

I. DISEASES OF CEREAL CROPS

WHEAT

STEM RUST - Puccinia graminis Pers.

B.C. - A slight infection of stem rust was found on wheat on Vancouver island and in the lower Fraser valley.

Alta. - Stem rust was found in 7 fields out of 174 examined. Infections varying from a trace to light were present beginning August 15 on late stands of wheat in southern Alberta. It was extremely scarce in northern and central Alberta. Rusted plants were received from Raymond (2063).

Sask. - Stem rust was found on wheat at Indian Head on July 16, at Saskatoon on July 24, and at Swift Current on August 8. Infection was light and the damage was nil or slight in the southern part of the province, but in late fields in zones 8, 10, 11 and the northern part of 7 (see 1930 Report for description of these zones) damage was moderate to severe.

Man. - Stem rust of wheat was present throughout the province. It was first observed at Morris on July 5 and at Morden on July 6. The heaviest infection was in the Red River valley, particularly in the eastern part, where it ranged from 3 to 5 per cent on Ceres and 5 to 25 per cent on Marquis and the durum wheats, while in a few late fields it reached 60 per cent. Infection was lighter in the rest of the province, particularly in the south-west, where only a trace of rust occurred. The extremely dry weather during July and the first week of August caused grain crops to ripen rapidly. By August 10, the crop was ripe and was being harvested, except in some late-sown fields and in the more northerly sections of the province (B. Peturson):

Ont. - In an experimental plot of winter wheat at Ottawa, no stem rust was present at harvest time.

Que. - Stem rust infection varied from 4 to 20 per cent in fields of Huron wheat in Kamouraska county, while a 75 per cent infection caused moderate damage to one field at Cap Rouge. Infections noted earlier were 75 per cent on Garnet and a trace on Brock at Lennoxville, and 15 per cent on Garnet, 5 per cent on Reward, and none on other spring wheats at Ste. Anne de la Pocatière.

N.B. - Stem rust was severe in Sunbury, Westmoreland, York and St. John counties. It also caused slight damage to Federation and severe damage to Filler Garnet 22-17 in the experimental plots at Fredericton.

P.E.I. - Damage from stem rust varied from slight to severe in the three counties of Prince Edward Island.

LEAF RUST - Puccinia triticina Erikss.

B.C. - Leaf rust infections ranged from 20 to 80 per cent in

the Fraser valley and on Vancouver island. Of the 11 winter varieties in the experimental plots at Agassiz, Panson 11 was the most severely affected.

Alta.- Leaf rust was unusually rare this year, being observed in 7 fields out of 174 examined. Only light infections were observed in the south and it was seldom seen in northern and central Alberta.

Sask.- Only slight amounts of leaf rust were recorded this year, chiefly in zones 7, 8, 10, and 11; the damage was a trace.

Man.- Leaf rust of wheat was less prevalent this year than in any other year since 1925. Only slight traces of rust were present on the durum and about 5 per cent on common wheat varieties.

Ont.- In an experimental plot of winter wheat a 60 per cent leaf rust infection was present on August 1. (3721)

Que.- Infection from leaf rust ranged from 8 to 25% in six fields of Huron wheat examined in Kamouraska county. It was less abundant in certain dry fields, where the leaves dried up early in August. At Cap Rouge the infection was about 60%. Further observations were: spring wheat varieties from 5 to 65% of leaf rust at Macdonald College; Garnet 75%, Huron 25%, at Lennoxville; Garnet 20%, Huron 5%, Red Fife trace, at Ste. Anne de la Pocatière.

N.B.- In the rod row plots, Experimental Station, Fredericton, the following leaf rust infections were recorded: heavy, 24-1316-MxG, 24-1320-MxG, 8/24-1320-MxG, Filler Garnet 22-17; heavy at ends, Early Red Fife Ottawa 16; moderate, Marquis Ottawa 15; slight, Ceres, Reliance, Red Fife Ottawa 17, Reward Ottawa 928; very slight, Huron Ottawa 3, Garnet.

N.S.- Leaf rust infection varied from 5 to 30% in the rod row plots of the Experimental Station, Kentville.

P.E.I.- Leaf rust caused slight to moderate damage to wheat in all 3 counties.

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

Alta.- Stripe rust was not reported on wheat, but light infections of this rust were found on Hordeum jubatum in moist locations in zone 2 in southern Alberta.

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

Besides the field reports from the individual provinces, Dr. W.F. Hanna has kindly supplied a summary of the data, which were collected from the records of the Western Grain Inspection Division.

