betterment in the smut situation in the Prairie Provinces. Indeed, the lower percentage of wheat samples free from bunt spores was to be expected because the percentage of cars grading smutty in 1946 crop was greater than in 1945. Dr. Greaney writes: "What is needed in this country is a well organized and directed seed treatment campaign. The results of our own tests, and experience, emphasize the urgent need of farmers becoming better acquainted, not only with the enormous, though entirely needless, losses from smut, but also with the newer fungicides and methods for the control of smut and other seed-borne diseases". (I.L. Conners).

Bunt (almost entirely due to T. foetida) was found in 25 fields out of 203 inspected in Sask. Infection was a trace in 13 fields, 2% in 3, 4-7% in 6, 15% in 2, and 25% in one. Bunt was more in evidence this year than usual, particularly in the south-east (H.W.M.). Field experiments were again carried out this year in Sask. to determine how much smut may develop in the field when seed of known spore loads is planted. In wheat the average infection was a fraction of one per cent when a trace of smut was present on the seed. Seed artificially inoculated and sown at the same time yielded a crop with 70% of the heads bunted. Similar results were obtained with the smuts of oats and the covered smut of barley, although the smut infection in the artificially inoculated seed was only 11% in oats and 4% in barley (R.C. Russell).

In the 14 fields examined in Man., 5% of bunt was found in one field of durum (W.J. Cherewick).

Table 2. Prevalence of Surface-borne Smut in Samples of Wheat, Oats, and Barley from the 1946 Crop in Western Canada.

(Summary of tests on farmers' seed samples made by Line Elevators Farm Service, Winnipeg, Man.)

Crop and Province	Number of Samples Tested	Percentage of Samples Carrying			
		No smut (Clean)	Trace to light smut-load	Heavy smut load	Very heavy smut load 1/
		%	%	%	%
WHEAT					
Manitoba	101	31.7	41.6	26.7	0.0
Saskatchewan	6841	29.1	45.5	23.5	1.9
Alberta	1325	26.2	45.7	26.1	2.0
All Provinces	8267	28.6	45.5	23.9	1.9
OATS					
Manitoba	51	9.8	60.8	27.4	2.0
Saskatchewan	2056	10.1	47.2	41.4	1.3
Alberta	871	12.1	60.3	26.6	1.0
All Provinces	2978	10.7	51.2	36.9	1.2
BARLEY					
Manitoba	58	1.7	15.5	32.8	50.0
Saskatchewan	608	1.5	21.5	35.2	41.8
Alberta	377	7.4	39.0	40.6	13.0
All Provinces	1043	3.6	27.5	37.0	31.8

1/ Smut balls or fragments of smut balls

Bunt (T. caries) was found in Ont. affecting 8% of the heads in one field of Dawson's Golden Chaff out of 6 examined and a trace and 2% respectively in 2 fields out of 7 of Cornell 595. The Cornell 595 was carefully examined for possible infection by dwarf bunt, but none was found (W.C. Broadfoot).

LOOSE SMUT (Ustilago Tritici). A trace was found in Garnet and Red Bobs in the plots at Lacombe, Alta. (J.D.G.). Very little loose smut was seen in Sask. in 1947; traces were recorded in 2 fields out of 203 examined. (H.W.M.). In 14 fields examined in Man. loose smut varied from 0 to 3% and averaged 0.5% (W.J. Cherewick). A careful count for loose smut was made in fields of winter wheat at widely separated points in Ont. Infection was a trace to 24% in Dawson's Golden Chaff and averaged 11% whereas it was never more than a trace in Cornell 595, which has been introduced from New York State on account of its resistance to loose smut. There is a distinct need for a variety resistant to loose smut, but it should combine resistance to other diseases, including leaf rust. The 1947 crop in Ont. is estimated by the Dominion Bureau of Statistics to have been 18,235,000 bu. The loss from loose smut is accordingly estimated at 2,354,000 bu. At the 1946 farm price of $1.23 per bu., the loss amounts

$2,895,000. In the fields inspected, the loss to the individual grower varied from a nominal 35 cents per acre where a trace of loose smut was present to $8.50 per acre where 24% of the heads were destroyed (W.C. Broadfoot, I.L. Conners). Loose smut was moderate to severe about Guelph; it is increasing in prevalence in susceptible varieties such as Dawson's Golden Chaff (J.D. MacLachlan). Infection was usually a trace, but in some fields it was 1% in the 16 examined in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLACK CHAFF (Xanthomonas translucens ff. spp.) was severe in Saunders wheat at Indian Head, Sask. (R.J. Ledingham, W.A.F. Hagborg).

