I. DISEASES OF CEREAL CROPS

WHEAT

STEM RUST - *Puccinia graminis* Pers.

B.C. - Stem rust was collected at Salmon Arm, Falkland, Koksilah, Mill Bay, Cobble Hill and Saanichton (M. Newton).

Alta.- Stem rust was first observed on August 20 on Garnet wheat at the Experimental Farm, Lacombe. Out of 825 fields examined, it was found in 15, which were located chiefly in zones 8 and 10.

Sask.- Stem rust appeared relatively late this year in Saskatchewan. It was first found at Saskatoon on July 25, and at Indian Head on July 27. Traces of stem rust were present in southern Saskatchewan on August 12, but the crop was practically ripe by that date. In northern Saskatchewan the grain was much heavier and later. However, damage from rust was very slight, except possibly in fields near the Manitoba boundary.

Man. - Heavy infections of stem rust were confined almost entirely to the area between the Red River on the east and a line joining Pilot Mound, Treherne and Lake Manitoba on the west, where the grain crops were the heaviest in the province. The average infection on common wheat in this area was 20 per cent, while in the southern part of the Red River valley it reached 25 per cent. The loss from rust in the larger area was estimated to be 3 to 8 per cent; in the Red River valley it varied from 5 to 10 per cent. In the south-western part of Manitoba the crops were much lighter and the loss from stem rust was placed at 0 to 1 per cent. In the northern half of the province most of the crops matured early and only traces of rust developed. However, in fields, where the grain was late, infections ranging from 20 to 40 per cent were present. The average loss in the northern half was one to 5 per cent.

Weather conditions appeared to play an important role in the spread of stem rust this year. During the first three weeks in June, precipitation was less than half the normal rainfall and heavy dews, which normally occur at night during this period, were almost entirely absent. On the other hand, during the last few days of June and the first week of July, the weather was very favourable for both spore germination and the development of the rust fungus. In consequence, although stem rust was not found until July 5, when traces of rust were observed at Morden and Morris, a sprinkling of rust was present throughout the southern part of Manitoba on July 8. Rust development continued very rapidly, so that on July 10

and 11, infections were reported as follows: Winnipeg, one per cent of the culms; Morris, 5 per cent; Morden, 30-40 per cent; and near Portage la Prairie, less than one per cent, with intermediate infections at places between those mentioned. Throughout the area, stem rust was less prevalent on Reward than on Marquis and Garnet, and less on Ceres than on Reward. Again, the average daily temperature was above normal during June and July. The crops were sown early and both reserve soil moisture and current rainfall were below normal. As a result most fields of cereals were rapidly maturing by the end of July and 95 per cent of the crops were ripe on August 10. The early ripening of the crops effectually halted further rust development.

In most fields of durum wheat only traces of rust were found. In one an infection of 25 per cent was reported.

Ont.- Pycnia of stem rust were found on May 12 and aecia on May 26 on the common barberry in the Arboretum at Ottawa.

In Carleton county most fields of wheat showed traces of stem rust. In one field infection varied from a trace to 5 per cent; the damage was nil. In Elgin county, three fields were examined, but no stem rust was observed.

Que.- Aecia of stem rust were found on twelve bushes of barberry in Mississiquoi county.

In L'Islet and Kamouraska counties, eight fields of Huron wheat were examined. Infection ranged from 10 to 50 per cent. At Macdonald College only a light infection was observed, apparently causing little or no damage.

N.B.- A trace of stem rust was found on wheat throughout the province.

N.S.- Specimens of the common barberry bearing mature aecia in abundance were received on July 1 from Cape Breton.

P.E.I.- The infection of stem rust was the heaviest observed on wheat for some time. Unlike its distribution in previous years, it was general throughout the Island. It caused a marked weakening of the straw and moderate to severe damage to the grain.

LEAF RUST - Puccinia triticina Erikss.

B.C.- Leaf rust was collected at Salmon Arm (several fields), Falkland, Koksilah, Cobble Hill, Mill Bay and Saanichton (M. Newton).

Alta.- Leaf rust was found in 10 per cent of the fields examined, being reported first on August 3. It was fairly abundant in zones 6, and 8 to 10, especially zone 8, where 26 fields out of 102 examined were rusted. In the rest of the province leaf rust was almost absent. The damage was estimated as follows: 30 fields, nil; 49 fields, less than 0.1 per cent; 3 fields, 0.1 to 1 per cent.

Sask.- Leaf rust was first reported on July 28 at Saskatoon. In south-eastern Saskatchewan it was fairly heavy in localized areas. It caused little or no damage except possibly in that part of the province.

Man.- Leaf rust was as widespread in the province as stem rust, but it was, as usual, less severe. Infections of leaf rust were light on Marquis, Reward, Garnet and Ceres, while fairly heavy infections were observed on Ruby and Kota. Traces only of rust occurred on durum wheat.