Table 1. Wheat Bunt in Western Canada
Inspections from August 1, to October 31, 1934

Classes of Wheat	Cars Inspected	Cars Graded Smutty	per cent Graded Smutty
Hard Red Spring	60,269	420	0.7
White Spring	68	0	0.0
Alberta Red Winter	246	30	12.2
Amber Durum	4,351	23	0.5
All Classes	64,977	480	0.7

If the figures given in Table 1 are compared with those recorded for previous years (see summary in Ann. Rept. Can. Plant Dis. Survey 13:2-3) wheat bunt is now being controlled equally well, if not better, in durum wheat than it is in common. On the other hand, bunt was more prevalent in Western Canada in 1934 than it has been for the past two years as the following figures show:- percentage of cars graded smutty for all classes of wheat: 1931, 1.4%; 1932, 0.6%; 1933, 0.3%; 1934, 0.7%.

B.C.- Bunt was found causing slight damage in a few fields in the Fraser valley and on Vancouver island.

Alta.- Bunt was found in 6.3% or 11 fields out of 174 examined. The damage was a trace to light, except in one field near Barons in zone 3, where it was 20%.

Sask.- Wheat bunt caused a trace of damage in 7 fields out of 146 examined. For 4 locations the causal organism was recorded: Tilletia foetens at Yorkton, Gull Lake, and Webb (2164) and T. Caries at Indian Head.

Ont.- In a smut treatment experiment at Ottawa, 4.2% of bunt (T. foetens) developed in a check plot of winter wheat (3681).

Que.- A trace of bunt was found in Huron wheat at Cap Rouge, Beaumont, and Rivière Ouelle.

P.E.I.- Infections caused by Tilletia foetens ranged from a trace to 1.5%. This is the first time that more than a trace of bunt has been found in Prince Edward Island in the observers' experience (R.R. Hurst and E.B. McLaren).

LOOSE SMUT - Ustilago Tritici (Pers.) Jens.

B.C.- Loose smut was found in a few fields of imported seed on Vancouver island. Infection varied from a trace to 10%.

Alta.- Loose smut was recorded from only 6 fields out of 174 examined; the damage was a trace to slight.

Sask.- Out of 181 fields examined 9.9% or 18 were affected with loose smut. These were located chiefly in zone 7. In one survey the variety was recorded with the following results: Marquis, trace in 1 field out of 84 examined; Reward, 0.5% in 5

fields out of 6 examined; Ceres, trace in 2 fields out of 5 examined; Mindum and Garnet, no smut in one field of each examined. A collection made June 30, at Scott, was received (2168).

Man.- Loose smut was recorded in 35% or 33 fields out of 94 inspected and the average damage was estimated at 0.8%, only a trace being present in most fields. The maximum infection in Reward was 2.5%; in Marquis 3%.

Que.- In the lower St. Lawrence valley, loose smut is common in every wheat field and is increasing on certain farms from year to year. The highest infection noted this year was 18%. A trace was present in spring wheat at Macdonald College.

P.E.I.- A survey revealed that loose smut was about equally prevalent in all 3 counties; infection ranged from a trace to 55%, while the average infection for the province was nearly 11%. A correspondent from Alberton reported his Reward wheat heavily infected.

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

Sask.- A leaf spot probably of bacterial origin, was collected at Melfort.

Man.- A trace of black chaff was found on seedlings at Ste. Rose du Lac and Winnipeg, out of 90 fields examined.

In 1933 Pseudomonas translucens var. undulosa was isolated from 22 collections of wheat from 19 points in Manitoba and one in Ontario (Kapuskasing). It has also been collected once on barley in Manitoba, while the barley blight organism (P. translucens) has been isolated from 9 collections of barley from 9 points in Manitoba. (W. Hagborg)

It was very scarce this year, probably as the result of a severe late frost which killed a high percentage of the primary leaves. The death of these leaves, reduced the amount of primary black chaff infection and its subsequent secondary spread.

Que.- A 5% infection of black chaff was recorded in a plot of Marquis at Lennoxville. This is the first report of black chaff from Quebec to the Survey.

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

Alta.- Basal glume rot was reported in 8 fields out of 174 examined. Infection varied from a trace to heavy.

Sask.- Specimens affected with basal glume rot were received from Waseca, zone 11.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot moderately infected a field near Spruce Grove, while it was abundant in the University plots, Edmonton.

Man.- A trace of ergot was found at Winnipeg on wheat, which was growing close to heavily infected awnless brome grass.

Que.- A trace of ergot was found in one field at St. Denis in Kamouraska county.

P.E.I.- Traces of ergot were found on wheat in all 3 counties.

POWDERY MILDEW - Erysiphe graminis DC.

B.C.- Powdery mildew caused slight damage to wheat on Vancouver island and in the Fraser valley, infection ranging from a trace to 60%.

