DISEASES OF CEREAL CROPS

WHEAT

STEM RUST - Puccinia graminis Pers.

B.C.-

Only a slight amount of stem rust was present on Vancouver island and in the lower Fraser valley.

Alta.-

Stem rust was first collected on August 31, just as the crop was mature (G. B. Sanford). Afterwards some of the late crop in Plant Disease Survey zone 9 was found slightly rusted. Late volunteer plants in southern Alberta were similarly affected. Stem rust was observed in 24 fields out of 702 examined, being present in zones 2,4 and 8-10. It caused no appreciable damage. (For an explanation of the Plant Disease Survey Zones established for the 3 Prairie Provinces see the Foreword).

Sask.-

The first collection of stem rust was made at Indian Head on July 11, when a single infected plant was found. By July 15 rust could be found as far north as Wadena and on July 26, it was reported from Pontrillas, 60 miles north of Saskatoon.

In Saskatchewan the rust situation was similar to that in Manitoba. Rust infection in the drier areas was very light, while in the heavier crop regions stem rust was abundant. Infections from 50 to 80 per cent were reported on common wheat throughout the area from Indian Head to the Manitoba boundary; 50 to 100 per cent from the Manitoba boundary to Melville, where the crops were, in general, late; and 25 to 50 per cent from Melville west to Qu'Appelle. From Moosomin southward rust infections became progressively lighter, ranging from 20 to 40 per cent about Carnduff and Estevan. Westward towards Weyburn infections became still lighter; in this district the rate of infection was less than 20 per cent. Only traces of rust were found in the Saskatoon area and infections were light throughout western Saskatchewan. No estimate of the damage caused by rust was made.

On durum wheat infections ranged from a trace to 15 per cent.

Man.-

Stem rust was quite prevalent on common wheat throughout the whole of Manitoba and was fairly heavy in all sections of the province except the south west corner, which suffered from lack of precipitation. The drought had served to check the progress of the rust to such an extent that losses in that area were estimated to be not more than 3 per cent. In all districts of the province outside the dry

Wheat

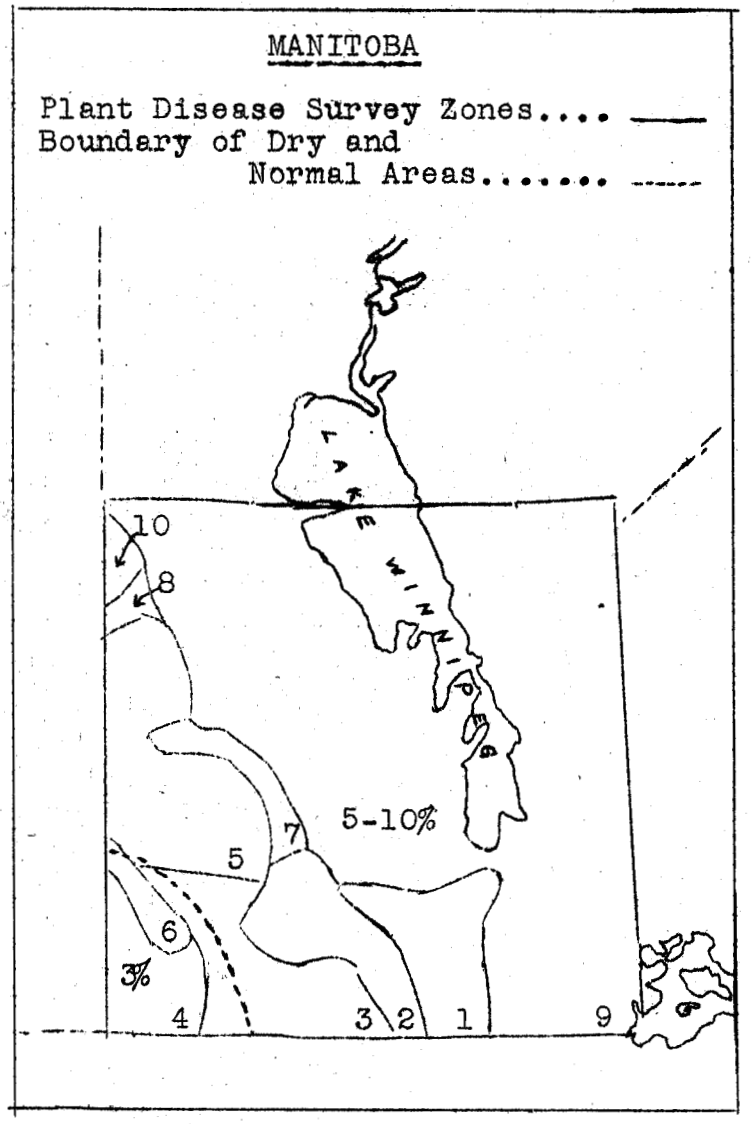

Fig. 1 Prevalence of stem rust in Manitoba in 1930.

area, stem rust losses were estimated to be 5 to 10 per cent of the crop. The severity of the rust in particular fields varied widely with the rankness of growth and the lateness of maturity. Early thin stands were only slightly affected while in fields, where the crop was heavy and late, it was invariably heavily infected and severely damaged by rust, both the grade and yield of grain being lowered. (See Fig. 1).

Weather conditions were favourable for the development and spread of stem rust, from the time of its appearance in June until the latter part of July. A period of hot, dry weather, which began then and extended into August, greatly hastened the maturity of the crop and to some extent retarded the further advance of stem rust. The rust, however, had become too firmly established to be materially checked by a few days of adverse weather conditions.

Stem rust was first observed on wheat on June 26, at Winkler, where several culms were found affected, each bearing a single pustule. A careful survey of the Red River valley at that time failed to reveal additional infections. Traces of stem rust were found on July 3-5 throughout the southern part of Manitoba as far west as Regent. Secondary infections of stem rust were present on July 8 in the Red River valley. Traces of rust were found north of Portage la Prairie on July 10, and as far north as Roblin on July 17. Stem rust became steadily more prevalent, first in the Red River valley, and then throughout the province reaching the proportions indicated in the first paragraph.