Leaf rust was first found on June 23 at Emerson, only a single pustule being collected. It was not again observed until July 5 and a trace was present throughout southern Manitoba by July 10. Unlike previous years, leaf rust was less prevalent than stem rust in the early part of the season. Usually the former is quite abundant by the time the latter makes its appearance. Doubtless the failure of leaf rust to develop, was due to the unfavourable weather conditions prevailing during most of June, which are briefly discussed under stem rust.

Que.- Leaf rust was reported from L'Islet, Kamouraska and Jacques Cartier counties. In general no damage occurred; some late fields may have suffered slightly.

Ont.- Leaf rust was fairly heavy on wheat in Carleton county, while there was a moderate infection on winter wheat in Elgin county. The damage was probably not more than a trace in either.

N.B.- Leaf rust was general on the plots of the Experimental Station, Fredericton.

N.S.- Although leaf rust was common on Marquis and Huron wheat in Kings county, it was not severe, except in late fields.

P.E.I.- Leaf rust was first reported on August 1, when it was observed on Huron wheat in Queens county. The outbreak was general over the Island. This rust was common and destructive to the leaves, but the amount of damage, which it caused, is difficult to estimate.

STRIPE RUST - Puccinia glumarum (Schmidt) Erikss.& Henn.

Dr. Margaret Newton has given a complete record of the collections of stripe rust which she has studied at the Dominion Rust Research Laboratory, Winnipeg, from 1927 to 1931. All these collections were made by Dr. Newton, except a few, where the collectors are indicated. The host and the place of collection are given below.

B.C.- Wheat: Dawsons Gold Chaff at Saanichton; Agropyron Richardsoni (Trin.) Schrad. at Point Gray, Mill Bay, Duncan, Agassiz; Bromus marginatus Nees at Victoria; B.sitchensis Bong. at Victoria, Duncan, Agassiz; Elymus glaucus Buckley at Victoria; E. Howellii Scribn. & Merrill at Victoria; E. marginalis Rydb. at West Saanichton; E. sp. at Victoria; Hordeum caespitosum Scribn. at West Saanichton (W. Newton); and H. jubatum L. at Victoria.

Alta.- Wheat: Chagot, Kubanka, Little Club and Stanley at Olds; Barley: O.A.C. at Olds; Agropyron Richardsoni at Edmonton; A. Smithii Rydb. at Red Deer; A. tenerum Vasey at Olds and Hobbema; and Hordeum jubatum at Lacombe, Olds, Red Deer, Edmonton and Hobbema.

Besides the report received from Dr. Newton,Dr. Sanford and his staff report the following collections of stripe rust in Alberta in 1931. Wheat: Chagot, Kubanka, Little Club at Olds; Chagot, Early Baart at Edmonton. Barley: O.A.C. 21 at Olds; White Barbless at Edmonton. Native grasses: Hordeum jubatum at many places from Calgary north and north-east to the Saskatchewan border and north to about the 54th parallel of latitude; Agropyron Richardsoni and A. tenerum at Hobbema, Mundare and in several locations near Vermilion; A. Smithii near Vermilion; on these native grasses and Bromus ciliatus L. in a grass nursery, Edmonton. Introduced grasses under cultivation: A. cristatum, A. desertorum, A. elongatum, A. obtusiusculum and A. sibiricum in University plots, Edmonton.

Collections of stripe rust from 1926 to 1930 found on wheat, barley and native grasses in many parts of Alberta and at Windermere, B.C. are recorded in the Plant Disease Surveys for these years. A complete list of varieties of wheat and barley found attacked by stripe rust in Alberta to

date is as follows. Wheat: White Federation, Bunyip, Marquis 7, Early Baart, Chagot, Bishop, Vermilion, Early Red Fife, Early Java, Little Club, Prelude, Reward, Jones Fife and Kitchener; Barley: O.A.C. 21 and White Barbless.

Sask.- Wheat: Marquis at Pontiex (B.J. Sallans) and Alsask (T.C. Vanterpool & J.H. Truscott); Aegilops sp. at Saskatoon.

Dr. Newton has found that all collections of stripe rust that she has cultured can infect wheat.

BUNT - Tilletia Caries (DC.) Tul. and T. foetens (Berk.) Trel.

In addition to the field surveys in the separate provinces, the following table on wheat bunt, prepared by Mr. Wm. Popp from the records of the Western Grain Inspection Division covering Western Canada for the three months ending Oct.31, 1931, may be of interest.

Wheat Bunt in Western Canada.

(Summary of inspections from Aug. 1 to Oct. 31, 1931).

	Cars Inspected	Cars "Smutty"	Percentage "Smutty"
Hard Red Spring	53,794	607	1.1
Alberta Red Winter	57	8	14.0
Durum	3,509	200	5.6
All wheat	57,456	816	1.4

Compared with last year there has been a marked reduction in the amount of smutty durum wheat, 16.6 per cent grading smutty in 1930 as against 5.6 per cent this year. Hard Red Spring wheat is also somewhat freer of bunt and as a result the percentage of all wheat grading smutty for the quarter has fallen from 2.8 per cent in 1930 to 1.4 per cent in 1931.