?MOSAIC (virus). A sample of leaves bearing chlorotic flecks was sent by W.J. Breakey of the Station, Morden, Man., to Dr. H.H. McKinney, U.S. Department of Agriculture, on account of the resemblance to the virus infection which the latter had found previously in winter wheat. Although Dr. McKinney was unable to decide definitely from the material submitted he considered that it might be a mosaic due to virus. According to Mr. Breakey the disease was very severe at Morden on selections from Hindum x Carleton crosses.

The sample received from Morden bore a marked similarity to the disease noted on Carleton wheat from time to time. I first encountered it at the Reclamation Station, Melita, 28 June 1945. The disease was severe on some of the plots at that time. In one plot sown 2 May, for example, all leaves were affected, with 40% of the leaf area chlorotic. The chlorosis was in the form of short linear streaks. A similar condition has been noted in Carleton and Carleton derivatives at Winnipeg (W.A.F. Hagborg).

LEAF BREAK (low temperature). A type of low temperature injury was observed in Alta. in cereal seedlings where the injury occurred on the first leaf at ground level. A few days later a chlorotic area developed and the leaf blade broke off at the point of injury. Damage was reported from several sections of Alta. and appeared to be most severe on wheat and oats although it did affect barley (J.D.G.).

OATS

HEAD BLIGHT (Alternaria and Fusarium spp.) affected about 5% of the spikelets in a plot of Ajax at Summerside, P.E.I.; it was present to about the same extent on several varieties in the Station plots, Charlottetown (D. Robinson).

ANTHRACNOSE (Colletotrichum graminicola). Specimens were received from Ridgetown, Ont. (OAC 751) (J.D. MacLachlan).

POWDERY MILDEW (Erysiphe graminis). A slight infection was observed in the University plots, Vancouver, B.C., on Alaska and Victory in 1946 (W. Jones) and on Victory in 1947 (I.C. MacSwan). A trace was observed in one field in the Montreal district, Que. (T. Simard).

COMMON ROOT ROT (Fusarium spp.). Damage from common root rot was 4-tr. 2-sl./70 fields in Alta. and 2-sl. 31-mod. 1-sev./34 fields in Sask. (B.J. Sallans). The prematurity blight phase caused moderate damage at the University, Saskatoon (H.W. Mead). F. culmorum was found fruiting on the leaf sheaths of Ajax oats affected by root rot received from Glenannon, Ont. (J.D. MacLachlan).

LEAF BLOTCH (Helminthosporium Avenae) was general on volunteer oats 25 April 1946 in North Saanich., B.C. (W. Jones). Infection was 18-tr. 11-sl. 2-mod./70 fields in Alta. Infection was also moderate to severe on several varieties at Edmonton, trace to light on all varieties at Lacombe and a trace at Olds. (J.D.G.). Traces of leaf blotch were present in most fields of oats examined in Ont., whereas infection was slight in a few fields and moderate in one of Beaver at Edgeley (D.G. Hamilton, W.C. Broadfoot). In the Montreal district, Que., infection was recorded as 26-tr. 24-sl. 3-mod. 1-sev./67 fields (T. Simard). In the Quebec Seed Board plots located at 16 widely scattered points in the principal grain-growing sections of Que., leaf blotch infection was usually a trace to light, but a moderate infection was recorded on all varieties at St. Flavien. (T. Simard, D. Leblond). Leaf blotch was prevalent in all oat fields examined and appears to be present everywhere in P.E.I. (D. Robinson).