Only slight traces of stem rust developed on durum wheat; the infection was not sufficiently heavy to cause measurable damage.

Ont. -

Stem rust was fairly light in southern Ontario. It was also light in the Experimental plots at Ottawa, the infection being about 10 per cent.

Que.-

In Kamouraska and l'Islet counties stem rust infections were about 10 per cent on Marquis and 10 to 20 per cent on Huron.

P. E. I.-

Only traces of stem rust were present on the early maturing crops, while it was abundant, causing appreciable damage, in late fields of wheat.

LEAF RUST - *Puccinia triticina* Erikss.

B.C.-

Slight infections of leaf rust were observed on Vancouver

Wheat

island and in the lower Fraser valley.

Alta.-

Secondary infections of leaf rust were found on winter wheat at Claresholm as early as April 10, by Dr. Sanford. In these fields he believed that the rust had overwintered.

Only traces of leaf rust were found in 14 fields out of 702 examined in August. The fields were located in zones 2-4, 9 and 10.

Sask.-

Only a slight infection of leaf rust was reported. The first recorded infection was observed on June 25 at Saskatoon. Leaf rust had begun to spread by this date in south-eastern Saskatchewan.

Man.-

Leaf rust was first collected at Treesbank. Primary infections occurred early and by July 8 the rust was fairly prevalent on common wheat throughout southern Manitoba. It became very abundant in central and southern Manitoba at the close of the growing period, the degree of infection ranging as high as 90 per cent, with 100 per cent of the plants infected. The losses from leaf rust are included in the estimated losses from stem rust. Durum wheat was only slightly infected.

Ont.-

Leaf rust was present in rather limited quantities in southern Ontario. On the other hand it was prevalent in Carleton county. An average infection of 40 per cent was common on Marquis and Huron, by July 15. At Kemptville, in Grenville county, 60 to 100 per cent of the leaf surface of Kharkov, a winter variety, was rusted by July 5.

P.E.I.-

Leaf rust was abundant on Huron, causing some premature withering of the leaves.

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

Alta.-

Stripe rust was found on wheat in southern Alberta only, in 16 fields out of 711 inspected. Fairly heavy leaf infections were noted in several fields of Red Bobs and Kitchener. It was also collected on Marquis. Stripe rust was found in both southern and central Alberta on Hordeum jubatum, being observed in 46 locations out of 96 inspected. The rust was more abundant in southern Alberta, appearing first in June, but it was also present in central Alberta by September. No collections were made on Agropyron tenerum, A. Smithii and A. dasystachyum. Stripe rust was also collected at Windermere, B. C.

Wheat

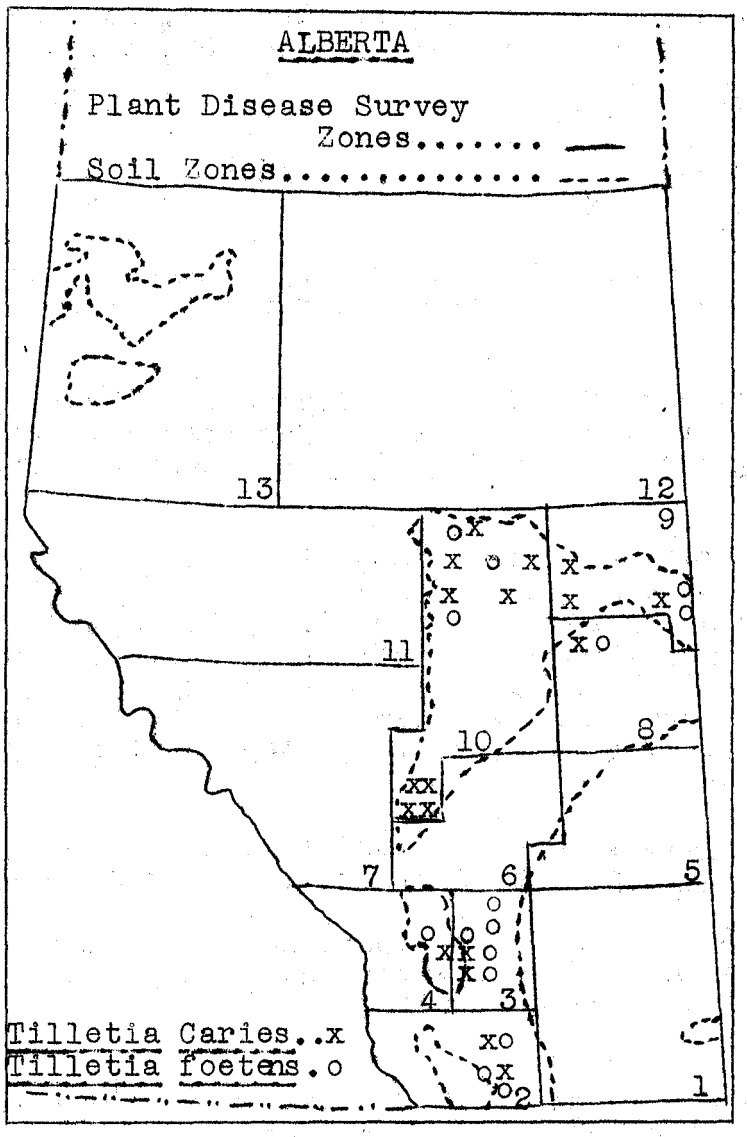

Fig. 2. Prevalence of Tilletia Caries and T. foetens in Alberta in 1930.

LOOSE SMUT - Ustilago Tritici (Pers.) Jens.

B.C.-

Slight infections of loose smut were found on Vancouver island and the lower Fraser valley.

Alta.-

Loose smut was comparatively rare this year. Traces were found in 11 fields out of 702 examined. The heavy infection in Reward wheat in 1928 has tended to disappear in the last two years. By actual count the highest infection observed in this variety was 3/10 of one per cent according to Dr. Sanford.

Sask.-

Out of about 360 fields examined, 42 showed traces of loose smut, while in 9, infections ranged from 1 to 5 per cent.