B.C.- A.sample of winter wheat, O.A.C. 104, grown at Armstrong in 1931, was found heavily inoculated with spores of Tilletia Caries. Evidently bunt had destroyed a high percentage of the heads. The correspondent noted that the infected heads were borne on culms, which were considerably shorter than those bearing healthy heads.

Alta.- Bunt was widely distributed in Alberta. It was found in 51 fields out of 825 examined. However, the individual infections were higher in the northern part of the province; an infection of 40 per cent was observed in one field in zone 8, and 50 per cent in one in zone 9. Tilletia foetens was confined mostly to the southern part of the province.

Sask.- Bunt was reported from 15 fields out of 240 examined. In most fields only a trace was present; in a few, infections of one to two per cent were observed. In general Tilletia Caries was more prevalent than T. foetens. In a small increase plot of the variety Liguleless at the University of Saskatchewan over 10 per cent of bunt was observed.

Ont.- Bunt due to Tilletia foetens was found in three fields of Huron wheat out of four examined in Elgin County. In two fields 4 per cent of the heads were bunted while in the other field 28 per cent were destroyed.

Que.- An average infection of 25 per cent of bunt (T. foetens) was observed in three fields of Huron wheat in L'Islet and Kamouraska counties.

P.E.I.- A single head was found affected with Tilletia foetens in Queens county.

LOOSE SMUT - Ustilago Tritici (Pers.) Jens.

Alta.- The average damage from loose smut was reported as only 0.04 per cent, the highest loss being 2 per cent. Nevertheless, out of 825 fields examined, 43 or 5.2 per cent were affected and in zone 10 out of 376 fields, 31 or 8.2 per cent were smutted.

Sask.- Out of 240 fields examined, 52 or 21.7 per cent were affected with loose smut. When the fields that were inspected were classified according to variety, it was found that the percentage of fields of each variety infected, was as follows: Marquis, 10 per cent; Garnet, 25; Ceres, 83; and Reward, 86.

Man.- Loose smut was present in 47 out of 48 fields examined. Infections were recorded as follows: 36 fields, trace to one per cent; 5 fields, 2 per cent; 4 fields of Reward, 2 to 7 per cent; 1 field of Kota, 3.6 per cent; 1 field of Ceres, 4 per cent. A trace to 1 per cent of smut was present in 13 out of 14 fields of durum wheat examined.

Ont.- Loose smut was again prevalent throughout western Ontario. Infection varied from 2 to 15 per cent. In Carleton county traces of smut were observed.

Que.- Infection by loose smut varied from 5 to 20 per cent in 8 fields of Huron wheat in L'Islet and Kamouraska counties, two fields showing the higher figure.

P.E.I.- Loose smut affected 15 per cent of the heads in a field of Huron in Queens county.

BLACK CHAFF - Pseudomonas translucens J.J. & R. var. undulosa (S.J. & R.) Stev.

Alta.- Black chaff was found in ten fields out of 828 examined and the damage was estimated at a trace.

Man. - Black chaff was reported from one field.

BASAL GLUME ROT - Pseudomonas atrofaciens (McCull.) Stev.

Alta.- Basal glume rot was reported from 10.3 per cent of the 825 fields examined. The heaviest infections were in zones 9, 10 and 11, where appreciable damage was caused in some fields.

Sask.- Out of 240 fields, 6 were found affected with basal rot and, although 10 per cent of the heads were affected in one field, the damage appeared to be slight. The disease was observed principally in the Battleford area, where infected fields were seen in addition to those reported.

Man. - Basal glume rot was severe in the two fields, where it was observed.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot was observed in only four fields. The highest infection was 2 per cent in one field in zone 11,

P.E.I.- Ergot was not common this year. Only traces were observed.

POWDERY MILDEW - Erysiphe graminis DC.

Alta. - Heavy infections of powdery mildew were common in experimental plots and in lodged places in fields.

Man. - A trace of powdery mildew was observed in one field.

Ont.- In a field of Huron wheat in Elgin county, the lower leaves were slightly affected.

P.E.I.- Powdery mildew was not common this year and where present caused slight damage.

GLUME BLOTCH - Septoria nodorum Berk.

Alta.- Glume blotch was reported in 175 or 21.2 per cent of the fields examined. The disease was reported from zones 6 and 8 to 11, the average damage being 0.4 per cent.

Sask.- Very little glume blotch was reported in southern Saskatchewan. It was found more frequently in the Battleford area, but it was generally present only on heads borne on prostrate culms.

Man.- A slight amount of glume blotch was reported in one field.

Que.- Glume blotch affected several varieties in Quebec, but the damage was apparently slight.

N.S.- Of all the varieties grown at the Experimental Farm, Nappan, Hope was the most severely affected with glume blotch. Seventy-five per cent of the heads were attacked.

P.E.I.- Glume blotch caused slight to moderate damage on the Island.