HELMINTHOSPORIUM BLIGHT (H. victoriae Meehan & Murphy) was first observed at Ames, Iowa, in 1944 (cf. P.D.S. 26:7). During 1946 its occurrence was widespread in the United States on oat varieties and selections that hav- Victoria as a parent and possess its resistance to crown rust. In June 1947, the disease was found in Canada in the Cereal Division plots, Central Experimental Farm, Ottawa, Ont. During a survey conducted in July Helminthosporium blight was found in widely separated districts in Ont. on the new Canadian oat varieties, Beacon and Garry, and the American variety Vicland. Infection varied from a trace in many fields to a severe infection with 75% of the plants affected in a small strip of Beacon at Blenheim, Ont. (D.G. Hamilton and W.C. Broadfoot. Sci. Agric. 27(9): 446-447. 1947). Since its discovery Helminthosporium blight was found on Garry oats from a plot at Shipman, Sask. (P.M. Simmonds) and in fields of this variety at several points in Man. (J.E. Machacek). Infection was moderate to severe at O.A.C., Guelph, Ont., on Beacon, Vicland, and Garry (J.D. MacLachlan). It was observed at Ste. Anne de la Pocatière, Que., Fredericton, N.B., and Charlottetown, P.E.I. (J.H. Craigie). In the Q.S.B. plots it was recorded on Garry at seven places and on Beacon at three. At Lennoxville it was also observed on Ottawa 2797-H2 and believed to be present on 3054-73. No estimate of damage was made (T. Simard, D. Leblond). Helminthosporium blight severely attacked the variety Garry in the rod row plots at Upper Woodstock and Bulls Creek, N.B. Many of the plants were killed in the seedling stage. On the surviving plants heads failed to develop or were poorly filled. Many of the plants were lodged, breaking over at the infected nodes. The pathogen was identified by J.E. Machacek (S.F. Clarkson). Examination of the nursery material (q.v.) disclosed the presence of the blight in Eastern Canada. It has now been identified at Winnipeg on diseased plants from one or more points in all provinces of Canada except Alta. It has also been found in samples of Garry oat seed from widely distributed points in Man. and Sask. (J.E. Machecek).

In a test at Ottawa only the organic mercury compounds controlled the disease on naturally infected seed. None of the seed treatments was effective in controlling the blight when the seed was sown in either naturally or artificially infested soil. H. victoriae has been isolated from seed produced at Ottawa in the years 1945 to 1947, but it was not isolated from seed of the 1944 crop. It has also been isolated from soil on which a susceptible oat variety was grown in 1947 (W.C. Broadfoot).

HALO BLIGHT (Pseudomonas coronafaciens) was present in 31 out of 70 fields in Alta. infection being trace in 25 and slight in 6. A trace occurred on Legacy at Edmonton (J.D.G.). In Sask., infection was recorded as 2-tr. 1-sl. 2-mod. 2-sev./37 fields. The disease was easy to find in the Meadow Lake area (H.W.M.).

CROWN RUST (Puccinia coronata) was found only in southeast Sask., infection being 2-tr. 1-sl. 2-mod./37 fields (H.W.M.). A moderate infection of crown rust was present throughout Man. In early sown fields it occurred as trace infections, but in later fields it reached an intensity of upwards of 80% (B. Peturson). Only traces of crown rust were seen in early July in southern Ont., (I.L. Conners). Later a light to moderate infection developed at Guelph (J.D. (MacLachlan). In the Q.S.B. plots, crown rust was severe on Vanguard at L'Assomption, St. Hyacinthe, Wotton and Frampton. Among the crown rust resistant varieties not more than a trace developed on Garry, but heavier infections occurred frequently on the others (T. Simard, D. Leblond). In the Montreal district the infection was estimated as 8-tr. 27-sl. 14-mod. 2-sev./67 fields (T. Simard). Crown rust was abundant in oat fields in York, Sunbury, Carleton and Victoria Counties, N.B.; however, the damage was in general slight as most fields became infected as they were approaching maturity (J.L. Howatt). Crown rust was prevalent at several points about Charlottetown, P.E.I., whereas only traces were noted near Montague and Kensington (D. Robinson). Late in the season infection was heavy everywhere on late oats, and on volunteer oat plants in potato and turnip fields (R.R. Hurst). The rust nurseries (q.v.) showed that crown rust was heavy at most points in eastern Ont. and further east.