Alta.- Powdery mildew was fairly common in late stands.

GLUME BLOTCH - Septoria nodorum Berk.

Alta.- A heavy infection of glume blotch was observed at Fallis. Traces of the disease were common in the Peace River district.

Sask.- Glume blotch was found in 2 fields, in both of which the diseased heads had been previously injured by wind or hail.

N.B.- Glume blotch was severe in one field at Andover.

P.E.I.- Traces of glume blotch were present on some experimental rows at Charlottetown.

SPECKLED LEAF BLOTCH - Septoria Tritici Desm.

B.C.- This disease caused slight damage on Vancouver island.

Sask.- Speckled leaf blotch caused slight damage to a field of Ceres wheat at Canora (2156).

FOOT ROTS

B.C.- Take-all (Ophiobolus graminis Sacc.) caused slight damage to a field of wheat on Vancouver island.

Five per cent damage was caused by foot rot in a field in Cariboo county; the soil reaction was pH 7.2. Surface irrigation is practised in this region.

Alta.- Take-all was found chiefly in zones 2, 4, 6, and 10, 48.8% or 85 fields out of 174 examined being affected. The average damage in the diseased fields was 2.8% and the greatest damage observed was 25 and 20% respectively in two fields in zone 11.

Common foot rot (Helminthosporium sativum P.K. & B. and Fusarium spp.) was reported from 37.3% or 65 fields out of 174 examined. The average damage in the affected fields in zone 10 was 3.0%; in all zones, 1.3%.

Sask.- Scattered plants showed take-all lesions on the primary roots in a few fields in the Annaheim district in June (3643). The damage was a trace, but some browning root rot was present on the secondary roots. Take-all caused a trace to slight damage in July in many fields near St. Gregor, where most of the new wheat fields show at least a trace. Besides zone 7, a trace was found in zone 1 (1 field) and zone 9.

Foot rot of the Helminthosporium-Fusarium type became progressively more prevalent and destructive as the season advanced. It caused lesions on the sub-crown internodes of 13% of the wheat

plants and the average damage was slight in the fields examined during a trip from Saskatoon to Indian Head via Moose Jaw on June 1, while 40% of the wheat plants were so lesioned and the average damage was moderate on July 4-5 along the same route. In August the average damage was moderate to severe. Common foot rot was found in 93% or 251 fields out of 270 examined; it caused severe damage in zones 2 and 3 and moderate damage in zones 1, 7, 9 and 11. It was especially serious in the drier areas.

In a plot of Reward wheat sown early, in 18" rows apart at Saskatoon, 15 to 20 per cent of the culms bent over at the base. Isolations from affected plants yielded twice as many cultures of Helminthosporium as those of all other fungi, the chief of these being Fusarium. Other varieties of wheat showed only a trace of straw lodging. Apparently Reward is more susceptible to common root rot than the other commonly grown varieties (T.C. Vanterpool).

A trace of prematurity blight (cause unknown) was reported from zones 1 and 2, and in the plots at Indian Head.

Man.- In a survey embracing 100 fields of common wheat and 26 of durum, foot rot infections caused by Helminthosporium and Fusarium were reported as follows:-

<u>Infection</u>	<u>Common</u>	<u>Durum.</u>
Heavy	10	4
Moderate	22	3
Slight	27	10
Trace	33	8
None	8	1

The average damage was slight.

Take-all was not found in 1934.

BROWNING ROOT ROT - Pythium spp.

Alta.- Browning root rot caused 20 and 40% damage respectively to 2 fields in zone 9.

Sask.- In central Saskatchewan, where browning root rot was severe last year, it could be found only in widely scattered fields. This was true also in south central Saskatchewan, not in the dried-out areas. On the other hand, in a large area around Paynton and Lashburn in the northwest and in another between Humboldt and Melfort in the northeast, there were many severely damaged fields. Practically all inquiries received this year came from these sections. This shift in the location of browning root rot, which has been observed from year to year, shows how closely the disease is correlated with environmental factors, not only those which prevail just prior to the appearance of the disease, but possibly also those affecting the bare fallow the previous summer.

On the plains, many fields of wheat on summer fallow that had drifted badly early in May, appeared brown in the eroded areas, where top soil had been removed, and green in the drifted areas. The absence of diseased root tips containing Pythium oospores on these plants from the eroded areas readily separates this trouble from browning root rot.