LEAF SPOTS

Alta.- Leaf spots reported to be due to Septoria Tritici Desm. were found in 26 or 3.4 per cent of the fields examined. The spotting was present in zones 8 to 13 only. The damage was estimated as follows: 9 fields, none; 17 fields, trace.

Sask.- Leaf spots were found in 68 fields out of 240 examined. They appeared to be more common in the zones that suffered least from drouth. The spots were caused by Septoria Tritici and S. nodorum in some cases.

ROOT ROTS

As in previous reports the root rot diseases are considered together with special reference to the specific pathogens as far as they are reported.

Alta.- Take-all (Ophiobolus graminis Sacc.) was reported in 247 fields out of 825 examined or 29.9 per cent of the fields visited. The average damage was estimated to be 1.1 per cent for all the fields surveyed, or 3.6 per cent for the diseased fields. In zone 9, where soil moisture was sufficient, the average damage was estimated to be 2.3 per cent. In zones 1 to 5 and in the southeastern sections of zones 6,8 and 10, the soil was too dry for typical take-all symptoms to develop. In consequence probably many fields affected with take-all in these zones were not reported as only those where the symptoms were typical were included in this estimate.

Root rot attributed to Helminthosporium sativum Pamm. King & Bakke and Fusarium spp. was found in 474 out of 825 fields examined, the percentage diseased being 57.4 per cent. The average damage was estimated to be 0.5 per cent for the fields surveyed or 0.8 per cent for the diseased fields. All cases of root rot except those showing typical take-all symptoms have been listed here.

Sask.- Take-all was very little in evidence this year except in a few districts, which did not suffer from drouth. It was reported from 28 fields out of 293 examined. The average damage was estimated to be a trace in zones 1, 7 and 9, and moderate in zone 10. As in previous years infections were found on comparatively new land.

Root rot caused by Helminthosporium sativum and Fusarium spp. was reported from 290 fields out of 293 visited. The average damage was considered moderate in zones 1, 2 and 9, and slight in zones 7 and 11. This type of root rot was quite severe in some fields of the drier areas. It was present practically everywhere, but does little damage on new land. (R. C. Russell).

Survey trips made during the middle of June in zones 10 and 11 and in the northern sections of zones 7 and 9, revealed a surprisingly small amount of the Helminthosporium type of root rot on wheat seedlings. After the late June rains, the outer leaves that had been damaged earlier by soil drifting, drought, or frost, were heavily infected near the base with Helminthosporium sativum, which was rapidly spreading to the tissue beneath and thus causing severe late-seedling blight. The damage was moderate to severe. (T. C. Vanterpool).

Browning root rot was found in 13 out of 240 fields, examined. Eleven of these fields were found in zone 11. Some of the fields showed light, but definite symptoms of browning, but the damage appeared to be slight (R. C. Russell).

All reports of browning root rot were received from the eastern and northern parts of the province. Severe cases of browning root rot were observed on summerfallow at Prudhomme, Humboldt, Brada (southeast of North Battleford) and at the Experimental Station, Scott. On June 25th one of the best examples of the disease ever encountered was that found at Brada. Plants in the healthy patches averaged 4 to 8 inches higher than those in the diseased spots. Secondary or crown roots were plentiful and over 50 per cent of them were rotted at the tips. Pythium oospores were numerous. Browning root rot was difficult to locate in the field on account of injuries suffered by the plants from drought, frost and soil drifting. The disease showed about the same distribution and severity as last year, and was not as serious as in 1928. (T.C. Vanterpool).

Man.- Root rot attributed to Helminthosporium sativum and Fusarium spp. was reported from 148 fields. The damage in the individual fields varied from a trace to severe.

HEAD BLIGHT - Gibberella Saubinetii (Mont.) Sacc.& Fusarium spp.

Alta.- Isolated heads affected with head blight were found in five fields in zones 9 and 10.

Sask.- Head blight was found in three fields out of 240 examined. In one field two to three per cent of the heads were affected.

Que.- Head blight was found in several varieties at Macdonald College. The average infection was estimated to be one per cent. The damage was slight.

N.B.- Traces of head blight were observed in the experimental plots, Fredericton. One field of Garnet wheat showed 2 per cent of the heads blighted.

N.S.- Less than one per cent of head blight was present on several varieties at the Experimental Farm, Nappan. A trace was also present in the rod row plots at Kentville.

P.E.I.- One per cent of the heads of Red Fife were affected with blight in a field in Kings county. Damage was slight.

HEAD BLIGHT - Helminthosporium sativum Pamm. King & Bakke

Alta.- Traces of head blight were found in zones 4, 8 and 10.

Sask.- A trace was found on the low heads in two fields.

