I. DISEASES OF CEREAL CROPS

WHEAT

HEAD DISCOLORATION (Alternaria sp.). Infection was a trace at Carmen, Man., slight on 20% of the heads at Oak Bluff, and slight at Sanford (T. Johnson). A slight infection was recorded on C.D. 3285, and traces on 3 other varieties among the 12 varieties in the test at Ste. Anne de la Pocatière, Que. (C. Perrault). The same varieties were tested at Fredericton, N.B.; 3065-5-2 was severely and 3080-1-6 moderately discoloured, with lesser amounts in 3 others. Some discoloration was also present in the soft wheat test. (S.F. Clarkson)

LEAF SPOT (Ascochyta graminicola). A trace of infection was present on leaves collected at Beaverlodge, Alta., Sept. 30. Spores were 18.1 x 5.8 microns. (T. Johnson)

LEAF SPOT (Cladosporium graminum) was slight in one field and moderate in a second out of 105 fields examined in Alta.

ERGOT (Claviceps purpurea). A trace of ergot was recorded in 2 fields in Alta. No ergot was found on either wheat or brome grass at a point near Lacombe (P.D.S. 22:1), where it was severe in a field of wheat and on brome grass along the fence in 1942 (M.W.C.). A trace of ergot was present on Thatcher at Elm Creek, Man. (T. Johnson). A trace was observed on wheat, once in Queens Co. and once in Prince Co., P.E.I. (R.R. Hurst)

ROOT ROT (Cryptoascus sp.) affected 10% of the plants in a field in Queens Co., P.E.I. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) slightly infected all varieties at the Station, Sidney, B.C. in July (W. Jones). The disease was severe in a field near Lethbridge, Alta., and infection ranged from a trace to severe in the variety plots at this point. A slight infection occurred in one other field (M.W.C.). Powdery mildew was more prevalent than usual on winter wheat both in the plots at O.A.C. and about Guelph (J.D. MacLachlan). It was severe in the rust nursery (q.v.) at Edmonton, and moderate in those at Saanichton, B.C., and Lethbridge, Alta. (T. Johnson)

HEAD BLIGHT (chiefly Fusarium spp.) Traces of head blight were recorded from Man. eastward, including a survey of 21 fields in P.E.I., but in the rust nursery (q.v.) at Macdonald College, Que., a light infection was reported. Isolations from affected material yielded the following: Edmonton, Alta., F. culmorum and F. ?Poae (A.W. Henry); Winnipeg, Man., Thatcher, F. Scirpi var. acuminatum; Kapuskasing, Ont., C.T. 141, F. avenaceum; Ottawa, Apex, F. Poae and F. avenaceum; Macdonald College, Que., Marquis, F. Poae; Ste. Anne de la Pocatière, Apex, F. graminearum; Kentville, N.S., Renown and Regent, F. avenaceum. (W.L. Gordon)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) was found in 53 fields out of 105 examined in Alta. The damage was estimated to be a trace in 24, slight in 23, and moderate in 6. (M.W.C.)

Common root rot was found in all the 114 fields sampled in Sask. in 1943. The disease was slight in 17 fields, moderate in 96 and severe in one. Disease ratings were calculated for the individual fields by the examination of upwards of 100 plants from each field; a histogram (fig. 1) was prepared showing the distribution of the fields according to disease rating. In figs. 2 and 3 are shown similar histograms for 1942 and 1941 respectively. It is apparent that the disease was about as prevalent and severe in 1943 as in 1941; on the other hand, it was considerably more severe in both these years than in 1942. The differences between the mean disease ratings 9.4 and 9.9, in 1943 and 1941, and that of 6.0, in 1942, are highly significant statistically. It should be noted that 1942 was an excellent crop year with moisture generally abundant and with rather low soil temperature. The other two years were characterized by about average wheat crops, with drought conditions present in large areas and with rather high soil temperature at times. (B.J. Sallans)

Common root rot was generally prevalent in the lighter soil districts of Man., but, owing to favourable weather conditions for plant growth in 1943, damage was slight. No severe attacks of common root rot were reported. In general, the disease was less severe than in 1942, and considerably less than in 1941 (F.J. Greaney)

TAKE ALL (Ophiobolus graminis) was observed in 10 fields in Alta. The damage was estimated as slight in 5 fields and moderate in 5 (M.W.C.). Very little take all was noted in Sask. in the districts visited in 1943. The use of rotations and lack of wet conditions seem to be the main factors for its absence (H.W.M.). Take all was not found in Man. in 1943. (F.J. Greaney)

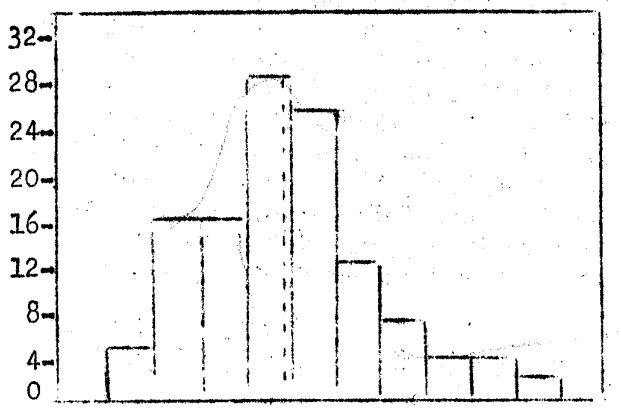
SHARP EYESPOT (Pellicularia filamentosa). On the basis of photographs published by I.D. Blair (Can. Jour. Research 20, Sec. C:174-185. 1942) Mary G. Glynne and Wendy M. Ritchie (Nature 152:161. 1943) conclude that certain Canadian strains of Rhizoctonia Solani, when inoculated into wheat, caused a stem girdling injury that appears to be identical with Sharp Eyespot, first described, according to these authors, by A.J.P. Oort (Tijdschr. over Plantenziekten 42:179-210, and 211-234. 1936).