Pythium arrhenomanes Drechsler, probably the chief causal agent of browning root rot of wheat, has been isolated from the following grasses; these grasses were grown in field soil naturally infested with Pythium species parasitic to wheat: awnless brome grass (Bromus inermis), couch grass (Agropyron repens), crested wheat grass (Agropyron cristatum), western rye grass (Agropyron tenerum), green foxtail (Chaetochloa viridis), reed canary grass (Phalaris arundinacea), timothy (Phleum pratense), and wild oats (Avena fatua). Pythium oospores have also been observed in diseased roots of common darnel (Lolium temulentum), Siberian millet (Chaetochloa italica maxima), and wild barley (Hordeum jubatum). (T.C. Vanterpool)

Man.- Browning root rot was found in 9 fields out of 80 examined, causing damage as follows: severe at Eden, Brandon, Forrest (2 fields); moderate at Kemnay, Souris, Deloraine; and slight at Rufford and Varcoe.

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

P.E.I.- Head blight showed infections varying from a trace to 2.5% in all 3 counties and on all varieties grown in Prince Edward Island, the damage was slight.

SPOT BLOTCH - Helminthosporium sativum Pamm. King and Bakke

Man.- A mere trace of spot blotch was found in 6 fields out of 70 examined.

ANTHRACNOSE - Colletotrichum graminicolum (Ces.) Wils.

Alta.- A light infection of anthracnose was observed in one field in zone 11. This is the first report of this disease on wheat in Canada, received by the Survey.

Coprinus Brassicae Pk. was found growing from crowns of apparently healthy green Marquis plants on August 7, in Manitoba, (Collected and identified by W.F. Hanna). This is the first record of its occurrence in Canada sent to the Survey.

FROST INJURY

Sask.- Frost on July 6 caused slight damage at Indian Head and in southeastern Sask. It was also reported that it caused some injury about August 25, at Kelvington in zone 10.

FIRING - Non-parasitic

Sask.- Several entire fields of wheat near Saskatoon showed

the tips of the terminal leaves dead or brown and in the last week of June this condition was common, according to reports. It was thought to be caused by strong warm winds, possibly combined with a lack of subsoil moisture (see Plant Disease Survey 12:10). Rains corrected the condition somewhat. (P.M. Simmonds)

PSEUDO BLACK CHAFF - Non-parasitic

Alta.- Pseudo black chaff was observed in several fields of Reward wheat.

Sask.- This discolouration was quite conspicuous in Reward wheat at the Experimental Station, Swift Current, this year.

STEM BREAK - Cause unknown, probably wind.

Sask.- Some specimens of stem break were brought to the Saskatoon laboratory by a hail inspector, who said that, in one field the damage was moderate, and traces were common.

BRITTLE DWARF - Cause unknown

Sask.- About 25% of the culms were affected with brittle dwarf in a patch about 50 feet in diameter in a field at Caron; the damage was slight. A trace was present at Hazenmore.

EEL-WORM DISEASE - Heterodera punctata Thorne

Sask.- Eelworms caused slight damage in a field in the 2nd or 3rd crop of wheat at Hepburn, 30 miles northeast of Saskatoon. This is the first report of eelworms in northern Saskatchewan, west of the Humboldt area.

EAR COCKLE - Anguillulina tritici (Steinb.) Gerv. & v. Bened.

Two samples of wheat being imported into Canada from Kashmir for experimental purposes, contained about one cockle per ounce. (2064). The shipment was destroyed. (I.L. Conners)

OATS

STEM RUST - Puccinia graminis Pers.

B.C.- Stem rust was general in most fields and caused moderate damage in some, on Vancouver island and in the Fraser valley.

Sask - Stem rust was first found on oats at Saskatoon on July 31, on about 4% of the stems. Its distribution and prevalence were similar to that of wheat stem rust, but it caused less damage being a trace to slight in southern Saskatchewan and slight to moderate in zones 7, 9, and 11.

Man.- Stem rust infection of oats was somewhat heavier than that of wheat stem rust. However, in only a small number of fields was the average infection over 20%; the average damage was slight. (B. Peturson)

Que.- Stem rust varied from a trace to 25% in western Que.; the damage was slight to moderate. It was not present at Macdonald College on July 9, but it developed later. Of a number of varieties at Lennoxville, Cartier was the most heavily rusted and Legacy the least. It was general on oats in Kamouraska county and at Cap Rouge. Infections varied from 2 to 40%, but the damage was slight.

N.B.- A trace to slight infection of stem rust was found on oats in the experimental plots, Fredericton, and in York county; the damage was slight.

N.S.- Forty per cent of stems were rusted in a 5-acre field at Kentville.

P.E.I.- The average infection of stem rust was 10% in 60 fields examined in the 3 counties; the damage was slight to severe.

CROWN RUST - Puccinia coronata Cda.

Sask.- Crown rust was not found in Saskatchewan this year.

Man.- Traces of crown rust were present in the eastern part of Manitoba, but it was almost entirely absent from the western part.