"BRITTLE DWARF" Disease - Cause unknown

Sask.- What is believed to be a new disease has been observed for the last seven or eight years in the Field Husbandry plots of the University at Saskatoon. Both winter and spring wheats are susceptible and certain hybrid varieties have shown extreme susceptibility. Affected plants are invariably stunted with a tendency to excessive stooling. The heads are occasionally malformed with the portion of the top internode just below the head somewhat twisted or otherwise distorted; usually, they are empty or contain only small shrivelled kernels. The stems are exceedingly brittle and may be broken off readily at or between the nodes. Aphids are associated with the diseased plants and commonly occur in masses under the leaf sheaths. In 1925 and 1928 bacterial lesions similar to black chaff were common on the majority of the affected plants, and this season a definite mottling of the leaves was noticed. It is possible that a disease complex is here manifest. Specimens were sent to Dr. H. H. McKinney, U. S. D. A., for examination, In his reply he mentions that it is not the same as the mosaic occurring in the United States east of the Mississippi river and says that, "It is a curious looking disease and I should say merits further study". The trouble can often be traced to what appears to be an infection source and is frequently severe enough to ruin one half of a fortieth acre plot. Individual plants have been found at widely separated points on the campus. Seed from diseased plants failed to reproduce the disease either in the greenhouse or field. It has not been seen outside Saskatoon. This note is intended to draw the attention of other pathologists to the disease so that they may be on the look out for it on survey trips. "Brittle Dwarf" is suggested as a common name. Saskatoon, Sask., September, 1931. (W. P. Fraser, P. M. Simmonds and T. C. Vanterpool).

STEM BREAK - Cause unknown

Sask.- Stem break is reported to occur to some extent every year in many fields in almost all parts of the province; the damage is slight. The trouble appears first about July 15. It was probably not as prevalent as usual this year. A little of the trouble was found in the University plots, Saskatoon (T. C. Vanterpool).

FROST INJURY

Sask.- During May several frosts killed back the leaves of wheat more or less completely in zones 7, 9, 10 and 11, and probably in others. Younger seedlings seemed to suffer more than older ones. The damage was probably slight in fields sown with plump, vigorous seed. The injury was aggravated by high winds and soil drifting. The degrees of frost at Saskatoon were:

May 5, 11.5°F.; May 19, 6.0°F; and May 20, 5.5°F.

SOIL DRIFTING

Sask.- Damage caused by high winds and drifting soil is probably not very great although the seedlings must suffer a setback due to abrasion and dessication. The damage is confused with frost injury. On six days in May the wind reached a maximum velocity of 31 to 41 miles per hour at Saskatoon.

LEAF DISTORTION - Cause unknown

Sask.- For several seasons the flag leaf has been found distorted in Hard Federation at Indian Head. Damage was apparently nil.

GLUME DARKENING - Cause unknown

Sask.- This condition occurs occasionally and is probably physiological. It does not appear to cause any harm.

NEMATODE DISEASE - Heterodera punctata Thorne

Sask.- Only one field affected with this root rot was reported this year. The parasite appears to die out as soon as rotation of crop is begun on new land.

OATS

STEM RUST - Puccinia graminis Pers.

B.C.- Stem rust was general on oats on Vancouver island. The damage was slight.

Alta.- Out of 149 fields examined only two were found rusted. The damage was a trace.

Sask.- Stem rust appeared very late this year. In southeastern Saskatchewan on July 12, the stage of the crop varied from the early milk to the firm dough, some fields being ripe. At that time rust infections varied from a trace to three per cent and the average damage was later estimated to be slight. In northern Saskatchewan where the crop was much heavier and later, damage from stem rust was slight in zone 7 and a trace in zones 9 and 11.

Man.- Stem rust of oats appeared at the same time and was about as prevalent as wheat stem rust. It was heaviest in the

southeastern part of the grain growing area, the average infection being 25 per cent in fields ripe by August 10. In the northern half of the province, stem rust caused an average infection of 5 per cent on the early crop. In both areas late fields were heavily rusted and considerably damaged. The losses due to rust were also about the same for oats as for wheat (see wheat stem rust).

Ont.- A trace of stem rust was found in Carleton county. Stem rust was heavy on late varieties in the crown rust nursery at Ottawa.

Que.- Stem rust infections varied from 10 to 25 per cent in six fields of Alaska oats examined in L'Islet and Kamouraska counties.

N.S.- Slight infections of stem rust were observed in two fields in Colchester county.

P.E.I.- Stem rust was present throughout the Island, infection averaging 10 per cent on August 15. It was abundant causing moderate to severe damage by September 1.

CROWN RUST - Puccinia coronata Corda

Man.- Traces of crown rust were found throughout southern Manitoba by July 27. Subsequently the infection became patchy in the Red River valley, varying from a light sprinkling of rust in some fields to 40 per cent infection in others. Damage from rust was confined to the late fields. Traces of crown rust could also be found late in the season in the southwestern part and the northern half of the province.

Ont.- Pycnia of crown rust were observed on May 11, and aecia on May 26 on buckthorn in the Arboretum, Ottawa.

Crown rust was very patchy in Carleton county, infections varying from a trace to 15 per cent, according to the field examined. The role of the buckthorn in initiating the infection was not established in the few fields examined. Some varieties were heavily infected in the crown rust nursery at Ottawa.