Man.-

Loose smut was found in 88 out of 115 fields, causing an estimated average loss of 0.6 per cent. This figure may be somewhat too high as Reward wheat was more severely affected than other varieties, while the acreage devoted to this variety was comparatively small.

Ont.-

In southern Ontario loose smut was very heavy on Dawson's Golden Chaff and Imperial Amber. It apparently is becoming more serious. In Carleton county loose smut was comparatively heavy. Infections ranged from a trace to 7 per cent, being particularly heavy on Huron. Practically every field showed at least a trace.

Que.-

Loose smut was observed in Kamouraska and l'Islet counties, infections varying as follows: Marquis 2-5 per cent; Huron 3-10 per cent. Out of 20 fields of Huron examined none were free from smut.

BLACK CHAFF - Pseudomonas translucens J.J. & R. var. undulosa J.J. & R.

Alta.-

Only one definite case of black chaff was observed. A discoloration of Reward wheat, which superficially resembles black chaff, is apparently not caused by the black chaff organism (G. B. Sanford). (See 1929 Report p. 7).

Sask.-

Black chaff was observed in the University plots, Saskatoon, especially on hybrid plants. The disease was patchy and light,

causing practically no damage.

Man.-
Black chaff was not common this year; a trace was found in several fields. In a field near Morden, however, 90 per cent of the plants were severely infected.

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

Alta.-
Basal glume rot was present in 20 fields out of 702 examined. In most fields, only a trace of infection was recorded, but in 2 fields 50 per cent of the plants were affected.

Sask.-
The disease was found in only 3 fields, the damage being merely a trace in every case.

Man.-
Traces of basal glume rot were found in 9 fields in zone 1.

P.E.I.-
Glume blotch was observed, causing 10 to 25 per cent infection on Red Fife and Huron respectively. The damage was moderate. (This report should be under Glume Blotch, page 12.)

ERGOT - Claviceps purpurea (Fr.) Tul.

B.C.-
A very slight amount of ergot occurred on Vancouver island and in the lower Fraser valley.

Sask.-
Traces were found on wheat in several parts of the province, but it was relatively rare and of little economic importance this year.

N.B.-
A single infected plant was found in York county.

P.E.I.-
A trace was observed on Huron wheat.

POWDERY MILDEW - Erysiphe graminis DC.

B.C.-
Heavy infections on wheat occurred at the Experimental

Farm, Saanichton. The damage was nil.

Alta.-

Dr. Sanford reported that a trace of powdery mildew could always be found if a careful examination was made. Sometimes the infection was heavy, but no damage from the disease could be detected. Powdery mildew was reported less frequently by Dr. Henry; he also found it causing no damage.

Sask.-

A fairly heavy infection of powdery mildew was reported on the lower leaves of winter wheat in the University plots, Saskatoon. The damage was probably slight. It was also severe on several plots of spring wheat.

Ont.-

The lower leaves on several varieties were heavily infected in the Experimental Farm plots, Ottawa. A medium infection of the lower leaves of Kharkov, a winter wheat was noted at Kemptville.

P.E.I.-

A trace was observed at the Experimental Station, Charlottetown.

FOOT AND ROOT ROT

The foot and root rot diseases of wheat are considered together as the records that were submitted frequently discussed all these diseases as a unit, with special reference here and there to specific pathogens.

B.C.-

Take-all (*Ophiobolus graminis* Sacc.) was serious in a number of districts.

Foot rot (*Helminthosporium sativum* P.K. & B.) caused considerable damage in certain districts.

Alta.-

As in 1929, damage from foot and root rots was difficult to determine in certain areas, where precipitation was light during May, June and early July. The zones where root rot damage was obscured by dry soil conditions were 1, 5, 6, 8 and 10.

Take-all (*Ophiobolus graminis*) was more abundant and more widely distributed than in 1929. It was particularly prevalent in the black soils of zones 9 and 10, although it was present in the adjacent zones and in southern Alberta. It was reported in 60 fields out of 286 examined (A. W. Henry).

Wheat

The total damage from take-all was decidedly greater in 1929, particularly in zones 2, 4, 9 and the eastern portion of 11 (G. B. Sanford).

Regarding the root rotting organisms Dr. Sanford said "As usual Helminthosporium sativum, Fusarium spp., Wojnowicia graminis (McAlp.) Sacc. & D. Sacc. and Leptosphaeria herpotrichoides de Not. were general over Alberta." Combining the root rot caused by Ophiobolus graminis and Helminthosporium sativum he found 277 fields diseased out of 416. The estimated average damage for all fields was 2 per cent. In fields, where the disease was more than a trace, the average damage was placed at 5.8 per cent. Zones 12 and 13 were not surveyed. Leptosphaeria herpotrichoides was definitely identified in 5 collections of root rot.

Foot rot in Alberta, aside from take-all, appeared to be primarily caused by Helminthosporium sativum and Fusarium spp. according to Dr. Henry, although Leptosphaeria herpotrichoides and Wojnowicia graminis were also present. He reported foot rot in 163 fields out of 286 examined. It was most prevalent in zones 2-4 and 10. The estimated average damage for all fields was 0.27 per cent.

Sask.-

Take-all (Ophiobolus graminis) was found in 87 fields out of 483 examined. The severity of infection was estimated as follows: a trace (less than one per cent), 65 fields; light (1-5 per cent), 14; moderate (6-20 per cent), 5; and severe (over 20 per cent), 3. In a field in southern Saskatchewan 48 per cent of the plants showed lesions and Ophiobolus mycelium in June. No estimate of damage was made.

Take-all appeared on Kharkov wheat in the University plots, Saskatoon. Take-all patches were scattered through the plots, but caused little damage. Plates of typical Ophiobolus mycelium were present inside the sheaths of the lower leaves, but no perithecia were observed. Instead, mature pycnidia of Wojnowicia graminis were abundant on the take-all plants.

Prematurity blight was found in 9 fields out of 219 examined; only traces were present in the diseased fields.