STEM RUST (Puccinia graminis) was first observed in Alta. at Thorsby. A trace was found on 4 fields in Alta. and on Legacy at Edmonton (J.D.G.). A light infection was recorded in a few fields in the eastern and southeastern parts of Sask. (H.W.M.).

A moderately severe rust infection (50-60%) developed on susceptible oat varieties in Man. The new stem rust resistant oat varieties carried considerable rust infection but were much less severely affected than the old susceptible ones. About one-third of the rust inoculum present in Man., as indicated by physiological race surveys, was composed of races 8, 10, and 11, and, owing to their susceptibility to these races, the new resistant varieties became infected. However, had the entire oat acreage in the province been seeded to Victory and Banner, the varieties formerly used, and which are susceptible to all the races of this rust present in the province this past summer, severe yield reductions undoubtedly would have occurred (B. Peturson).

A light to moderate infection developed on oats at Guelph, Ont. (J.D. MacLachlan). In the Q.S.B. plots, stem rust was usually only a trace; however a moderate infection developed on Ajax at St. Hyacinthe and Lennoxville, Que. (T. Simard, D. Leblond). Heavy stem rust infection was observed in the Frelighsburg and Sweetsburg districts where numerous barberry bushes have been found. In the Montreal district infection was usually a trace (T. Simard).

SPECKLED LEAF BLOTCH (Septoria Avenae). A slight infection was found in only one of the 70 fields examined in Alta. (J.D.G.). In the Q.S.B. plots infection was usually a trace to light, but it was moderate to severe on several varieties at St. Arsène, Normandin and Péribonka, Que. (T. Simard, D. Leblond). In the Montreal district infection was 24-tr. 3-sl./67 fields (T. Simard). Speckled leaf blotch was again the principal disease of oats at Ste. Anne de la Pocatière; however, the average infection rarely exceeded 10% and did not vary noticeably from one variety to the next (A. Payette). Its prevalence in Que. is confirmed by Johnson in his survey of nursery materials (q.v.).

OAT SMUTS (Loose Smut, Ustilago Avenae, and Covered Smut, U. Kolleri). Smut was found in 9 fields in Alta., infection being 1-tr. 8-sl./70 fields. (J.D.G.). Traces of loose smut were found in Sask. in 3 fields out of 37 examined. On the other hand covered smut infection was trace in 4 fields, 2% in 2, 5% in 3, 12% in one and 20% in one. Covered smut appeared to be a little more prevalent than last year (H.W.M.). In the 94 fields examined in Man. smut infection varied from 0 to 29%, average 2.0% (W.J. Cherewick). The oat smuts were less prevalent than usual about Guelph, Ont. (J.D. MacLachlan). Smut was present in 5 fields out of 15 examined in Ont., infection ranging from 4 to 15% (D.G. Hamilton, W.C. Broadfoot). Smut infection in the Montreal district, Que., was 10-tr. 1-sl. 5-sev./67 fields (T. Simard). A 10% infection of covered smut was noted in 2 fields on the same farm in Kings Co. P.E.I. (G. Ayers). Traces of loose smut only were found during a limited examination this year in P.E.I. (R.R. Hurst).

BLAST (non-parasitic) was recorded in Alta. as follows: 45-tr. 19-sl. 2-mod. 2-sev./70 fields; blast was a trace in the plots at Olds and a trace to slight at Lacombe and Lethbridge (J.D.G.). A small amount of blast occurred in all fields in Sask. (H.W.M.). There was considerable blast in Ont. in 1947 (D.G. Hamilton). Blast was recorded in the Montreal district, Que.: 38-tr. 15-sl. 7-mod./67 fields (T. Simard). A careful estimate of blast was obtained by counting the blasted grains in 10 panicles chosen at random from each plot and making the calculation: Number of blasted kernels x 100/ (sum of blasted and sound kernels). The figures for the named varieties were Beaver 6.3, Mabel 6.1, Roxton 6.9, Ajax 6.2, Banner 15.3, Beacon 4.1, Garry 3.4, and Erban 5.3 (F. Gauthier).