Que.- A slight infection of crown rust was observed in Jacques Cartier county, while 10 to 20 per cent of rust was found on Alaska oats in Kamouraska and L'Islet counties.

N.S.- Crown rust was heavy on late fields of oats at Nappan. The damage was slight. Rust infections were generally light in

the fields examined in Pictou, Halifax and Colchester counties, only occasionally causing slight damage.

P.E.I.- Crown rust was found on buckthorn at Charlottetown in July. The rust was abundant on oats this year and apparently caused moderate to severe damage.

SMUT - Covered Smut - Ustilago levis (Kellerm. & Swingle) Magn. and Loose Smut - Ustilago Avenae (Pers.) Jens.

Alta.- Out of 235 fields examined, 110 or 46.9 per cent were infected with smut. The average damage was estimated to be 1.4 per cent. Smut appeared to be somewhat heavier in the southern part of the province, but this may have been due to the small number of fields observed. Most of the fields were affected with covered smut; only in a few fields was loose smut recorded.

Sask.- Covered smut was found in 25 fields out of 42 examined, while loose smut was present in only six. In a few fields 20 per cent or more of covered smut was recorded, but in most fields the damage ranged from a trace to 5 per cent. In one field in zone 1, 2 per cent of loose smut was present; in the others, the infection was a trace. Sixty per cent of loose smut was reported by a farmer from Quill Lake, where the oats had not been treated.

Man.- Covered smut was somewhat more prevalent than loose smut. The former was reported as follows: 23 fields, trace to 6 per cent; 1 field, 15 per cent; 1 field, 50 per cent. The latter was found as follows: 19 fields, trace to 3 per cent; 4 fields, 10 to 25 per cent.

Ont.- Loose smut was very prevalent in Wellington county this year. In some infected fields 17 per cent of the panicles were smutted. Both the loose and covered smuts were reported from Carleton and Lincoln counties; the average infection was about 10 per cent for loose smut and 2 per cent for covered.

Que.- In five fields of Alaska oats in Kamouraska county, 2 to 5 per cent of the panicles were destroyed by loose smut. In a plot of Banner, Macdonald 44, at Macdonald College, 5 per cent of the panicles were affected with loose smut.

N.S.- Loose smut was reported in the following counties: Kings, less than one per cent in several fields examined; Colchester, 3 to 6 per cent in 4 fields; Pictou, 3 to 10 per cent on 2 fields. Similarly, covered smut was recorded as follows: Colchester, 3 per cent in 2 fields; Halifax, 6 per cent in one field.

P.E.I.- Loose smut was abundant this year. Out of 50 fields examined throughout the province, 42 were smutty, infection ranging from a trace to 65 per cent, with an average infection of 8 per cent.

HALO BLIGHT - Pseudomonas coronfaciens (Ch. Elliott) Stev.

B.C.- Halo blight was general on Vancouver island and caused slight damage.

Alta.- Halo blight was reported from 42 fields out of 235 examined. The amount of damage in diseased fields was: 22 fields, none; 20 fields, a trace.

Sask.- Halo blight was reported from 2 fields out of 46 examined. At Maryfield the infection was severe on the lower leaves. In addition 20 fields were affected with leaf spots, which caused a trace to very slight damage. In many fields these leaf spots may have been halo blight, but they differed somewhat in appearance from that disease.

Halo blight was reported from Lintlaw, where the disease had been noticed the previous year in the same locality. It was worse in low spots of the field, where the soil was peaty.

Que.- Halo blight was very severe on several varieties at Macdonald College, infection varying from 10 to 100 per cent. This disease has been very serious on the College experimental plots and is interfering with the varietal tests. However, in a survey made last summer in several districts of the province, it was found to be of minor importance elsewhere.

BACTERIAL STRIPE BLIGHT - Bacterium (Pseudomonas) striafaciens Ch. Elliott

Alta.- Bacterial stripe blight was found in 48 out of 149 fields examined. The damage was as follows: 34 fields, none; 14 fields, a trace.

ROOT ROT

Alta.- Root rot caused by Helminthosporium sativum and Fusarium spp. was found in three fields out of 149 examined. Damage was a trace.

Sask.- Helminthosporium-Fusarium root rot was widespread (in 45 out of 49 fields examined), but it was rather mild in its action (damage, a trace). Crops on new land showed less lesioning on the average than those on older fields. In two

1/100th acre plots at Saskatoon about one per cent of the plants were affected with seedling blight due to Fusarium. The diseased seedlings were conspicuous on account of their yellow colour among the green and taller healthy ones.

Prematurity blight was present in four out of 42 fields. The disease was not very prevalent this year.

Man.- Helminthosporium-Fusarium root rot was found to some extent in Manitoba, causing a trace to slight damage.

BLAST - Cause unknown

Alta.- Blast was very common in all parts of the province. It was reported in 192 fields out of 235 examined. The average damage was estimated to be 6.1 per cent and in individual fields the loss was placed as high as 20 to 30 per cent.