Browning root rot was reported by Dr. Simmonds, from 144 fields out of 483 examined. The severity of infection was as follows: a trace in 58 fields; light in 19, moderate in 38, and severe in 29.

Browning root rot caused by Pythium spp. etc. was not as severe on spring wheat over the province as a whole as in the wetter season of 1928. It probably was least common and of little

economic importance in the south-west part of Saskatchewan. It appeared to be confined to the crop on summer-fallow. Frequently seventy-five per cent of the plants were attacked causing medium to heavy damage. In severe cases a loss of 10 to 15 bushels per acre is common. Many farmers have reported a lower yield of wheat on summer-fallow than on stubble. The disease is first noticed on the plants when they have reached a height of 4 to 8 inches. The seasonal distribution depends on rainfall and temperature (T. C. Vanterpool).

Browning root rot was also found on Kharkov (winter wheat) on the University plots, Saskatoon. In a "date of seeding" experiment, plants from all "dates of seeding" had as many as one third of their root tips necrotic and packed with Pythium oospores. It was difficult to estimate the damage. This is probably the first report of Pythium on winter wheat in Saskatchewan (T. C. Vanterpool).

Helminthosporium- Fusarium root rot caused by Helminthosporium sativum and Fusarium spp. was found in 440 fields out of 483 examined. The severity of infection was as follows: a trace in 36 fields, light in 32, moderate in 140 and severe in 232. The damage is exceedingly difficult to estimate.

Man.-

Traces of take-all (Ophiobolus graminis) were found in one field in each of the zones 1, 2 and 4.

Root rot caused by Helminthosporium sativum and Fusarium spp. was found in 79 fields out of 124 examined. The average percentage of plants infected by zones were as follows: zone 1, 4 per cent; zone 2, a trace; zone 3, 3 per cent; zone 4, 20 per cent; zone 5, 2 per cent; zone 8, a trace, zone 9, 15 per cent. Although it is difficult to estimate the damage caused by root rot, losses were undoubtedly heavy in zone 4.

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

Alta.-

A single blighted head was found at New Norway by Dr. Henry in August. Material bearing perithecia of Gibberella Saubinetii was collected at Claresholm in April by Dr. Sanford. The fungus was isolated in pure culture from the perithecia.

Man.-

Traces only of head blight were found in zones 1 and 2.

N.B.-

A trace of head blight was found on Garnet wheat in the rod-row plots at the Experimental Station, Fredericton.

Wheat

P.E.I.-

Infections varying from a trace to 100 per cent were observed on Huron and Red Fife in Kent and Prince counties. Appreciable losses from this disease occur each year (R.R. Hurst).

HEAD BLIGHT - Helminthosporium sativum P.K. & B.

Head blight, caused by Helminthosporium sativum, was reported on wheat from Edmonton, Alta. It also caused some spotting of the leaves.

GLUME BLOTCH - Septoria nodorum Berk.

B.C.-

Slight infections of glume blotch were observed.

Alta.

Glume blotch was found in only 16 fields out of 702 examined, wheat being remarkably free from this disease in 1930. Infection rarely exceeded a trace.

Sask.-

Glume blotch was found in only 3 fields. Infection was a trace in each case.

LEAF SPOTS - Cause undetermined.

Alta.-

Wheat affected with leaf spots were reported by Dr. Sanford in 11 fields out of 416 examined. The foliage was remarkably free from leaf spots.

Sask.-

Leaf spots were very prevalent and difficult to identify. Some of the spotting was due to Septoria spp. or bacteria, but in many instances the cause was unknown. Leaf spots were reported in 174 out of about 300 fields examined. The severity of infection was as follows: Trace in 59 fields, light in 8, moderate in 30; and severe in 77.

NEMATODE DISEASE - Heterodera punctata Thorne

This disease was reported twice in Sask. "This nema appears to come from the native sod when it is broken up; it is apparently parasitic and easily destroyed by crop rotation."

(R.C. Russell).

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

Before summarizing the results of field surveys in B. C., Alta., and Sask., data obtained from the records of Western Grain Inspection Division covering western Canada for the three months ending Oct. 31, 1930 are given. The records show that the following percentages of cars graded "Smutty":-

Hard Red Spring	1.7 per cent
Alberta Red Winter	5.5 " "
Durum	16.6 " "
All wheat	2.8 " "

Compared with 1929 there was a marked increase in losses from bunt especially in Hard Red Spring wheat.

B.C.-

There were fairly heavy losses from bunt in winter wheat on Vancouver island and in the lower Fraser valley. Both species of Tilletia were present, T. Caries predominating.

Alta.-

Bunt was unusually common this year and appeared to be more prevalent than in 1929 according to Dr. Henry. It was reported in zones 2-4, 6 and 8-10, in 36 out of 286 fields inspected. The damage was estimated at 1.4 per cent. An examination of the spores showed that both species of Tilletia were equally prevalent and were present in the same territory. (See Fig. 2). The relative prevalence of the species by zones was as follows:

Tilletia Caries, 5 collections in zones 2-4 and 14 in zones 8-10;
Tilletia foetens, 9 collections in zones 2-4 and 6 in zones 8-10.

Dr. Sanford did not report as heavy losses as given above, but he noted that some elevators had reported a considerable number of cars grading "Smutty".

Sask.-

Bunt was found in 10 fields out of 200 examined. The damage was estimated at one per cent.

Que.-

Bunt was found in 4 fields out of about 20 examined in Kamouraska and l'Islet counties. Infections ranged from 2 to 5 per cent in the affected fields.

N.B.-

A single specimen of Tilletia Caries was collected in York county.

OATS

STEM RUST - Puccinia graminis Pers.

Alta.-
Stem rust was exceedingly rare being found in zones 8 and 10 in 3 fields out of 202 examined;

Sask.-
Oats were only slightly rusted in east central Saskatchewan.

Man.-
Stem rust of oats was heavy on late oats in the Red River valley, causing noticeable damage; early oats however yielded well. The average damage was placed at 5 per cent. The average percentage of infection by zone was as follows: 40 per cent in zone 1, and southern part of 9; 20 per cent in 2; 15 per cent in 3; 10 per cent in 5 and 8; and 5 per cent in 4 and 6.