GREY SPECK (manganese deficiency) appeared in a block of Erban foundation oats at O.A.C., Guelph, Ont., but a corrective spray was applied (J.D. MacLachlan).

BARLEY

ERGOT (Claviceps purpurea). A trace was found in 2 fields out of 66 examined in Alta.; infection was a trace in the plots at Olds and a trace to severe at Edmonton (J.D.G.). Ergot was very rare in farm crops in Sask.; a light infection was present in the plots at Saskatoon and Indian Head (H.W.M.). Ergot infection was light to moderate at Guelph, Ont. (J.D. MacLachlan). Traces of ergot were observed in two fields and a slight infection in a third of Colsess at Charlottetown, P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe graminis) was general on all winter varieties at the Farm, Agassiz, B.C. (W. Jones). It was also quite general on Olli in the University plots, Vancouver, B.C. (I.C. MacSwan). A trace was observed in Man. in 1947 (W.J. Cherewick). In plots of Foundation and Elite seed at O.A.C., Guelph, Ont., powdery mildew was so severe on O.A.C. 21 that it masked all other diseases, severe on Montcalm, moderate on Barboff and slight on Galore (J.D. MacLachlan). Traces were observed in 2 out of 29 fields examined in the Montreal district and in Q.S.B. plots at St. Arsène and St. Flavien (T. Simard, D. Leblond). One sample was brought in from Queens Co., P.E.I. (R.R. Hurst). Examination of the nursery material (q.v.) revealed that infections were lighter than usual in B.C. and Ont.

HEAD BLIGHT (Fusarium spp., Helminthosporium sativum, etc.). In the Q.S.B. plots at L'Assomption, Que., in a crop already maturing infection was moderate on Byng, Peatland, Brandon 112 and Lennoxville 16, whereas only traces were recorded on Montcalm, O.A.C. 21, Velvet, MC8129, and MC8229. In the Montreal district, infection was 13-tr. 6-sl. 2-mod. 1-sev./29 fields (T. Simard).

STRIPE (Helminthosporium gramineum) infection was recorded as follows: 2-sl. 2-sev./66 fields in Alta. (J.D.G.); 3-tr. 1-mod./29 fields in the Montreal district, Que. (T. Simard); slight on Charlottetown 80 at Hunter River, P.E.I. (D. Robinson).

SPOT BLOTCH (Helminthosporium sativum). Infection in Alta. was 13-tr. 8-sl./66 fields; trace in some varieties at Lacombe and all varieties at Lethbridge, and slight to moderate at Edmonton (J.D.G.). Slight infections were present on Barboff and Galore at O.A.C., Guelph, Ont. (J.D. MacLachlan). Spot blotch infection was 9-tr. 2-sl. 3-sev./29 fields in the Montreal district, Que. (T. Simard).

NET BLOTCH (Helminthosporium teres). A moderate infection was found in one field at Perryvale, Alta. (J.D.G.). The hot dry summer was unfavourable for net blotch and other leaf spots in Sask.; infection was 2-tr. 1-sl. 2-mod., the latter two in south-east Sask. (H.W.M.)
A slight to moderate infection was found on the lower leaves of barley at St. Adolphe, Man. (T. Johnson). Infection was 8-tr. 2-sl. 3-sev./29 fields in the Montreal district, Que. (T. Simard). A general infection not exceeding 15% was present on barley varieties at Ste. Anne de la Pocatière (A. Payette).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 11-tr. 7-sl. 2-mod. 1-sev./66 fields in Alta. (J.D.G.). During the survey in Sask., 26 fields were sampled, mostly in the east and northern areas; damage was 2-sl. 16-mod. and 8-sev. In general, barley was much more severely lesioned than wheat in the same districts (H.W.M.). Severe damage was caused by root rot in a plot of Charlottetown 80 in a 4-year rotation (clover, timothy, Swede turnips and barley) at Charlottetown, P.E.I. The plot receives only 500 lb. 2-12-6 fertilizer per acre the year it is in turnips (D. Robinson).