BASAL GLUME BLOTCH (Pseudomonas atrofaciens). A trace of infection was observed in 3 fields in Alta.

STRIPE RUST (Puccinia glumarum). No stripe rust was found on wheat or barley, but there was a trace to slight infection on Hordeum jubatum at several points in southern Alta.

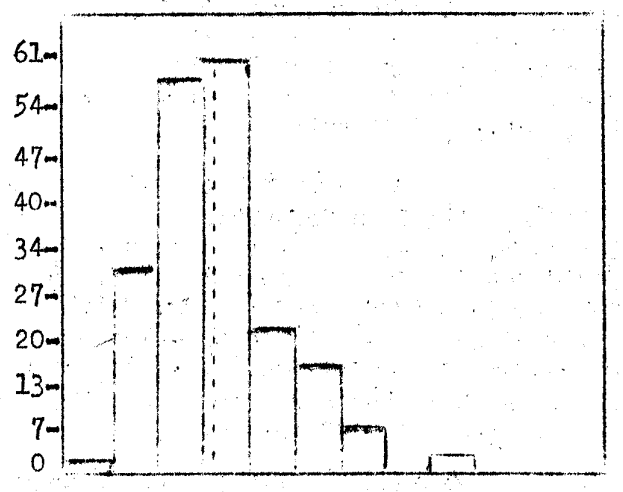
STEM RUST (Puccinia graminis) was first found at Edmonton, Alta., in mid-July, but it developed slowly and caused no damage owing to the prevailing cool weather. During a survey in central Alta. in late August, stem rust infection was a trace in 7 fields, slight in 8, and moderate in 4. Severe local infections occurred in some of the plots at Edmonton and rust ranged from a trace to moderate in the plots at Lethbridge. (M.W.C.)

Stem rust was first found at Saskatoon, Sask., on Red Bobs on July 27; the rust appeared late and was difficult to find. At Swift Current, stem rust was severe on irrigated land, but only a trace occurred on dry land. Infection was severe on Red Bobs at Shaunavon and moderate at Limerick. The average damage for the province was a trace. (H.W.M.)



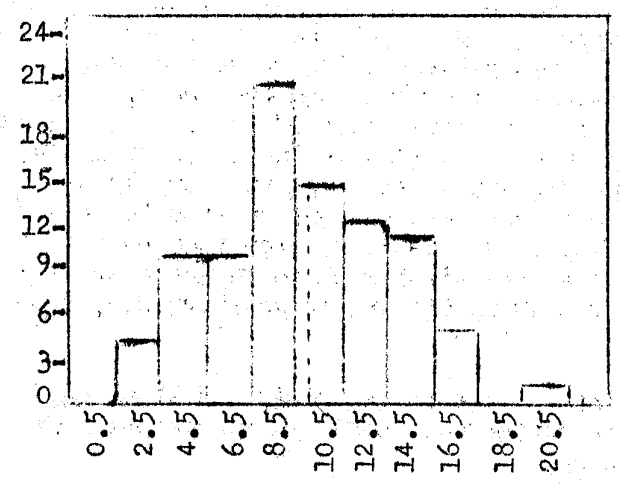
Common Root Rot of Wheat
in Saskatchewan

Fig. 1.
1943: 114 fields
Mean disease rate = 9.4
SD = 3.73



No. of Fields

Fig. 2.
1942: 192 fields
Mean disease rate = 6.0
SD = 2.59



Disease Ratings

Fig. 3.
1941: 88 fields
Mean disease rate = 9.9
SD = 3.78

Stem rust of wheat was first observed in southern Man. on July 12, in 1943, almost two weeks later than normal. It spread slowly on barley, susceptible wheat varieties, and on susceptible grass hosts, but by the end of the season had spread throughout the province. Practically no stem rust infection occurred on the stem-rust resistant varieties Thatcher, Renown, and Regent. The amount of stem rust on barley, except perhaps in some very late fields, did not exceed 1 or 2% and in some barley fields it was difficult to find rust infections. Practically no wheat varieties susceptible to stem rust are now grown in Manitoba and stem rust, therefore, was rarely found in wheat fields and caused no damage. However, Marquis wheat grown in rod-row plots at Morden and Brandon carried infections of 30% and 15% respectively. Only traces of stem rust occurred on Durum wheat. (B. Peturson)

Stem rust was severe on winter wheat at Guelph, Ont., both in the plots at the Ontario Agricultural College and in the vicinity. (J.D. MacLachlan)

No stem rust was recorded in the variety plots at Ste. Anne de la Pocatière, Que., and Fredericton, N.B. Stem rust was very late in developing in 1943 in P.E.I. Most of the grain was sufficiently mature to escape attack. Late fields, however, were severely infected. In the rust nurseries, stem rust was moderate to severe only at Indian Head, Sask., Morden and Winnipeg, Man., Kapuskasing, Ont., and Kentville, N.S.

LEAF RUST (Puccinia triticina) was severe on Thatcher, Red Bobs and Garnet, moderate on Marquis and N.S. 2489B, slight on Coronation and a trace on Ottawa 1544-30-20 and Regent at the Farm, Agassiz, B.C. (W. Jones). Leaf rust appeared late in the season and did not become prevalent in Alta. A survey in central Alta. in late August showed a trace in 9 fields, slight infection in 6 and moderate in one. Infection was slight in the plots at Edmonton, and ranged from a trace to moderate at Lethbridge (M.W.C.). Some fields heavily infected by leaf rust were seen in the Broadview district, Sask. In general, infection was much less severe than in 1942 (H.W.M.)