Ont.-
Early varieties escaped heavy infection in southern Ontario. Late varieties, however, were heavily infected resulting in considerable damage.

Que.-
Infection on oats varied from 3 to 10 per cent in Kamouraska and l'Islet counties.

N.B.-
Stem rust was practically absent from the Experimental Station plots, Fredericton. Infection was only a trace.

N.S.-
Only traces of stem rust were observed in a field in Halifax county.

P.E.I.-
Stem rust was absent from the early maturing crop, but it was severe and caused serious damage to late fields.

LEAF RUST - Puccinia coronate Corda

B.C.-
Traces of leaf rust only were found on Vancouver island.

Alta.-
No leaf rust was observed in Alberta.

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

Oats

Man.-

Buckthorn bushes were found rusted at Boissevain, Man., only. In the vicinity of these bushes leaf rust was found on oats about July 8, before its appearance elsewhere. Eventually, leaf rust was general throughout the Red River valley; infections, however, were light, averaging about 5 per cent. The damage was very slight. Rust was scarce in the western half of the province.

Ont.-

Early varieties mostly escaped infection, but all late varieties were heavily rusted in southern Ontario.

Leaf rust was absent or traces only were present in Carleton county, except in fields near cultivated or escaped buckthorns.

The inportance of the buckthorn in initiating epidemics of leaf rust was well illustrated at Antrim, in Carleton county. Two buckthorn hedges about 125 feet long were found bordering the north and south sides respectively of the front lawn of a farm house. These bushes were about 8 feet high although they were kept well trimmed. The owner reported that they were about 50 years old. This was the only cultivated hedge that was located, but numerous escaped bushes were found within a radius varying from a half to one and one half miles from the hedges. All the escaped bushes were located along the fence rows, none were found in the open in the pastures. The bushes were of all ages and heights, varying from young plants 2 feet high to mature ones 8 to 10 feet in height. In several instances the buckthorns were growing intermixed with chokecherry and plum forming almost continuous hedges. The older bushes were actively reproducing themselves except the two hedges which in recent years have been kept trimmed to prevent the setting of seed.

Leaf rust on oats was heavy around the edges of the fields, where buckthorns were growing. Near the buckthorns the crop was often lodged and infected 100 per cent with rust. On the upright plants infection was somewhat less, 60 to 100 per cent of the leaf surface being rusted. From the edge of the field the rust gradually became lighter until at 75 yards, only 25 per cent of the plants were rusted, the affected plants showing a trace to 5 per cent infection. At this point infection became almost stationary. In adjacent fields, without buckthorns along the edges infection often fell to a trace on not over 25 per cent of the plants. Several fields between Antrim and Ottawa were examined the same day for leaf rust. Sometimes no rust was observed and generally less than one per cent of the plants were infected with traces of rust.

Damage caused by leaf rust was not great except close to the buckthorns and might be considered of little importance, but it

should be noted that the present season was not particularly favourable for the development of rust and under conditions ideal for rust development the yield would be seriously reduced.

It might be mentioned that the presence of buckthorn in the Antrim district was discovered by first finding rust on the oats and then noting its severity while walking through the field.

The observations made this year were limited, but they strongly suggest that the buckthorn is entirely responsible for the occurrence of leaf rust and the losses occasioned thereby in eastern Ontario.

N.B.-

Leaf rust was widespread, but caused only moderate damage this season.

N.S.-

Leaf rust caused only slight damage. In several fields no rust was found.

P.E.I.-

Leaf rust was heavy, apparently causing severe injury.

SMUTS

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

B.C.-

Loose smut was general on Vancouver island and in the lower Fraser valley. The damage, however, was slight.

Alta.-

Covered smut is a common and destructive disease in Alberta. It was reported in 15 fields out of 47 examined by Dr. Henry. In one field 35 per cent of heads were destroyed. Without distinguishing the species responsible, Dr. Sanford reported smut infection in 29 out of 155 fields examined. He also collected covered smut on wild oats, Avena fatua, at Granum and Edmonton and on a fatuoid form of Victory at Olds. In some places this smut was rare and its absence was apparently due to proper seed treatment.

Sask.-

Covered smut was reported in 39 fields out of 129 inspected. Infections as high as 10 per cent were observed in several fields. Loose smut was found in 6 fields out of 127 examined.

Man.-

Covered smut appears to be much more prevalent than loose

Oats

smut. It was present in 55 out of 57 fields widely scattered over the province. The estimated average infection was 6.4 per cent.

Loose smut was found in 35 fields out of 45 examined; the average infection was estimated to be 0.5 per cent.

Ont.-

Covered smut was reported on Alaska, O.A.C. 3, Banner, Gold Rain, Abundance, and Victory in southern Ontario. O.A.C. 3, and O.A.C. 72, were very susceptible. Covered smut was present in practically every field examined in Carleton county. The average infection in 11 affected fields was 6.3 per cent; 15 per cent of the heads were affected in 2 fields.

Loose smut was found in Banner, Alaska, O.A.C. 72, Gold Rain, Abundance, O.A.C. 13 and Victory in southern Ontario, Banner was particularly heavily attacked, infections as high as 20 per cent were observed in some fields. O.A.C. 144, Markton and Burt were resistant.

Loose smut was generally less prevalent than covered smut in Carleton county although in one field 22 per cent of the heads were destroyed.

Que.-

In Kamouraska and l'Islet counties loose smut infections varied from 1 to 5 per cent in Banner and 3 to 5 per cent in Alaska. No covered smut was reported.

N.B.-

Covered smut was widespread in York county. In several plots of Victory at the Experimental Station, Fredericton, the average infection was estimated to be 7 per cent.

Seventeen per cent of the heads were destroyed by loose smut in a field of Victory at the Experimental Station, Fredericton. The disease was widespread in York county.