Que.- A trace of crown rust was found on oats on July 6. A 15% infection was recorded on Legacy at Lennoxville on July 25, while less was present on other varieties. Crown rust was light but general throughout the lower St. Lawrence valley, but it caused no apparent damage.

N.B.- Crown rust caused severe damage to one field of white Russian in Westmoreland county, and one field of Victory at the Experimental Station, Fredericton.

N.S.- Crown rust moderately infected oats in the rod row plots at Kentville. Adjacent fields were only slightly infected. One field in Pictou county was moderately infected while single fields in Kings and Colchester bore traces of rust.

P.E.I.- Crown rust infection varied from a trace to severe on all varieties grown in Prince Edward Island, while the damage was correspondingly slight to severe. No aecia were observed on buckthorns this year.

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

B.C.- Both the loose and covered smuts caused slight damage in a few fields in the Fraser valley.

Alta.- Smut caused an average damage of 4.9% in the infected fields, the number not being recorded; the highest infection was 65% in a field near Perryvale.

Sask.- In south and eastern Saskatchewan, loose smut was found in 3 fields out of 19 examined; the average infection was 0.3% and the highest 5% at the Experimental Farm, Indian Head. In the same area, covered smut was found in 11 fields, the average infection was 3.7%, and the highest 30% at Langenburg. In a

similar survey in zones 7, 9, and 11, no loose smut was found, but covered smut was present in 18 out of 29 fields examined and the average infection was 4.0%. Loose smut was found affecting a few heads in the University plots, Saskatoon. Collections were received as follows: loose smut from Indian Head, July 14 (2188); covered smut from Duff, August 15 (2190) and Radisson, August 3 (2181).

Man.- Smut was found in 16 fields out of 40 examined. The average infection was 0.8%, the maximum infection 15%.

Que.- Covered smut is more common than loose smut, both in western Quebec and along the St. Lawrence between Cap Rouge and Rimouski. The highest recorded infection was 5%.

N.B.- Traces of both loose and covered smut were recorded, the former in Westmoreland county and the latter in York county.

N.S.- Loose smut was reported from 8 fields in 4 different counties; the average infection was 13%, while the maximum was 20%. For 5 of these fields it was learned that the oats had not been treated. Covered smut infected 15% of the heads in one field sown with untreated oats in Colchester county.

P.E.I.- Five per cent of loose smut was found in Banner and 7% in Black in Kings county.

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

Alta.- Damage from halo blight was a trace in 6 fields and heavy in one, the latter in zone 10.

Sask.- Halo blight was reported from 7 fields out of 52 examined; the damage was slight in the south and moderate to severe in the northeast. Specimens received from Indian Head collected July 16 (2192).

Man.- Halo blight was recorded in 18 fields out of 40 examined; the average damage was slight. In a few fields 100% of the plants were infected, in some it was mixed with stripe blight.

Que.- Halo blight infection was slight to moderate on oats at Macdonald College and Lennoxville, and a trace at Ste. Anne de la Pocatière. Cartier appeared to be one of the most susceptible varieties.

N.B.- Infection by halo blight was recorded in rod row plots at Fredericton as follows:- severe on Robin, moderate on Foster, slight on Eagle, very slight on Laurel.

P.E.I.- A trace of halo blight was reported on breeding material at Charlottetown.

STRIPE BLIGHT - Bacterium (Pseudomonas) striafaciens Ch. Elliott

Alta.- Stripe blight caused slight damage in one field in zone 10.

Man.- Stripe blight infected oats as follows: moderate at Starbuck and a trace at Letellier. Stripe blight may have been present in some fields reported as affected by halo blight due to the infections being mixed.

FOOT ROTS

B.C.- Foot rot attributed to Fusarium culmorum (W.G. Sm.) Sacc. caused slight damage in a field in Cariboo county. The soil reaction was pH 7.2.

Alta.- Common foot rot thought to be due to Fusarium spp., was found in 11 fields out of 77 examined. The average damage in the zones surveyed was: zone 2, 7.5%; zone 4, 3.6%; zone 6, 0; zone 10, 1.7%; zone 11, 0; zone 12, 0.5%; general average, 3.3%.

A new foot rot of oats (Colletotrichum graminicolum (Ces.) Wilson) reported for the first time last year by Sanford was found in 32 fields out of 92 examined, mostly in zones 10 and 11. The damage was as follows: heavy in 2 fields, moderate in 3, slight in 24, and a trace in 3.

Anthraxnose (Colletotrichum graminicolum) on the above-ground parts of the plant, caused slight damage in one field in zone 11.