Leaf rust of wheat, although somewhat less prevalent than in 1942, was present throughout the whole of the grain-growing area of Man. It made its appearance in the southern part of the province on June 21, almost a week later than normal. It developed rather slowly during the latter part of June and early July owing to the subnormal temperatures which prevailed during that period and to the paucity of air-borne inoculum from the south. The scarcity of inoculum in this area during the early part of the season was due mainly to the steady northerly winds which prevailed in June. In mid-July, when most of the wheat had passed the flowering stage and the kernels were from $\frac{1}{4}$ to $\frac{1}{2}$ formed, only traces of leaf rust were present on from 50 to 90% of the plants of susceptible wheat varieties. However, from then on this rust developed very quickly and by the end of the first week in August average infections in southern Man. ranged from 40 to 60% and in northern Man. from 10 to 25%. (B. Peturson)

Leaf rust was severe on winter wheat in the plots and about Guelph, Ont. (J.D. MacLachlan). Leaf rust infection was severe in the majority of the rust nurseries (q.v.) across Canada.

BROWNING ROOT ROT (Pythium spp.). A survey made in early July in the brown soil area of central Alta. revealed that browning root rot had evidently been prevalent and, in some fields, severe earlier in the season. At the time that the survey was made, however, considerable recovery was noted. The damage was estimated as a trace in 6 fields, slight in 2, moderate in 2, and severe in 3 (G.B. Sanford). Damage was also reported from a field at Berwyn, in the Peace River district. (A.W. Henry)

For the first time in many years Pythium root rot of wheat was definitely more severe in the heavier soils of the Regina plains and the Rosetown area in Sask. than in the darker, but lighter-textured soils north, northeast and east of Saskatoon. As a large number of summer-fallowed fields in the heavy soil areas had been sown to flax this year, there were fewer wheat fields to become diseased. Thus, the loss in the field from browning root rot was lower than it otherwise might have been.

In the areas northeast of Saskatoon, browning root rot was negligible even in areas where it is commonly widespread and more or less severe. Mr. McPhail, superintendent of the Experimental Station, Melfort, stated that, in his experience, this was the first year browning root rot was hardly noticeable in the district. In early June, however, some seedlings collected from fields showing early browning symptoms in east, central, and northeast areas were found to be infested with Pythium in the fine lateral roots of the primary roots. Dry conditions then prevailed and the crown roots were late in forming. They apparently escaped infection when they did form. In the heavier soils areas, on the other hand, better moisture conditions in early June permitted severe infection of the crown roots to occur. In the province as a whole, losses were well below average. (T.C. Vanterpool)

In a survey trip through the southern part of Sask., browning root rot was very noticeable in numerous fields on the Regina plains. It was particularly severe in an area around Riceton and Gray; practically every field of wheat on summer-fallow was affected. The usual field symptoms were clear, especially on slopes and knolls. The disease caused a reduction in tillering and a general unthriftiness, as well as considerable delay in growth. From reports received it was learned that the disease was widespread in the south central part of the province. (H.W.M.)

A severe outbreak of browning root rot occurred in the Gilbert Plains district of Man. in 1943. A high percentage of the wheat fields on summer-fallow in the area extending from Shortdale to Ashville was affected. In late June, the amount of infection in some fields in this area amounted to 80%. The weather conditions of July and August favoured slow but fairly complete recovery, and yields were moderately high. In most fields the degree of root lesioning by Pythium spp. was not severe. However, the disease was not confined to patches but extended throughout the affected fields. Field symptoms indicate a general phosphate deficiency in the soils of the Gilbert Plains area. The extent and severity of the attack can be partly explained by the fact that unusually wet and cool weather prevailed throughout the northern districts of Man. in May and June. Browning root rot was fairly severe in several fields at Ste. Rose du Lac; the disease was also found in a field near Harding, Man. (F.J. Greaney)

GLUME BLOTCH (Septoria nodorum) was found in 40 fields out of 105 examined in Alta.; infection was a trace in 17 fields, slight in 19, and moderate in 4 (M.W.C.). Glume blotch infection varied from a trace to severe in P.E.I. (R.R. Hurst)

SPECKLED LEAF BLOTCH (Septoria nodorum and S. Tritici) was general on all varieties except Garnet in the trial plots at Agassiz, B.C. (W. Jones). The disease was particularly prevalent in the central sections of Alta. Infection was a trace in 5 fields, slight in 40 and moderate in 21 out of 105 examined. It was slight to moderate in the plots at Edmonton and Lacombe, and a trace to slight in those at Olds and Lethbridge. Of the 31 specimens examined microscopically, 8 were affected by S. nodorum, 15 by S. Tritici and 8 by both species (M.W. Cormack). In Man. infection was a trace to slight in 6 fields, moderate in 4 and moderate to severe in one (T. Johnson). Speckled leaf blotch (S. Tritici) was noted occasionally on winter wheat in the plots at the Ontario Agr. College and in fields about Guelph, Ont. (J.D. MacLachlan). S. nodorum was recorded in the rust nursery material (q.v.) from 19 of the 26 localities across Canada, while S. Tritici was found also only at Edmonton and Lacombe, Alta.; the former pathogen caused mostly a trace to light infections, but it was reported as moderate from Kemptville, Ont., Lennoxville, Que., and Charlottetown, P.E.I.

BUNT (Tilletia caries and T. laevis). The usual summary of car inspections for the first quarter of the grain year, 1943-44, was prepared by W. Popp from the records of the Western Inspection Division. It should be noted that much of the grain delivered during this period was of the 1942 crop, and accordingly the summary may be less representative than usual. However, the percentage of cars of both Hard Red Spring and Amber Durum graded smutty is virtually tripled over the previous year; this increase in the amount of smut may be due to seasonal fluctuation, but growers should be warned not to neglect seed treatment.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1 to October 31, 1943

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	36,967	89	0.24
Amber Durum	639	13	2.03
White Spring	0	0	0.0
Alberta Red Winter	144	0	0.0
Garnet	8	0	0.0
All Classes	37,767	102	0.27

A trace of bunt was observed in 3 fields out of 105 examined in Alta. (M.W.C.). Bunt was found in 4 fields out of 115 examined in Sask.; 3% of the heads were affected in a field at Tuxford and 5% in one of Red Bobs at Cutknife (H.W.M.). In field tests with naturally-inoculated seed, five times as much

bunt developed in rows sown April 27 as in rows of the same seed sown May 17. Covered smut of barley and the smuts of oats behaved in the opposite way. (R.C. Russell)

LOOSE SMUT (Ustilago Tritici). A trace was present in 5 fields out of 105 examined in Alta. A trace was found in only two fields both of Durum wheat, at Oak Bluff and La Salle, Man. Loose smut occurred occasionally, sometimes in moderate amounts, about Guelph, Ont. (J.D. MacLachlan). Loose smut infection ranged from a trace to 7% in the 21 fields examined in P.E.I.