N.S.-

Observations on the oat smuts were made in Halifax and Colchester counties. Infections of covered smut varied from 10 to 20 per cent and those of loose smut from 5 to 20 per cent. In fields, where the infection was high, the seed had not been treated; fields sown with treated seed were free from smut.

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

B.C.-

Halo blight was general on Vancouver island and the lower mainland.

Alta.-

Halo blight was reported by Dr. Henry in 4 fields out of 47 examined, being quite prevalent in zone 10. Dr. Sanford reported that halo blight was apparently common wherever Victory oats were grown. He found halo blight in 35 fields, out of 155 examined, infections ranging from a trace to general.

Sask.-

Halo blight was severe in a field of oats at Armley. The field appeared quite brown from the roadway. The observations were made following a fortnight of rainy weather.

Man.-

Halo blight was observed in one field located in zone 4. One hundred per cent of the plants were severely diseased.

Ont.-

What appeared to be halo blight, affected several varieties, especially Banner, on the Experimental Farm, Ottawa. The infection, however, was very uneven, some plots were severely affected while others of the same variety from the same seed lot were free from disease. The location of the plot in the field and the date of seeding seemed to determine the severity of infection. Halo blight was also observed in two fields in Carleton county. About 40 per cent of leaf surface was affected.

N.B.-

A slight infection of halo blight was observed on Victory at the Experimental Station, Fredericton.

FOOT AND ROOT ROT

Sask.-

Prematurity blight was much less common than it has been for some years. One field out of 60 examined was affected and in this field the damage was a trace.

Browning root rot (Pythium sp.) was observed in 2 fields out of 127 examined. The disease was relatively rare in oats this year.

Helminthosporium-Fusarium root rot was present in 81 out of 127 fields, being about as prevalent as last year.

Oats

Man.-

Root rot of oats caused by Helminthosporium sativum and Fusarium spp. was uncommon. It was reported from 3 places, a light infection in 2 and 40 per cent of the plants affected in the third.

BLAST - Non-parasitic.

Alta.-

Oat blast was observed in zones 2-5, 7 and 10, the average percentage of blasted spikelets varying from 2.3 to 12.0 per cent according to the zone. These figures are based on counts of blasted spikelets of representative plants in the field. Out of 155 fields examined 61 were affected. If the blasting of the spikelets reduces the yields, the trouble was sufficiently heavy this year to cause much loss (G. B. Sanford).

Out of 47 fields examined by Dr. Henry, 5 were found affected. The estimated loss was a trace.

Sask.-

Oat blast was reported in 25 out of 127 fields. The estimated average damage was 5 per cent.

N.B.-

Oat blast was widespread and fairly severe on oats. Ninety per cent of the plants were moderately affected in several varieties at the Experimental Station, Fredericton.

P.E.I.-

About 10 per cent of the heads were severely affected in several fields of Banner.

LEAF SPOT - Helminthosporium Avenae Eidam

B.C.-

The disease was general on Vancouver island and the lower Fraser valley. The damage was slight.

N.B.-

A leaf spot attributed to Helminthosporium Avenae was severe on several varieties at the Experimental Station, Fredericton. The disease was widespread.

FALSE STRIPE - Cause unknown.

A disease similar in appearance to the false stripe disease

of barley was observed on a plot of registered Alaska oats, at the Experimental Farm, Ottawa, Ont. All culms of a plant were affected, leaves and leaf sheaths turning pale reddish yellow. Only fungi that were considered secondary were found fruiting on the older leaves. Infection was estimated to be one per cent.

LEAF SPOT - Cause unknown

A leaf spot of oats was reported in 23 fields out of 127 examined in Sask., but light infections were present in many others. Sometimes 80 per cent of the leaves were spotted. No estimate of the damage was made.

ERGOT - Claviceps purpurea (Fr.) Tul.

B.C.-

Oats were occasionally attacked by ergot on Vancouver island and the lower mainland.

Alta.-

Oats were found infected with ergot at Edmonton.

POWDERY MILDEW - Erysiphe graminis DC.

Powdery mildew was general on Vancouver island and the lower mainland. Oats were severely damaged in the seedling stage, but the pathogen was incapable of causing appreciable damage to the maturer plants.

BARLEY

STEM RUST - Puccinia graminis Pers.

Alta.-

Traces of stem rust were reported from zones 8-10.

Sask.-

Stem rust was slightly lighter on barley than on common wheat through east central Saskatchewan.

Man.-

Traces of stem rust were first observed about July 17, on barley in the Red River valley. Within a period of two weeks it had become quite prevalent through central and southern Manitoba. By harvest time barley was heavily rusted especially in the Red River valley. The crop was more heavily rusted than it had been for several years, even when stem rust had been severe on wheat.

Barley

Damage was estimated to be less than 5 per cent.

Ont.-
Most of the barley crop escaped serious infection in southern Ontario. However late sown barley was severely attacked.

N.B.-
General observations indicated that stem rust was widespread. The infection was fairly heavy.

P.E.I.-
Stem rust caused moderate infection of late barley in Queens county.

LEAF RUST - Puccinia anomala Rostr.

B.C.-
Leaf rust was common and quite severe on Vancouver island and the lower Fraser valley.

Man.-
A very light infection of leaf rust of barley occurred throughout southern Manitoba. In many fields 100 per cent of the plants were infected. This rust has never been previously so prevalent in Manitoba.

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

B.C.-
Stripe rust was found only occasionally on Vancouver island.

Alta.-
Stripe rust was collected on O.A.C. 21.

LOOSE SMUT - Ustilago nuda (Jens.) Rostr.

Alta.-
Very little loose smut was present. It was found in 7 fields out of 108 examined in zones 8 and 10. Infections were as follows: 5 fields, a trace; 1 field, 6 per cent; and 1 field, 20 per cent.

Sask.-
Out of 72 fields examined, traces of loose smut were found in 10 and slight infections in 2.

Man.-
Loose smut was found in 22 fields out of 26 examined. The

estimated average damage was one half of one per cent, the disease being most prevalent in zones 1-3.