Sask.- Foot rot of the Helminthosporium-Fusarium type was present in 90% or 67 fields out of 74 examined. It was about twice as prevalent in the southern part of Saskatchewan, as in the central and northern districts; the average damage was: south, slight to moderate; central and north, slight.

Foot rot (Fusarium spp.) caused 5% damage in oats in rod rows 18" apart. The wide spacing was an innovation this year and it apparently allowed foot rot damage to become more manifest (see report under wheat). (T.C. Vanterpool)

Prematurity blight caused slight damage in 4 fields out of 29 examined.

Man.- Foot rot caused by Helminthosporium and Fusarium spp. was found in 25 out of 45 fields examined. Infection was as follows: moderate in 2 fields; slight in 4; trace in 19.

LEAF BLOTCH - Helminthosporium Avenae Eidam

B.C.- Leaf blotch caused slight damage to oats at Saanichton.

Que.- This disease was reported in 3 fields at Ste. Anne de la Pocatière, where it caused a trace of damage, although infection was higher in low, wet spots in one field.

N.B.- Leaf blotch caused slight damage to variety 1944-3-13 in the rod row plots, Fredericton.

P.E.I.- Moderate damage was caused by leaf blotch to Banner in a field in Queens county.

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

Que.- Speckled leaf blotch was observed on oats on June 20 at Macdonald College. In late July infection ranged from 20 to 45% there and at Lennoxville, while a trace to 5% was present at Ste. Anne de la Pocatière.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.- Ergot caused moderate damage to one field of oats in zone 10.

POWDERY MILDEW - Erysiphe graminis DC.

Alta.- Powdery mildew appeared on oats in the greenhouse at Edmonton for the first time.

HEAD BLIGHT - ?Fusarium spp.

Alta.- Head blight caused slight damage in one field in zone 10.

BLAST - Cause unknown

Alta.- Blast was found in 60 fields out of 77 examined. Damage was more severe this season than usual, the average for the affected fields being 10.9%

Sask.- Blast was reported from 41 fields, well distributed over the province, out of 55 inspected. The damage varied from slight to moderate.

Man.- Blast was severe on nearly all plants in a field at Giroux, it caused slight damage at Elm Creek and Elie.

N.B.- The disease was general in York, Carleton, Charlotte and Sunbury counties.

P.E.I.- Blast caused moderate damage on Banner. Infection ranged from a trace to 12% in the 15 fields examined.

EEL-WORM DISEASE

Ont.- The following notes on the discovery of Heterodera schachtii on oats and other cereals were prepared by Mr. D.F. Putnam, and Dr. Thorne respectively:-

During the past few years a serious seedling disease has affected the oat crop in the southern part of Simcoe county. Examination of diseased oat plants collected in July 1933, showed them to be badly infected by root rotting fungi; in addition, large numbers of nematode oysts were found adhering to the roots. The observations were continued in 1934 and a survey made to determine the host range of the parasite and the area of the infested territory. To date the parasite has been found capable of completing its development upon the following hosts: oats, wild oats; barley, spring and fall wheat, speltz and chess. Specimens of the nematodes found on oats were submitted to Dr. Thorne of the U.S.D.A. who identified them as Heterodera schachtii; those on the other host plants have been compared and found to be identical. This is the first reported case of Heterodera schachtii infesting cereals in America, although it has been known as a serious parasite in Europe since 1874.

The present area of infestation includes a rather compact district of about thirty square miles in South Simcoe and a much smaller area which has been found in Ontario county. A total of 139 infested fields were found on about 75 different farms. Of these over 90% were located on the same type of soil, a heavy silty clay loam, excessively high in lime and very strongly alkaline.

The disease is apparently more severe upon oats than upon any of the other cereals, so the following brief description will deal only with the oat plant. The symptoms first appear about three weeks after seeding, when the seedlings have two leaves each. The leaves stand stiffly erect with somewhat inrolled margins and the tip of the first leaf turns a brick red colour which gradually involves the whole leaf and often the second leaf as well. Ordinarily, very few plants are actually killed, but because of their stunted growth, the field takes on a very patchy appearance. The greatest contrast is to be seen in the roots. While the roots of healthy oat seedlings are long, white and almost unbranched, infested roots are short, thickened and beset with short stubby laterals. The whole system has a very bushy appearance, a crisp texture and a dirty yellow or yellowish brown colour. Diseased plants are late in maturing and bear small unfilled heads. In dry years an infested field represents a total crop failure.

(D.F. Putnam)

On July 25, 1934, a collection of oat roots heavily infected with Heterodera schachtii was received from Mr. D.F. Putnam of the Ontario Research Foundation, Toronto, Canada. Mr. Putnam reported that "It was a severe seedling disease of spring cereals in Ontario". This constitutes the first record of H. schachtii as infesting oats in America, although it is frequently reported as a serious parasite in Europe.