BLACK CHAFF (Xanthomonas translucens). Out of 28 fields examined in Man., X. translucens f. sp. undulosa and f. sp. cerealis appeared to be about equally prevalent in the 9 affected fields, the average damage varying from a trace to moderate. In 2 fields, at Ste. Rose du Lac and Teulon, a light infection was present on 100% of the plants. Black chaff was also found in collections of rust nursery (q.v.) material from Manotick and Kapuskasing, Ont. In both cases X. translucens f. sp. undulosa was isolated. No bacterial blight of barley or halo blight of oats were found present, but many of the collections were too advanced in maturity for a satisfactory examination of the leaves. It may be noted that with wind-disseminated fungus pathogens, such as rust, the severity and extent of an attack in any locality can be gauged by the examination of relatively small plant populations in the uniform rust nurseries. With bacterial diseases, on the other hand, the distribution of the disease is patchy, and the examination of relatively small populations is of little value, except, in some cases, to give evidence of the presence of the disease. (W.A.F. Hagborg)

OATS

ANTHRACNOSE (Colletotrichum graminicola). Infection was slight in one field near Camrose, Alta., and moderate in the rust nursery (q.v.) at Ste. Anne de la Pocatière, Que.

POWDERY MILDEW (Erysiphe graminis). A slight infection was present on all varieties in the plots at Sidney, B.C., but no mildew was seen at Agassiz. (W. Jones). In the rust nurseries powdery mildew was found only on material from Saanichton.

COMMON ROOT ROT (Fusarium spp.) affected 10 fields out of 80 examined in Alta.; damage was a trace in 5 fields, slight in 4, and severe in one near Ramsey.

HEAD BLIGHT (Fusarium sp.). Traces were observed in a field in Queens Co., P.E.I. (R.R. Hurst)

LEAF BLOTCH (Helminthosporium Avenae) was unusually prevalent in central Alta. in 1943. Infection was a trace in 12 fields, slight in 35, moderate in 13 and severe in 2, a total of 62 fields out of 80 examined. Infection varied from a trace to severe in the variety plots at Edmonton and Lacombe, and from a trace to slight at Olds (M.W.C.). All fields inspected in the southern part of the Red River Valley, Man., were affected. This was the most severe infection ever noted in the province (J.E. Machacek). Most

varieties showed a trace to slight infection in the variety plots at Ste. Anne de la Pocatière, Que. (C. Perrault). Leaf blotch was slight to moderate on most varieties at Fredericton, N.B. (S.F. Clarkson). A slight infection was recorded at Billtown, N.S. (R.M. Lewis). Infection varied from a trace to slight in Prince and Queens Counties, P.E.I. (R.R. Hurst). Helminthosporium Avenae was isolated from rust nursery (q.v.) material from Indian Head, Sask., St. Catharines, Ont., Macdonald College, Que., Kentville, N.S., and Charlottetown, P.E.I.

OAT NEMATODE (Heterodera avenae). In the report for 1942 (P.D.S. 22: 9), it was stated that the oat nematode population was on the increase, even though the visible injury from this source was comparatively small. The grain crop got away to a good start and made vigorous growth in 1942. However, this abundant growth also provided an excellent food supply for the nematodes, with the result that the population gave signs of rapid increase during that year (1942). Due to the little visible evidence of field injury one might easily have been lulled into a feeling of false security by assuming that these nematode populations were on the decline. The reverse was the case.

A forecast was made that injury from the attacks of the oat nematode would be heavy in 1943, possibly not quite as heavy as that experienced in 1941, but very much more than in 1942. Drought in 1941 tended to accentuate the damage from this source.

Due to wet spring in 1943 many grain fields were planted late and got off to a delayed start. However, growth should have been rather rapid thereafter due to plenty of sunshine and warmth. In other words the conditions for growth of grain, except for the delay in planting, were not altogether unfavourable. In spite of this the injury to these plants from oat nematode attack was severe. Under conditions of drought last spring there is little doubt but that the injury would have been worse. The net result is that there is now a heavy population of these nematodes which has been building up in the areas of infestation during the last two seasons (1942, 1943). If the spring of 1944 is dry, the danger is very great that injury to the crop in some fields will be very severe to a complete loss. (A.D. Baker)

CROWN RUST (Puccinia coronata) was more prevalent in Sask. in 1943 than for many years, and was reported farther west than usual. Infection was moderate on 100% of the plants of Banner at Saskatoon on August 17. Rhamnus cathartica was moderately infected at Saskatoon on June 27. (H.W.M.)