Sask.- Blast was reported in 15 fields out of 46 examined. The trouble was quite noticeable this year; sometimes 90 per cent of the heads showed more or less blasting of the spikelets. The damage was slight to moderate. The extremely dry hot season may have favoured the disease.

N.S.- Blast was present in all the plots at Nappan and it was general in the ordinary fields.

P.E.I.- Blast caused slight damage in Queens county, average infection being 3 per cent in 25 fields.

LEAF BLOTCH - Helminthosporium Avenae Eidam

B.C.- Leaf blotch was general on Vancouver island. The damage was slight.

Alta.- It was found in 15 fields out of 235 examined. Damage was a trace only in the infected fields.

Que.- Leaf blotch was heavy on Alaska in Kamouraska and L'Islet counties.

N.B.- This disease was reported as general in York county.

SPECKLED LEAF BLOTCH - Leptosphaeria avenaria Weber (Septoria Avenae Frank)

Que.- Speckled leaf blotch caused slight damage to Banner, M.C. 44, on the plots at Macdonald College. It was present late in the season in several districts of Quebec, but infection took place too late to do any real harm.

N.B.- This disease was common along with leaf blotch, caused by Helminthosporium Avenae, at the Experimental Farm, Fredericton.

SEEDLING INJURY

Sask.- Oats suffered severe damage in the seedling stage in the experimental plots Saskatoon. The injury was probably due to frost, wind or drought, but it was impossible to decide which was the most important.

BARLEY

STEM RUST - Puccinia graminis Pers.

B.C.- Stem rust was collected at Salmon Arm and Cobble Hill. (M. Newton).

Alta.- Scattered local infections of stem rust were found late in the season, in five fields, all located in zone 10. It caused no damage.

Sask.- Stem rust was reported in 6 fields out of 24 examined. A mere trace of rust was found in zone 11, while more rust was found in some fields in zones 1, 2 and 7. Very little damage resulted.

Man.- Stem rust was prevalent on barley in Manitoba, It caused about the same amount of damage on barley as on wheat (see wheat stem rust).

Que.- Stem rust infections varied from 5 to 10 per cent in three fields in Kamouraska and L'Islet counties.

P.E.I.- In the plots at Charlottetown infections of stem rust varied from a trace or 10 per cent.

LEAF RUST - Puccinia anomala Rostr.

B.C.- Leaf rust was general on Vancouver island and in the lower Fraser valley. Damage was slight.

Man.- Slight traces of leaf rust were present throughout Manitoba.

Que.- Leaf rust infections varied from 3 to 5 per cent in two fields in Kamouraska county.

LOOSE SMUT - Ustilago nuda (Jens.) Rostr.

Alta.- Loose smut was found in 6 fields out of 116 examined. The highest infection observed was 6 per cent.

Sask.- This smut was reported from 6 fields out of 24 examined. Generally less than one per cent of the heads were smutted, except in a field at Midale and in a few experimental rows at Saskatoon, where five and seven per cent of the heads respectively were affected.

Man.- A trace to one per cent of loose smut was observed in 10 fields.

Ont.- Loose smut destroyed one per cent of the heads in a field in Carleton county.

N.S.- Three to 5 per cent of loose smut was reported in one field each in Colchester, Pictou and Halifax counties. One of the fields was in two-rowed barley.

P.E.I.-Loose smut affected 3 per cent of the heads in one field in Queens county.

COVERED SMUT - Ustilago Hordei (Pers.) Kellerm. & Swingle

Alta.- Covered smut was both common and destructive in Alberta. Out of 116 fields examined 62 or 53.5 per cent were smutty, the average damage being 2.3 per cent. The two highest infections were 25 and 70 per cent respectively.

Sask.- Covered smut was found in 10 out of 24 fields examined. Infection was usually only a trace, except in one field in zone 7, where 10 per cent of the heads were destroyed.

Man.- Covered smut was reported as follows: 10 fields, trace to one per cent; two fields, 3 to 4 per cent.

Que.- Very little covered smut was found at the Experimental Farm, Ste. Anne de la Pocatiere, but infections ranging from one to 3 per cent were found in 3 fields in Kamouraska county.

N.B.- A trace of covered smut was found at the Experimental Station, Fredericton.

P.E.I.- Covered smut affected up to 15 per cent of the heads in 10 fields in Queens and Kings counties.

STRIPE - Helminthosporium gramineum Rabh.

Alta.- Stripe was found in 14 fields out of 112 examined. The damage was as follows: 9 fields, trace; 3 fields, 1-5 per cent; 2 fields, 5-10 per cent.

Sask.- This disease was found only in the experimental plots at Indian Head and Saskatoon, where it was present on one or two varieties in each instance.

Man.- Stripe was found in 5 fields in Manitoba. The damage was slight in three fields and moderate in two.

N.B.- Barley stripe was reported from York county.

FALSE STRIPE - Cause undetermined

Sask.- Two per cent of the plants of O.A.C. 21 were affected in the rod row plots at Indian Head.