Comparison with Heterodera punctata Thorne, which attacks wheat in Saskatchewan, Canada, showed that the two were very distinctly different. (Gerald Thorne)

BARLEY

STEM RUST - Puccinia graminis Pers.

Sask.- Stem rust was present in all fields examined and was more abundant than last year, but it caused slight damage.

Man.- Very little stem rust was present except in late fields and the average damage was a trace. The maximum infection was 50 to 60%, which was found in a single field.

Ont.- Stem rust was collected on barley at Ottawa, August 1 (2060).

Que.- Stem rust was heavy in one field in Mississiquoi county. While low percentages were recorded at Lennoxville and in Kamouraska county, where it appeared patchy in three fields.

N.B.- A trace of stem rust was recorded at the Experimental Station, Fredericton.

P.E.I.- A trace to 10% of stem rust was reported on Charlottetown 80 in Queens county.

LEAF RUST - Puccinia anomala Rostr.

B.C. Leaf rust caused slight damage to barley in the Fraser valley and on Vancouver island.

Man.- A trace of leaf rust was recorded at Portage la Prairie.

Ont.- Leaf rust was collected on barley at Ottawa, August 1. (2059)

Que.- The following percentages of leaf rust were reported on barley at Lennoxville: 20%, O.A.C. 21; 5%, Velvet; 3%, Oxford; trace, Bearer, Pontiac, and Gordon.

Leaf rust was more common than stem rust in Kamouraska county, an infection of 70% was present in 3 fields.

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

Alta.- Covered smut was reported in 21 fields out of 43 examined. The average damage was 2.9%.

Sask.- Eight fields out of 16 examined were affected with covered smut. The average damage was 1%, the two highest infections being 6% at Moosomin and 5% at Swift Current (2189).

Man.- Covered smut was found in 2 fields out of 30 examined; in one at Grayville 20% of the heads were diseased.

Que.- About 1% of the heads were affected with covered smut in a field showing also loose smut, at Macdonald College. A trace was also present in the Agronomy plots.

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

P.E.I.- Traces of covered smut were present on Himalayan, Charlottetown 80, Manchurian and O.A.C. 21, at Charlottetown.

LOOSE SMUT - Ustilago nuda (Jens.) Rostr.

B.C.- Loose smut caused slight damage to barley on Vancouver island and the lower mainland.

Alta.- Loose smut was reported from 5 fields out of 43 examined; the average damage in affected fields was 1.1%.

Sask.- This smut was found in 5 fields out of 23 examined. The average damage was a trace; the highest infection was 5% at Melville.

Man.- Loose smut caused a trace of damage in 8 fields out of 30 examined; the maximum infection was 2%.

Que.- Loose smut varied from a trace to 5% in fields and plots in western Que, while infections ranged from a trace to 1% in Kamouraska county, where the disease was uncommon this year.

P.E.I.- Loose smut infected from a trace to 15% of the plants in Prince, Queens and Kings counties. All varieties grown in P.E.I. were affected.

STRIPE - Helminthosporium gramineum Rabh.

B.C.- Barley stripe was reported from Lillooet district.

Alta.- A trace of stripe was found in one field, located in zone 10, out of 43 fields examined.

Sask.- A trace of stripe was reported from one field.

Man.- Stripe was reported from 3 fields as follows: moderate infection at Brandon and Ashville and a trace at Petersfield.

Ont.- A few plants were found affected with stripe at Ottawa (2056).

Que.- Stripe was observed in one field at Ste. Anne de la Pocatière. It occurred in patches, 5 to 15% of the plants being infected.

P.E.I.- Stripe caused moderate damage in Prince county, the rate of infection being 5 to 20%.

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

Alta.- A trace of net blotch was found in 7 fields out of 43 examined.

Sask.- Net blotch caused moderate damage in 4 fields out of 10 examined.

Man.- Net blotch was present in 11 fields out of 25 examined. The average damage was slight to moderate. In a few fields 100% of the plants were infected.

N.B.- Net blotch caused slight to moderate damage to the following varieties in the rod row plots, Fredericton: Byng, Sanalta, Trebi, Glabron, Hannoehen Sask. 229, Peatland, Nobarb, Star, Washington 4725, O.A.C. 21, Wisc. Pedigree 38.

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

B.C. Spot blotch was fairly general, but caused slight damage on Vancouver island.

Alta.- A leaf spot (Helminthosporium sp.) caused moderate to heavy damage in 2 fields in zone 11, out of 43 examined in the province.

Man.- Spot blotch was reported from 2 fields out of 46 inspected. Usually only a trace was present, but in 3 fields 75 to 100% of the plants were affected.