Owing to very favourable weather conditions for spore germination, and to the presence of an abundance of the black stage of crown rust on the debris of last year's crop, a very heavy aecial infection of crown rust of oats occurred on Rhamnus cathartica in Man. In the Red River Valley, practically every leaf on this shrub carried one or more infections. Fortunately it occurs only in very small numbers in Man. and the few bushes that occur are located mostly in towns and cities and are situated usually a considerable distance from oat fields. Although all the buckthorn bushes in this area were heavily infected, they are so few in number that they could not have had any practical bearing on the crown rust infections which later developed throughout Man., chiefly, no doubt, from air-borne spores from the south. The heaviest crown

rust infections occurred in the south-eastern part of the province and averaged from 20 to 80% intensity of infection with most of the fields carrying infections of less than 40%. The prevalence of the infection gradually diminished towards the north and the west; in the north-western half of the agricultural area of the province, average infections did not exceed 20% in the most severely rusted fields, and in many fields infections averaged less than 5%. (B. Peturson)

Crown rust was exceptionally severe at Guelph, Ont. None of the resistant varieties in the plots at the Ont. Agr. College were free from rust (J.D. MacLachlan). Crown rust was moderate on susceptible varieties in the plots on clay at Ste. Anne de la Pocatière, Que., while only traces occurred on the same varieties sown on sandy soil (C. Perrault). Four varieties of oats sown on June 7 near 36 large bushes of Rhamnus cathartica set out in 1939 for rust studies near Fredericton, N.B., were moderately to severely infected by crown rust; the percentage infection was estimated to be 45% on Ajax, 55% on Vanguard, 70% on Erban, and 100% on Victory. The same varieties sown on May 20, about 400 yards from the alternate hosts, developed only a trace on Victory. Crown rust was singularly light in the plots at Fredericton, N.B. (S.F. Clarkson). The rust was severe in one field at Prospect, N.S. (R.M. Lewis), and was generally heavy on late oats in P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) crown rust was severe at Brandon and Morden, Man., Kapuskasing and Kemptville, Ont., Ste. Anne de la Pocatière, Que. and Fredericton, N.B.

STEM RUST (Puccinia graminis). A slight general infection was reported at Ladner, B.C. (W. Jones). Stem rust was first observed at Edmonton, Alta., on July 11. Although it appeared early and caused severe local infections in the plots at Edmonton, and in a few fields, it was not unusually prevalent late in the season (M.W.C.). Stem rust showed moderate development on late crops of susceptible oats in Sask. In some heavy stands infection was severe. (H.W.M.)

Stem rust of oats was very much more prevalent in Man. this year than it has been for several years past. It appeared in southern Man. early in July and quickly spread throughout the grain growing area of the province. Fields of susceptible oat varieties, particularly late sown ones, became quite heavily infected. Early sown fields of susceptible oats carried stem rust infections averaging from 15 to 35% with only a small percentage of these fields averaging more than 20% in intensity of infection. However, later sown fields carried infections averaging upwards of 40%. For the first time, appreciable infections of stem rust developed on the new stem-rust-resistant oat varieties. These resistant varieties did not become uniformly infected. Generally, quite heavily rusted spots, often limited to a few square feet or yards in area, developed at irregular intervals in fields of these varieties. The irregularity of these rusted spots and their limited extent strongly suggested that they had been initiated by a very light spore shower of some strain of rust capable of infecting these new varieties. Later, this was confirmed by greenhouse tests which showed that races 8 and 10 of stem rust of oats caused these infections. Up to the present year, these races had been of very rare occurrence. The cause of the increase in prevalence of these virulent races is as yet unknown, and no prediction can, at the present time, be made regarding their prevalence in the future. (B. Peturson)

Stem rust was unusually prevalent in the plots at the Ont. Agr. College, Guelph, Ont. and in the neighborhood. None of the resistant varieties were entirely free from infection (J.D. MacLachlan). Bond and Erban sown on June 7 about 100 feet from 24 large bushes of Berberis vulgaris set out for rust studies in 1939 near Fredericton, N.B., showed 75% and 45% infection respectively, on Aug. 18, while Erban sown on May 20, some 400 yards from the same bushes, was free from stem rust (S.F. Clarkson).

Stem rust was almost entirely absent in the variety plots at Ste. Anne de la Pocatière, Que., and Fredericton, N.B. A light infection was reported at Kentville, N.S., and, although many fields were free from rust in P.E.I., infection was very heavy in all late fields. In the rust nurseries (q.v.) rust infection was moderate at Brandon, Morden and Winnipeg, Man., Kapuskasing, Guelph, St. Catharines and Kemptville, Ont., Kentville, N.S., and severe at Fredericton, N.B.

SPECKLED LEAF BLOTCH (Septoria Avenae) was widely distributed on the lower mainland, B.C., and caused slight damage. In the plots at Agassiz, it was more prevalent on Roxton and Ripon than on the other varieties (W. Jones). A trace was recorded at Forrest and Gilbert Plains, Man. (T. Johnson). The disease slightly to moderately infected most varieties at Ste. Anne de la Pocatière, Que. (C. Perrault), and at Fredericton, N.B. (S.F. Clarkson). In the plots at both places, it seemed to be somewhat more prevalent than leaf blotch (q.v.). Only traces were observed in the rust nurseries (T. Johnson). A very slight infection was reported at Charlottetown, P.E.I. (R.R. Hurst)

SMUTS (Loose Smut, Ustilago Avenae, and Covered Smut, U. Kolleri). A slight infection of loose smut was present on several varieties in the plots at Sidney and Agassiz, B.C. (W. Jones). Smut was found in 14 fields out of 80 examined in Alta.; infection was a trace in 7, slight in 3, moderate in 2, and about 20% in 2 (M.W.C.). Covered smut affected a trace to 2% of the heads in 15 fields in Sask., while a slight infection of loose smut was recorded in 3 fields (H.W.M.). In plots sown with naturally-inoculated seed, there was more covered smut in the late than in the early sown rows. The same was true for loose smut, but infection was relatively light even in the early sown rows (R.C. Russell). Smut was recorded in 24 fields out of 35 examined in Man.; the average percentage in infected fields was 4.4% and in all fields 3%, with 12.0% present in a single field (W. Popp). Loose smut was prevalent in the neighborhood of Guelph, Ont., wherever the grain had not been treated; covered smut was much less common. The incidence of the two smuts was about the same as usual (J.D. MacLachlan). In a survey of 25 fields in P.E.I., considerable loose smut was present in each field, the highest infection being 42%. (R.R. Hurst)