STEM RUST (Puccinia graminis). A trace was found 20 Sept. in the late-sown plots at Edmonton, Alta. (J.D.G.). Infection was 2-tr. 1-sl. 2-mod./26 fields in east and south east Sask. (H.W.M.). Stem rust on barley in Man. is discussed under stem rust on wheat (q.v.). Infection was a trace to moderate about Guelph, Ont. (J.D. MacLachlan). In the Q.S.B. plots at 10 places in Que., stem rust was absent or a trace except at Ste. Martine where infection was slight to moderate (T. Simard, D. Leblond). It was moderate on nursery material (q.v.) from Fredericton, N.B.

LEAF RUST (Puccinia Hordei). A moderate infection occurred in a field near Melfort, Sask.; elsewhere traces of rust were encountered infrequently (H.W.M.). Although leaf rust was generally present on barley throughout southern Man., only traces were present (B. Peturson). Leaf rust was a trace on O.A.C. 21, light on Galore, moderate to severe on Montcalm and severe on Barboff in fields of these varieties at O.A.C., Guelph, Ont. (J.D. MacLachlan). Infection was trace to light in the Q.S.B. plots at St. Hyacinthe, Lennoxville and St. Flavien (T. Simard, D. Leblond). Leaf rust was moderate to heavy on nursery material (q.v.) from Pictou, N.S., and Charlottetown, P.E.I.

SCALD (Rhynchosporium Secalis). In Alta., infection was 16-tr. 13-sl. 2-mod. 2-sev./66 fields; infection was a trace in the plots at Olds and light at Lacombe (J.D.G.). A moderate infection occurred on the commonly grown varieties of barley (Regal, Rex, Hannchen, Warrior and Prospect) at the Station, Scott, Sask.; a light infection also occurred at Saskatoon (H.W.M.).

SPECKLED LEAF BLOTCH (Septoria Passerinii). Infection was 3-tr. 3-sl./66 fields in Alta.; it was also slight on all varieties at Lethbridge (J.D.G.). For its occurrence elsewhere in Canada Johnson's survey of nursery material (q.v.) should be consulted.

COVERED SMUT (Ustilago Hordei). Infection was 2-tr. 2-sl./66 fields in Alta. (J.D.G.). Covered smut appeared to be slightly more prevalent than in 1946 in Sask., but no heavy infections were seen; infection was a trace in 6 fields, 2% in one, and 5% in one (H.W.M.). In Man. infection by covered smut and false loose smut (U. nigra) together varied from 0 to 42% in the 135 fields examined; the average infection was 4.75% (W.J. Cherewick). The estimated yield of barley for 1947 in Man. was 44,000,000 bu. If the 135 fields surveyed for smut are representative of the crop in the province, the covered and false loose smuts caused a loss

of 2,194,000 bu. in Man., a loss to the individual farmer ranging from 0 to 4.4 bu. per acre (I.L.C.). A trace of covered smut was present in a field of Colsess barley at Charlottetown, P.E.I. (D. Robinson).

LOOSE SMUT (Ustilago nuda or U. nigra). Infection was 13-tr. 4-sl. 1-mod./66 fields in Alta.; infection was a trace in Sanalta and light in Newal at Lacombe and a trace in Newal at Olds (J.D.G.). Loose smut was more prevalent in Sask. than in 1946; infection was a trace in 8 fields, 5% in one, 10% in one. (H.W.M.). In Man., infection from loose smut (U. nuda) varied from 0 to 12% and averaged 0.7% in 135 fields examined. Both U. Tritici (wheat) and U. nuda seemed to be more prevalent this year in Man. than in 1946 (W.J. Cherewick). Loose smut was moderate about Guelph, Ont. (J.D. MacLachlan). A trace was seen in a field in Queens Co., P.E.I. (R.R. Hurst).

BACTERIAL BLIGHT (Xanthomonas translucens). A slight infection was present in a field of beardless barley at Leduc, Alta. (A.W. Henry). A heavy infection was present on some varieties at the Station, Ste. Anne de la Pocatière, Que.; it was also observed in a few fields at Ste. Anne and St. Jean-Port Joli (A. Payette).