Que.- Spot blotch infections ranged from a trace to 25% at Macdonald College and Lennoxville, while a trace was present at Ste. Anne de la Pocatière.

FOOT ROTS

Alta.- Take-all (Ophiobolus graminis Sacc.) caused moderate damage in one field out of 43 examined.

Foot rot of the Helminthosporium-Fusarium type, was found in 53% or 23 fields out of 43 inspected; the average damage was 1.9%.

Sask.- Common foot rot (Helminthosporium and Fusarium spp.) became increasingly more injurious as the season advanced. It was present in practically every field in the southern sections and caused moderate to severe damage, in the central and northern districts it was less prevalent and severe.

A trace of prematurity blight (cause unknown) was present in one field in zone 1.

Man.- Foot rot was found in all 22 fields examined; infections varied as follows: Heavy, 2 fields; moderate, 7; slight, 7; trace, 6.

Barley

ERGOT - Claviceps purpurea (Fr.) Tul.

Sask.- A trace of ergot was reported from 2 fields out of 10 examined.

P.E.I.- Traces of ergot were found in most barley fields.

SCALD - Rhynchosporium Secalis (Oud.) Davis.

Alta.- Scald was heavy in 2 fields out of 43 examined.

TWIST - Dilophospora Alopecuri (Fr.) Fr.

Sask.- A portion of the original collection made on barley at Carlyle, Sask., July 27, 1924 by Dr. P.M. Simmonds has been deposited in the Ottawa herbarium (2129). This is the only record of this disease on cereals in Canada. (See Drayton, F.L., Dom. of Canada Dept. Agr. Bull. 71 n.s.:14. 1926, for a more extended account).

POWDERY MILDEW - Erysiphe graminis DC.

B.C.- Powdery mildew was fairly general, but it caused slight damage on Vancouver island.

Que.- At Lennoxville; powdery mildew infected barley as follows: 40%, Bearer; 30%, O.A.C. 21; 20%, Oxford; 10%, Gordon and Pontiac; and trace, Velvet. The disease was also general on barley in Kamouraska county, 100% of the plants being infected.

P.E.I.- Powdery mildew moderately infected barley in Queens county.

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

Man.- Pseudomonas translucens was isolated from lesions on barley collected at Brandon and Morden (see also report under wheat).

FALSE STRIPE - Heterosporium Avenae Oud.

Alta.- False stripe caused moderate damage in one field in zone 10.

Man.- False stripe was reported from 10 fields. The average infection was a trace, but in one field 20% of the plants were affected.

NON-PARASITIC LEAF SPOTS

After the appearance of Christensen's interesting paper (Phytopathology 24:726-742. 1934) barley fields in zone 9 were examined for non-parasitic leaf spots. They were relatively inconspicuous there and in the University plots, Saskatoon, although the latter half of the season was very dry. (T.C. Vanterpool)

HEAT INJURY

Sask.- The terminal leaves of many plants were killed by heat in several University plots. The damage was slight.

RYESTEM RUST - Puccinia graminis Pers.

Man.- No stem rust was found in 1934.

Que.- A trace of stem rust was reported from Macdonald College.

LEAF RUST - Puccinia dispersa Erikss.

Man.- No leaf rust was found in 1934.

Que.- Leaf rust caused infections ranging from a trace to 85% at Macdonald College.

STEM SMUT - Urocystis occulta (Wallr.) Rabh.

Sask.- Traces of stem smut were observed at Abernethy (2193) and Indian Head.

Man.- No stem smut was found in 1934.

ERGOT - Claviceps purpurea (Fr.) Tul.

Sask.- Traces of ergot were reported from 2 fields out of 7 surveyed. It was also present in the University plots, Saskatoon.

Man.- Ergot was found in 4 fields out of 12 examined as follows: trace, Cowan and Ethelbert; 10% of the plants, Bowsman; 75% of plants, experimental plots, Winnipeg (natural infection).

Que.- No ergot was seen in rye at Macdonald College. Ergot developed on rye grown in 1934 on Anticosti Island (2262).

FOOT ROTS

Sask.- Foot rot of the Helminthosporium-Fusarium type caused moderate damage in all 6 fields surveyed.

Man.- A trace of foot rot was present in 8 out of 12 fields examined.

POWDERY MILDEW - Erysiphe graminis DC.

Que.- Powdery mildew moderately infected the leaves of rye at Macdonald College.

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

Sask.- Bacterial blight caused a trace of damage in 3 fields. It destroyed about 10% of the leaf surface, the maximum infection, in one field at Belcarres. A collection was received from Indian Head (2191).

Man.- Five per cent of the plants were infected by bacterial blight at Carmen.