HALO BLIGHT (Pseudomonas coronafaciens). Infection was a trace in 2 fields and slight in 9 out of 80 examined in Alta. (M.W.C.). Halo blight was found in 4 fields in southwestern Sask. and in 4 others in central and northeastern sections (H.W.M.). On June 9, at Saskatoon, about 20% of the plants in the Laboratory plots bore water-soaked lesions on the distal half of the first leaf, and occasionally at the tip of the second leaf. The infection appeared to have originated from the seed (B.J. Sallans). Halo blight

infection was rather severe in a field west of Saskatoon on June 6, and on Banner in the University plots on June 11. It would appear that the hot, dry summers in Sask. are unfavourable for the further advance of the disease. (T.C. Vanterpool)

Only 9 fields were found affected in Man. out of 22 examined, the disease rate ranging from slight to 15%. The low incidence of halo blight in 1943 may be related to the increasing use of halo-blight resistant varieties - Ajax, Exeter and Vanguard (W.A.F. Hagborg). Halo blight was occasionally observed in a few fields in Queens Co., P.E.I. (R.R. Hurst)

BACTERIAL LEAF BLOTCH (organism not specifically determined). A moderate, patchy infection was found in several fields between Edmonton and Leduc, Alta. The disease was severe in one field in the fourth crop of oats after summer-fallow. (W.C. Broadfoot)

Blast (non-parasitic) caused slight damage at the Station, Agassiz, B.C.; it was most prevalent on Laurel 22 in the variety plots (W. Jones). Blast was present in all fields examined in Alta.; a trace in 21 fields, 5% in 28, 10% in 14, and 15-20% in 17. Blast ranged from 5 to 15% in the variety plots at Lacombe and from a trace to 15% at Olds (M.W.C.). Blast was present in every oat field examined in Sask. and caused moderate damage. It was more severe than in 1942 (H.W.M.). Blast was 22-43% in variety plots on sandy soil at Ste. Anne de la Pocatière, Que., but only 4-11% was recorded on the same varieties on clay (C. Perrault). Blast varied from 2 to 25% in the plots at Fredericton, N.B. (S.F. Clarkson). An average of 4% blast was noted in 7 fields examined in Queens Co., P.E.I. (R.R. Hurst)

MAGNESIUM DEFICIENCY was general throughout P.E.I., but the damage was negligible. (R.R. Hurst)

LEAF-TIP BROWNING (phosphate deficiency) was general and severe in the Dauphin, Gilbert Plains and Grandview areas, Man. The trouble retarded an already late crop. Considerable damage was evident. (F.J. Greaney)

WIND DAMAGE. Withered seedlings were sent from Invermay, Sask. on June 23. The oats were sown on June 10, about 2 5/8 inches deep (average of seedlings submitted), and the young seedlings were subjected to a strong wind on June 20. Many seedlings withered off when 2 inches high, but there was some recovery. Two other instances of similar damage to oats have been received previously. Careful inquiry into these two cases led me to believe that the killing off of the seedlings soon after emergence was mainly due to the effects of strong winds, which were unusually warm for the time of year, on seedlings weakened by too deep seeding. Fungus damage was negligible. (T.C. Vanterpool)

BARLEY

ERGOT (*Claviceps purpurea*). Heads of hooded barley affected by ergot were sent in, on Sept. 12, by Mrs. K. Wood, from the experimental plots at Fort Selkirk, Yukon. The infection was heavy, being 6 to 10 sclerotia per head. This is believed to be the most northerly collection of ergot on barley ever

made in Canada (A.M. Brown and Margaret Newton). About 3% of the heads were affected in a field near Edmonton, Alta. (M.W.C.). A slight infection of ergot was found in 3 fields out of 36 examined in Sask. Infection was very light in the province in spite of the presence of ergots in much of the 1942 seed and, presumably, of ergot bodies introduced into the soil the same year (H.W.M.). A trace of ergot was observed at Sanford, Man. (T. Johnson). Only traces of ergot were found in barley in 1943 in P.E.I., but nearly every field was affected. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) was slight on Hannchen in the plots at Sidney, B.C. (W. Jones), and on Montcalm at Ste. Anne de la Pocatière, Que. (C. Perrault). It was very severe in the plots at the Ontario Agr. College, and in fields in the vicinity of Guelph, Ont. It is the most important barley disease in this area (J.D. MacLachlan). In the rust nurseries (q.v.) it was moderate or severe at Saanichton, B.C., and St. Catharines, Guelph, and Kemptville, Ont. Traces were also reported in P.E.I.

STRIPE (Helminthosporium gramineum) moderately affected O.A.C. 21 in the seed treatment plots at Saskatoon, Sask. Spores of the organism were observed. Formalin failed to control the disease, while Ceresan, Ceresan dip and Leytosan were effective (H.W.M.). A trace of stripe was present in two plots at Brandon, Man. (B. Peturson). It was observed occasionally in the plots at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan)

SPOT BLOTCH (Helminthosporium sativum) was a trace in 6 fields, slight in 12 and moderate in 4 out of 43 examined in Alta.; infection ranged from slight to moderate in the variety plots at Edmonton, Lacombe, Olds, and Lethbridge (M.W.C.). A slight infection was noted at Homewood, Man. (F.J. Greaney)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) affected 10 fields out of 43 examined in Alta.; the damage was a trace in 1 field, slight in 8, and moderate in one (M.W.C.). The disease was present in all fields examined in Sask.; the damage was slight in 2 fields, moderate in 32 and severe in one. (H.W.M.)