Ont.-

Loose smut was prevalent in southern Ontario as O.A.C. 21, the most commonly grown variety, is very susceptible. Success is also susceptible. Infections varying from one half to 4 per cent were observed in Carleton county.

N.B.-

Loose smut was general, but it was of little importance in York county.

N.S.-

In the only field of barley examined, 8 per cent of the heads were infected.

P.E.I.-

A trace of loose smut was found in Charlottetown .80 in Queens county.

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

Alta.-

Covered smut was extremely common and destructive. Several fields were observed where the infection was 40 to 50 per cent of the heads. O.A.C. 21 was most frequently affected. Thirty-five out of 108 fields were affected in zones 3-4 and 7-11.

Sask.-

Out of 72 fields examined 12 contained a trace of covered smut; 5, a slight infection; and 2, a moderate infection. About 25 per cent of the heads were smutted in a small Experimental plot at Saskatoon.

Man.-

Covered smut was found in 22 out of 32 fields examined. The estimated average damage was 2 per cent. The average damage by zones was reported as follows: zone 4, 5 per cent; zone 2, 4 per cent; zone 8, 3 per cent; zone 1 and zone 7, 2 per cent; zone 3, 1 per cent and zone 5, a trace. Many farmers have stated that their thrashed barley was heavily contaminated.

Ont.-

Little covered smut was present in southern Ontario. Experiments at the Ontario Agricultural College Farm showed that O.A.C. 21, Lyon, Trebi and Success were resistant to covered smut, while White Hulless, Hanchen, French Chevalier, Plumage and Archer were susceptible.

Barley

One per cent of heads were destroyed by covered smut in a field in Carleton county.

P.E.I.-
Trace of covered smut was observed in Queens county.

STRIPE - Helminthosporium gramineum Rabh.

Alta.-
Stripe was abundant in Experimental plots and it was occasionally severe in fields in the country. In general, however, the damage was slight. Stripe was found in 25 out of 108 fields examined. Infections were as follows: 18 fields showed a trace; 3, slight infection; and 4, heavy. In one of the latter 20-30 per cent of the plants were affected.

Sask.-
Stripe was reported in 3 out of 72 fields examined. Damage varied from a trace to slight. In the University plots, Saskatoon, stripe was most severe on variety "60-day."

Ont.-
Stripe was less prevalent in 1930 than for many years. This fact is attributed to the dry weather following seeding.

N.B.-
Barley stripe was reported as widespread and severe in York county.

FALSE STRIPE - Cause undetermined.

Sask.-
Very little false stripe was observed this year. A few plots in the variety tests at Indian Head were slightly affected.

Ont.-
A trace of false stripe was found in plots of hybrid material at the Experimental Farm, Ottawa.

P.E.I.-
In the rod row plots at the Experimental Farm, Charlottetown 50 per cent of plants were affected.

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

Alta.-
Bacterial blight was observed on Regal and O.A.C. 21 at

Saskatoon. Infections were present on the leaves and culms. It was reported in the general survey of the province in 2 fields out of 72 examined. Five per cent of the plants were infected in one field.

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

Alta.-
A trace of net blotch was found in 15 fields out of 108 examined in zones 7, 9 and 10 only.

Sask.-
Net blotch was found in 55 fields out of 84 examined; in 17 fields there was a trace; in 8 infection was slight; in 11 moderate; and in 19 severe.

Man.-
Net blotch was reported in 9 fields. In general, the infection was a trace in these fields, but spots were found, where the plants were severely infected.

N.B.-
Slight infection of net blotch was reported on O.A.C. 21. The disease was not important this season.

P.E.I.-
Net blotch was present in head row plots at the Experimental Station, Charlottetown, but the crop was not seriously affected.

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

Alta.-
Traces of spot blotch were reported in 2 fields.

Man.-
Traces of spot blotch were found in 2 fields.

FOOT AND ROOT ROT

Sask.-
Traces of take-all were reported in 8 fields out of 96 examined.

Prematurity blight was found once. This disease is rarely found on barley.

Browning root rot (Pythium spp.) was observed in 3 fields out of 98 examined. The disease is usually less conspicuous on

barley than on wheat.

Root rot of the Helminthosporium-Fusarium type was present in 89 fields out of 98 examined. The diseased fields were grouped as follows: Trace, 7 fields; light, 2; moderate, 31; severe, 49.

Man.-

Helminthosporium-Fusarium root rot was reported from 29 fields out of 33 examined. The average percentage of infection by zone was; zone 1, 15 per cent; zone 2, 20 per cent; zone 3, 10 per cent; zone 7, a trace.

Ont.-

Foot rot and spot blotch was severe in the variety plots at the Experimental Farm, Ottawa. All varieties were affected, but 20 and 50 per cent of the plants were killed in the seedling stage in Wash. 238 and Wash. 113 respectively.

HEAD BLIGHT - Fusarium spp.

N.B.-

A trace of head blight was reported on O.A.C. 21 at the Experimental Station, Fredericton.

SCALD - Rhynchosporium Secalis (Oud.) Davis

Alta.-

Scald was reported from 6 fields out of 36 examined. Certain varieties, for example Alberta Beardless, were heavily attacked. In general, however, scald infections were light.

ERGOT - Claviceps purpurea (Fr.) Tul.

Sask.-

A trace of ergot was observed at Rosthern.

N.B.-

A trace was collected in a plot of O.A.C. 21 at the Experimental Station, Fredericton.

POWDERY MILDEW - Erysiphe graminis DC.

Alta.-

A trace was observed on barley.

Ont.-

Powdery mildew was very heavy on barley through southern

Ontario.

P.E.I.-
A slight infection of powdery mildew was present in Queens county.

RYE

STEM RUST - Puccinia graminis Pers.

Man.-
A trace of stem rust was collected in zones 4 and 5.

LEAF RUST - Puccinia dispersa Erikss.

Sask.-
A trace of leaf rust was found at Indian Head.

Man.-
Leaf rust was quite common in Manitoba this year, but it was not sufficiently heavy to damage the crop.

Ont.-
Traces of leaf rust were observed in Carleton county.