LEAF SPOT (non-parasitic) was moderate in Charlottetown 80 and Hanchamont at Charlottetown, P.E.I. The spots were of 2 types: (1) small brown specks and (2) large, sharply-defined black blotches. They largely disappeared as the season advanced. Dr. W.F. Hanna designated them as physiological. A moderate infection of the brown speck type only was noted on Montcalm, O.A.C. 21, Vantage and Charlottetown 80 at Urbinville (D. Robinson, B. MacLaren).

RYE

ERGOT (Claviceps purpurea). Damage was 2-tr. 1-sl./9 fields in Alta.; a trace occurred on spring rye in the plots at Olds (J.D.G.). A very light infection was observed in the University plots, Saskatoon, Sask., and in a few fields examined (H.W.M.). Two reports of severe ergot infection were received from Loon Lake and another from Paradise Hill. In one field at Loon Lake, infection was "one head in every 10 square feet" (T.C. Vanterpool).

POWDERY MILDEW (Erysiphe graminis). A slight infection was found on Storm in the University plots, Vancouver, B.C. (I.C. MacSwan).

STEM RUST (Puccinia graminis). A trace was present on Cornell in the plots, Guelph, Ont. (W.C. Broadfoot). No stem rust was observed on rye in Man. in 1947 (B. Peturson).

LEAF RUST (Puccinia secalina) was recorded as follows: slight infection on Storm in the University plots, Vancouver, B.C. (I.C. MacSwan);

infection 2-sl. 1-mod./9 fields in Alta. (J.D.G.); moderate infection in one field near Melville, Sask. (H.W.M.); a very light infection throughout southern Man. (B. Peturson).

SPECKLED LEAF BLOTCH (Septoria Secalis). Infection was a trace in one field and slight in 4 in Alta. (J.D.G.)

ROOT ROT (cause unknown) damage was a trace in 2 fields and severe in one in Alta. (J.D.G.).

SURVEY OF NURSERY MATERIAL FOR PLANT DISEASES IN 1947

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

In Table 3 are summarized the data derived from 33 rust nurseries distributed across Canada in 1947. As in previous years separate tables were prepared giving the reaction of the individual varieties of cereals to the rusts and mildews, but the complete report, mimeographed separately, must be consulted for these tables. This year, in addition, an attempt was made to utilize the nurseries for a general survey for plant diseases, particularly those affecting the leaves and heads. It should not be assumed that the data here presented provide an exact record of the intensity of any given disease at the time of plant maturity. In several instances the plants were gathered while the crop was still green.

Twelve varieties of wheat, 8 of oats, and 4 of barley were grown in the nurseries. They were as follows: wheat - Apex, McMurachy, Regent, Carleton, Little Club, Marquis, Spelmar, Thatcher, Vernal, Norka, Redman, Warden x Hybrid; oats - Bond, Erban, Trispernia, Ajax, Vanguard, White Russian, Garry, Clinton; and barley - Goldfoil, Heil's Hanna, Plush, Vantage. Varieties grown commercially in Canada are underlined.

In Man. and eastern Sask., stem rust (Puccinia graminis) of wheat was unusually severe on susceptible varieties, which generally carried 80% to 100% infection at maturity. The resistant varieties now commonly grown carried only trace infection or none at all. Durum wheats also were lightly infected. Barley in this area was more heavily rusted than usual. Oat stem rust was moderately severe in the same region. In other parts of Canada stem rust was of minor importance except for a few isolated local epidemics.

Leaf rust of wheat (Puccinia triticina) was generally severe except in Alta. and western and northern Sask. Infections of 70% to 85% were recorded on Regent and Redman in the central part of Canada, whereas only 5% to 15% infections were observed on the same varieties from several places in the coastal sections. These percentages indicate that Regent and Redman have now no appreciable resistance to leaf rust in the central part, but still maintain considerable resistance in some localities in other parts of Canada. Stripe rust (Puccinia glumarum) was noted on Redman at Creston, B.C.