NET BLOTCH (Helminthosporium teres). Infection was a trace in one field, slight in 8, moderate in 2, and severe in one out of 43 examined in Alta. (M.W.C.). Net blotch was found in 14 fields out of 36 examined in Sask.; although it was fairly common, it was not severe (H.W.M.). Net blotch was recorded in 9 fields in Man.; infection was a trace in 2, slight in 3 and moderate in 4 (W.L. Gordon). Infection varied from a trace to severe in the plots on clay at Ste. Anne de la Pocatière, while only traces were noted in the plots on sand. (C. Perrault)

LEAF RUST (Puccinia anomala) was usually slight to moderate in the plots at Agassiz, B.C. (W. Jones). A light general infection of this rust occurred on barley varieties throughout Man. in 1943. The heaviest infections occurred in the southern part of the province and ranged upward of 35% in some fields. Generally, however, infection of leaf rust did not much exceed 5% and only traces of this rust were present in the majority of the fields. It was not quite as prevalent as last year (B. Peturson). Leaf rust was very severe both in the plots at the Ont. Agr. College and in fields about Guelph, Ont.

(J.D. MacLachlan). Traces of leaf rust were present in all late fields in P.E.I. (R.R. Hurst). In the rust nurseries (q.v.) leaf rust was moderate to severe at Winnipeg, Man., and St. Catharines and Guelph, Ont.

STEM RUST (Puccinia graminis) was not observed in any barley fields in Alta.; there was a slight infection late in the season in the plots at Edmonton. Stem rust was very light in Sask., being recorded in 5 out of 36 fields examined. A moderate infection was seen at Kincaid. Stem rust (q.v. on wheat) was very light on barley in Man., except in some very late fields. It was very severe in the plots at the Ont. Agr. College, and in fields of barley about Guelph, Ont. Traces of stem rust were present in all fields of barley examined in P.E.I. In the rust nurseries stem rust was light to moderate at Indian Head, Sask., Brandon and Winnipeg, Man., and Kapuskasing, St. Catharines, Guelph and Ottawa, Ont.

SCALD (Rhynchosporium Secalis) was general in the plots at Sidney, B.C., and was severe on some of the hybrid lines under test (W. Jones). Scald was a trace in 6 fields, slight in 10 and moderate in one out of 43 fields examined in Alta.; infection was slight to moderate in the plots at Edmonton, Lacombe and Olds, and a trace to slight at Lethbridge. (M.W.C.)

LEAF SPOT (Selenophoma Donacis (Pass.) Sprague & Johnson var. stomaticola (Bauml.) Sprague & Johnson). This fungus was observed on diseased barley received from Dodsland, Sask. on Sept. 5, and was determined by R. Sprague (S 1284, DAOM 13227). (R.C. Russell)

SPECKLED LEAF BLOTCH (Septoria Passerinii). Infection was a trace in one field, slight in 2 and moderate in 3 in Alta., and it ranged from slight to moderate in the plots at Edmonton (M.W.C.). A trace was found at Portage la Prairie and Carmen, Man., a slight infection at Ste. Amélie and Woodside and a heavy attack at Gladstone. A trace of Septoria nodorum was also found on barley at Sperling. (T. Johnson)

COVERED SMUT (Ustilago Hordei) affected 10 fields of the 43 examined in Alta.; infection was a trace in 2 fields, slight in 3, about 5% in 4, and about 10% in one (M.W.C.). This smut was recorded in 5 fields out of 36 examined in Sask.; infection was a trace to 1% (H.W.M.). In plot tests, infection from naturally inoculated seed was very light, although it was heavier in late-sown than in early-sown seed. (R.C. Russell)

LOOSE SMUT (Ustilago nigra and U. nuda). In Alta., loose smut (species not determined) was observed in 15 fields out of 43 examined; infection was a trace in 5 fields, slight in 3, about 5% in 4, and 15% in one field near Calgary. There was a trace to slight infection on Newal at Edmonton, Lacombe, and Lethbridge; a trace also occurred on most of the other varieties at Lacombe (M.W.C.). In Sask., loose smut (mostly due to U. nuda) affected 19 fields out of 36 examined; infection was usually a trace to 3%, but in one field at Spiritwood, 12% of the heads were affected. A slight infection also occurred on Prospect and Newal at Saskatoon. (H.W.M.)

Smut, including covered smut, was found in 33 fields out of 37 examined in Man. U. nigra was definitely determined from 5 fields, and mixed infections of U. nigra and U. nuda were obtained from 3; the species present in the other

25 fields was not determined. The highest percentages of smut in individual fields were, U. nigra, 18%; U. nuda, 8%; species undetermined, 30%. (W. Popp and W.L. Gordon)

Collections of loose smut were made from all agronomic districts of Que.; 147 collections were germinated on potato dextrose agar using the technique of Tapke. Eighty-eight collections (59.9%) yielded Ustilago nuda, 55 collections (37.4%) yielded U. nigra and the remaining 4 collections (2.7%) proved to be a mixture of the two species (R.O. Lachance). Traces of loose smut were found in all fields examined in P.E.I. (R.R. Hurst)

BACTERIAL BLIGHT (Xanthomonas translucens f. sp. hordei-avenae) was not found in 8 fields of barley examined in Man. The single positive record was made at Winnipeg, in the plots, where a moderate, natural infection occurred. (W.A.F. Hagborg)

FALSE STRIPE (non-parasitic) affected a few plants of an unknown variety at Saskatoon, Sask. (H.W. Mead). A trace of false stripe was present at Rosenfeld, Man., and a slight to moderate infection in several plots at Morden. (B. Peturson)

HEAD BLIGHT (cause undetermined). A slight infection was recorded on Wisconsin 38 at Ste. Amélie, Man. (T. Johnson)

RYE

ERGOT (Claviceps purpurea) infection was slight in 2 fields, moderate in one and severe in one in the 4 fields examined in Alta. In the last field, at Minburn, about 50% of the heads were affected. There was a slight infection in the plots at Lethbridge. Ergot infection was generally lighter in Sask. in 1943 than in the previous year. Infection was light at Saskatoon, moderate at Cutknife and severe in Volunteer rye at Kennedy. A slight infection was reported from Medford, N.S.