STEM SMUT - Urocystis occulta (Wallr.) Rabh.

Sask.- 1930
An outbreak of stem smut occurred this year. It was found in 19 fields out of 84 examined. The centre of infection was in an area embracing Belcaires, Lemberg and Neudorf, although smut was found also at Mortlach and Fairlight. (See Fig. 3). Infections varied from a trace to 11 per cent. As far as known stem smut has been observed only once previously in Saskatchewan when Dr. Simmonds collected it several years ago.

Man.-
A trace of smut was found in one field near Carman. In 1925 it was collected at Carman and at Emerson, where 10 per cent of the heads was found infected in one field.

ERGOT - Claviceps purpurea (Fr.) Tul.

Alta.-
A trace was found in two fields out of 32 examined.

Sask.-
A trace of ergot was reported in 8 fields of fall rye out

Rye

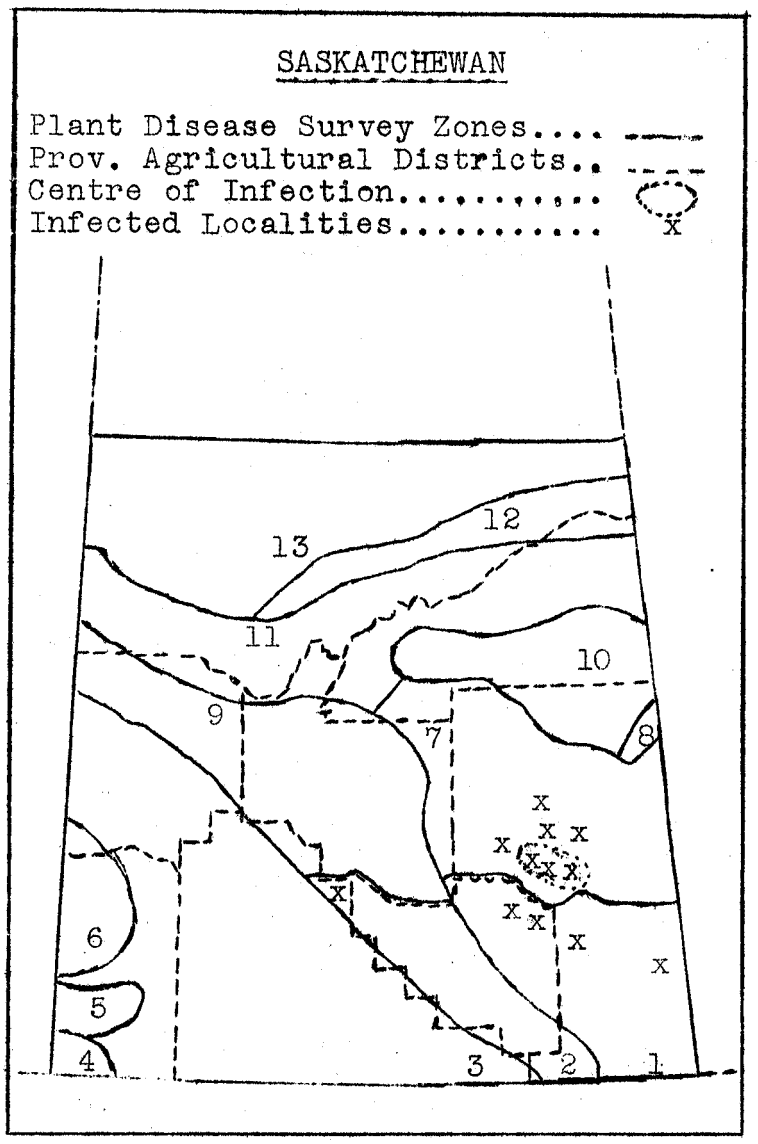

Fig. 3. Distribution of rye smut in Saskatchewan in 1930.

of 88 examined. A trace was also observed in two fields of spring rye.

Man.-

A trace was present in most fields examined. In a field in zone 8, over 1 per cent of the heads were infected.

FOOT AND ROOT ROT

Sask.-

Prematurity blight was found in 2 fields out of 39 examined. The disease is uncommon in rye.

Browning root rot (Pythium spp.) was reported in one field out of 87 examined. Only a trace of infection was found.

Helminthosporium-Fusarium root rot was found in 74 out of 87 fields. The rate of infection was classified as follows; Trace in 3 fields; slight in 4; moderate in 19; and severe in 48.

Man.-

A few infected plants were found in a field in zone 8.

POWDERY MILDEW - Erysiphe graminis DC.

Alta.-

A trace of powdery mildew was reported in one field.

Sask.-

At Ituna a field was found where the lower leaves of the plants were heavily infected with a mixture of powdery mildew and secondary fungi.

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

A bacterial blight of rye culms was fairly common in Saskatchewan. Sometimes the stems were profusely lesioned, but the disease did not appear to be doing much damage. At Saskatoon some plants of fall rye were almost a total loss due to a combination of causes. Dry winds at heading time were followed by hail. The heads were than attacked by a disease similar to black chaff of wheat.

CEREALS

FROST INJURY - Non-parasitic

Ten degrees of frost was recorded by the University observer the night of May 15, at Saskatoon, Sask. The next day seedlings showed purplish to yellow areas on the first leaf, mainly at the point of most rapid growth.

INJURY FROM SOIL DRIFTING - Non-parasitic

A high south-east wind (maximum velocity of 43 miles per hour) blew for one and one half days, May 24 and 25, at Saskatoon, Sask. As a result soil drifting caused severe injury to seedlings in the University plots and to fields in several districts near Saskatoon, notably around Hague and Clavet. Wheat appeared to recover better than other cereals on our plots (R.C. Russell).

CHEMICAL INJURY - Non-parasitic

Patches of cereals of varying sizes were partially or wholly killed out in the seedling stage in Saskatchewan by sodium chlorate present in the soil. The chlorate had been applied to these spots last year to kill the weeds. Similar after effects were noticed following the use of Altacide. The autumn and spring were very dry.