BACTERIAL BLIGHT - Pseudomonas translucens J.J. & R.

Alta.- Bacterial blight was present in 9 fields out of 78 examined. It caused a trace of damage in 3 fields.

NET BLOTCH - Pyrenophora teres (Died.) Drechsl.
(Helminthosporium teres Sacc.)

Alta.- Net blotch was found in 33 fields out of 116 examined. The damage was negligible, being none in 15 fields, a trace in 10, and light in 8.

Sask.- Net blotch was found in 16 fields out of 24 examined. Infections were usually very light in the southern part of the province and in the drier parts of zone 9, but some heavy infections were seen in the north, where the disease caused slight damage.

Man.- This disease was found in 7 fields, infections being a trace in 2 and moderate to severe in 5.

P.E.I.- Traces of net blotch were observed in the head row plots at Charlottetown.

SPOT BLOTCH - Helminthosporium sativum P.K. & B.

B.C.- Spot blotch was general on Vancouver island and in the lower Fraser valley. The damage was slight.

Alta.- Spot blotch was found in 20 fields out of 116 examined, causing no damage in 17 fields and a trace in 3.

Man.- A trace of spot blotch was found in 4 fields.

P.E.I.- Spot blotch was heavy in a field in Queens county.

ROOT ROT

Alta.- Root rot caused by Helminthosporium sativum and Fusarium spp. was reported from 8 fields out of 78 examined. the damage being a trace to slight.

Sask.- Helminthosporium-Fusarium root rot was found in 23 out of 24 fields visited. The damage was slight to moderate. Infection increased rapidly after July 1. The drier districts and the older fields showed the highest infections.

Prematurity blight was observed in three fields, all located in southern Saskatchewan.

Man.- Root rot of the Helminthosporium-Fusarium type was reported in 19 fields. The damage varied from a trace to moderate.

SCALD - Rhynchosporium Secalis (Oud.) Davis

B.C.- Scald was found severely injuring O.A.C. 21, Hannchen, Gold, Star, Plumage, Archer, Duckbill and Charlottetown in the experimental plots at Saanichton. Trebi appeared to be very resistant.

Alta.- Scald was found in 12 fields out of 116 examined, causing a trace to slight damage. The disease caused considerable damage on the experimental plots, at Vermillion, Lethbridge, Olds and Edmonton.

Sask.- A trace of scald was found in 3 fields out of 24 examined.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- A trace was found in one field out of 78 examined.

POWDERY MILDEW - Erysiphe graminis DC.

Que.- Powdery mildew was severe in one field in Megantic county.

P.E.I.- This disease was reported as severe on some volunteer barley in Queens county.

RYE

STEM RUST - Puccinia graminis Pers.
Man.- Stem rust did no damage to rye.

Que.- A light infection of stem rust was observed in Kamouraska county.

LEAF RUST - Puccinia dispersa Erikss.
Alta.- A trace of leaf rust was found in 3 fields out of 14 examined.

Sask.- Traces of leaf rust were reported from Kipling.

Man.- A trace of leaf rust was found at Gladstone.

Ont.- Two per cent of leaf rust was observed on rye growing in a field of wheat in Elgin county.

STEM SMUT - Urocystis occulta (Wallr.) Rabh.
Sask.- A trace of stem smut was found in one field near Neudorf. This single report is in marked contrast to the outbreak of last year, when 19 fields were found smutted, and infections varied from a trace to 11 per cent. 1931

ERGOT - Claviceps purpurea (Fr.) Tul.
B.C.- Ergot was reported from Summerland on volunteer rye.

Alta.- Ergot was found in 12 fields out of 14 examined. The damage was a trace to light in most of the fields surveyed. Four growers living in zones 6 and 10 reported that ergot had caused heavy damage to their rye.

Sask.- Ergot was rarely seen in most parts of Saskatchewan this season. This was possibly due to the drouth in spring and early summer.

The disease was not common in the plots at Saskatoon, and what was present, was distributed unevenly. It appeared much later than usual and then on the late maturing heads.

Man.- A trace of ergot was reported from one field.

Ont.- A light infection of ergot occurred in rye grown as a cover crop in Lincoln county.

Que.- Three per cent of the heads of rye, Common 513, were affected with ergot at Macdonald College. A trace was also reported from Kamouraska county.

ROOT ROT

Sask.- Helminthosporium-Fusarium root rot was found in 12 fields out of 14 examined. The disease was common and widespread, but it caused only slight damage.

Man.- A trace of root rot was reported in two fields.

BACTERIAL BLIGHT - Pseudomonas translucens J.J. & R. var. Secalis (R. G. & J.) Stapp

Alta.- Bacterial blight caused a trace of damage in 4 fields out of 14 examined.

Sask.- A purple stem streak, possibly caused by bacteria was seen near Hafford. The infection was light.

LEAF SPOTS - Cause undetermined

Sask.- Leaf spots caused a trace of damage in 3 fields out of 14 examined.