POWDERY MILDEW (Erysiphe graminis) was general and abundant on young plants of winter rye on Sept. 20, at the Botanical Garden, Montreal, Que. (J.E. Jacques)

LEAF RUST (Puccinia secalina) was general on all varieties in the plots at Agassiz, B.C., and caused slight damage (W. Jones). Leaf rust was a trace in one field and slight in a second in Alta.; a trace to slight infection was also present in the plots at Lacombe (M.W.C.). A light sprinkling of leaf rust was present on rye in Man. during 1943 (B. Peturson). Young plants of winter rye were already moderately rusted on Sept. 20 at the Botanical Garden, Montreal, Que. (J.E. Jacques)

SCALD (Rhynchosporium Secalis) was fairly general on all varieties in the plots at Agassiz, B.C.; the damage was slight (W. Jones). A slight infection was recorded in one field in Alta. (M.W.C.)

SPECKLED LEAF BLOTCH (Septoria Secalis). Infection was slight in one field in Alta. and a trace to slight in the plots at Lacombe.

TABLE 2 - Pathogenic fungi found present on wheat, oats, and barley grown at 26 localities in Canada in 1943

Locality	Wheat								Oats						Barley		
	P. graminis tritici	P. triticina	S. nodorum	S. tritici	Fusarium spp. (Scab)	H. sativum x	E. graminis	Melanism (on Apex, Renown, etc.) xx	P. graminis avenae	P. coronata avenae	S. avenae	H. avenae x	C. graminicola	E. graminis	P. graminis	P. anomala	E. graminis
Saanichton, B.C.	0	4	0	0	0	-	3	1	0	0	0	-	0	1	0	1	3
Smithers, B.C.	0	0	0	0	0	-	2	1	0	0	0	-	0	0	0	0	0
Agassiz, B.C.	0	4	2	0	0	-	1	4	1	0	1	-	0	0	0	1	1
Creston, B.C.	1	4	1	0	0	-	0	1	0	0	0	-	0	0	1	2	1
Beaverlodge, Alta.	0	0	1	0	0	-	1	1	0	0	0	-	0	0	0	0	0
Edmonton, Alta.	0	1	2	1	0	-	4	1	0	0	1	-	0	0	0	0	0
Lacombe, Alta.	0	2	1	1	0	-	2	0	0	0	0	-	0	0	0	0	1
Lethbridge, Alta.	0	0	0	0	0	-	3	1	0	0	0	-	0	0	0	0	0
Scott, Sask.	1	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0
Melfort, Sask.	1	2	0	0	0	-	0	0	1	0	0	-	0	0	1	1	0
Indian Head, Sask.	3	4	2	0	0	-	0	1	2	1	0	1	0	0	2	1	0
Brandon, Man.	2	4	2	0	0	-	-	1	3	4	0	-	0	0	2	1	-
Winnipeg, Man.	4	4	2	0	0	-	0	1	3	2	0	-	0	0	3	3	1
Morden, Man.	3	4	2	0	0	1	-	2	3	4	0	-	0	0	-	2	-
Kapuskasing, Ont.	3	4	2	0	1	-	0	3	3	4	1	-	0	0	2	2	0
St. Catharines, Ont.	2	4	0	0	1	-	1	1	1	2	0	1	0	0	2	4	3
Guelph, Ont.	2	4	3	0	0	-	0	3	3	1	0	-	0	0	2	3	4
Kemptville, Ont.	2	4	2	0	0	-	0	1	3	4	0	-	0	0	1	1	4
Manotick, Ont.	2	4	2	0	1	-	-	2	-	-	0	-	0	0	-	-	-
Ottawa, Ont.	0	4	2	0	0	1	1	3	1	1	0	-	0	0	2	1	2
Macdonald College, Que.	2	4	2	0	2	1	0	3	1	1	1	1	0	0	0	1	1
Lennoxville, Que.	1	4	3	0	1	1	0	3	2	2	0	-	3	0	1	0	1
Ste. Anne de la Pocatière, Que.	2	4	2	0	1	-	0	2	2	4	0	-	0	0	1	0	0
Fredericton, N.B.	1	1	0	0	1	-	0	2	4	4	0	-	0	0	1	0	0
Kentville, N.S.	3	4	2	0	1	-	0	3	3	2	0	1	0	0	1	1	0
Charlottetown, P.E.I.	2	1	3	0	0	-	0	2	1	1	1	1	0	0	0	0	0

x Evidence of presence obtained through isolation studies.
xx Melanism of heads and internodes - confined to derivatives of Hope and H 44 and probably induced by more than one agency.

Explanatory note:
0 = none; 1 = trace; 2 = light; 3 = moderate; 4 = severe; - = plants not examined for presence of organism

SURVEY OF RUST NURSERY MATERIAL FOR PLANT DISEASES IN 1943

In table 2 are given the result of examination of material from 26 uniform rust nurseries scattered across Canada. The examination was made by members of the Winnipeg Laboratory and the table was prepared by one of them, Dr. T. Johnson.

Thirteen varieties of wheat, nine of oats and three of barley were grown in these nurseries. The varieties were as follows: Wheat - Apex, R.L. 226 (Marquis x Kanred), McMurachy, Regent R.L. 975.6, C.T. 141 (R.L. 704 x Ma), R.L. 1183 (Iumillo x Mindum), Little Club, Marquis, Renown R.L. 716.5, Spelmar, Thatcher, Vernal, Norka; oats - Bond, Erban, Sevnothree, Trispernia, Ajax, Vanguard, White Russian, S-811, R.L. 1228 (Victoria x 524); barley - Goldfoil, Heil's Hanna, and Plush.

The nurseries were sown at the end of the seeding period at each Station and were harvested early, while the plants were still green or when they were beginning to turn colour. Accordingly, it is probable that few diseases had an opportunity to reach their maximum development. Readings for each disease were made on all varieties and separate tables were prepared for the rusts. Since these tables only go to emphasize the level of development at any particular Station, these detailed tables are omitted and only Table 2 with its figures representing the severity of each disease on the more susceptible varieties for each Station is shown.