I. DISEASES OF CEREAL CROPS

WHEAT

HEAD DISCOLORATION (Alternaria, etc.) was common on Apex wheat in Sask. It was particularly severe at Swift Current and Saskatoon. Head discoloration was a trace to moderate on all heads at Giroux, Man., and on 75% at Niverville; the trouble was slight on some heads at Ste. Anne, and on 20% at Virden. About 5% of the heads of Dawsons Golden Chaff were overgrown with Cladosporium herbarum at Ailsa Craig, Ont.; the grain was badly shrunken in the affected heads (J.K. Richardson). Head discoloration was a trace to slight in the variety plots at Ste. Anne de la Pocatiere, Que. It also affected most heads in the plots at Lennoxville. The disease was usually only a trace in N.B., but the infection was 40% in a field at Waterville and 15-25% in some varieties in the plots at Black River Bridge and Fredericton. Head discoloration was generally absent in the plots in P.E.I., but a slight amount was present on one variety at Charlottetown.

ERGOT (Claviceps purpurea). A trace was present on both common and durum wheats at Winnipeg, Man. and on common wheat at Scarth. A trace was observed on Huron and Red Fife in Queens Co., P.E.I.

ROOT ROT (Cryptoascus sp.). A 25% infection occurred at Kensington, P.E.I., on Red Fife. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) infected wheat slightly in June at the Station, Sidney, B.C. It was also quite general on the leaves of 75% of the plants in the Lytton district. Infection was a trace to severe in the plots at Beaverlodge, Alta., and slight in 2 out of 30 fields examined in the Peace River district; it was severe on nearly all varieties in the plots at Lethbridge. Infection was severe on the lower portions of the stems and lower leaves of breeding material in the greenhouse in October at the University, Saskatoon, Sask. Powdery mildew was moderate on one variety, slight on a second, and a trace or absent on all others at Ste. Anne de la Pocatiere, Que.

HEAD BLIGHT (chiefly Fusarium spp.). Trace to slight damage was caused by Fusarium spp. in fields at Athabaska and Dewberry, Alta.; slight infection by Helminthosporium sativum was found in the plots at Edmonton (A.W. Henry). Blighted heads of wheat yielded the following fungi when isolations were made: Ste. Anne, Man.: Thatcher - F. graminearum; Winnipeg: Regent x Thatcher - F. graminearum and F. Scirpi var. acuminatum, Iumillo - F. Poae; Kemptville, Ont,: C.T. 129 - F. avenaceum; Lennoxville, Que.: Vernal Emmer - F. graminearum; Ste. Anne de la Pocatiere: Marquis x Kanred - F. avenaceum; Fredericton, N.B.: Coronation - F. Poae, Epicoccum purpurascens, Alternaria, etc. Only a trace of infection was recorded at all locations. This is the first time that F. gramineaum was isolated from head blight of wheat in Man., although it was isolated once from a sample of durum wheat seed of the 1939 crop obtained at Oak Bluff, and again once from a sample of common wheat seed of the 1940 crop obtained at Portage la Prairie (W.L. Gordon). In general only traces of head blight were recorded in Que., N.B., and P.E.I.; in some of the plots, however, particularly at Fredericton, N.B., up to 15% of heads were affected.

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) caused apparently less damage than usual in Alta., although its effect was frequently masked by drought injury. The damage was a trace in 22 fields and slight in 24 out of 81 examined.

Common root rot was widespread in Sask. and in general was more severe this year than in 1940. Examination of material from the dates of seeding test at Saskatoon showed that the usual rise in the disease rating came in the first half of July in 1941 as against the latter half of June in 1940. The increase followed rainy periods in each year. Soil temperatures were much higher during June and July in 1941 than in 1940. The disease was much more severe this year on wheat in the rotations on Illustration Stations than last. It was very prevalent as a prematurity blight. Plants ripened early and in many cases lodged. At Tisdale, 2% of the plants were affected in one field. Specimens of stunted plants from the south-eastern part of the province yielded H. sativum.

As in the previous 2 years, 10 fields of ripe wheat in each of the 6 principal soil zones in Man. were sampled to determine the effect of common root rot on the yield of wheat. On the basis of the data obtained, it was calculated that the disease reduced the yield of wheat by 12.1% in 1941. This was less than the figure (16.6%) obtained in 1940 but greater than that (7.47%) obtained in 1939. The average yield of healthy plants in 1941 was 1.01 gm., and was greater than the yield (0.85 gm.) in 1940 or the yield (0.72 gm.) in 1939. There were more culms per plant, but the weight of grain per head was no greater in 1941 than in 1940. Attacks by the disease did not reduce the yield of individual plants to the degree they did in 1940 or in 1939. It is thought that the abundant precipitation during late summer prevented the premature ripening of the affected plants.

KERNEL SMUDGE (Helminthosporium sativum, etc.) was not as prevalent in the Prairie Provinces in 1941 as in 1940. The losses from this disease in Hard Red Spring wheat, owing to lowering of the commercial grade, were small. An examination of the car-inspection records of the Western Grain Division, Department of Trade and Commerce, Winnipeg, Man., for the period August 1 to October 31, in 1940 and 1941 respectively, gave the following results:-

Year	Cars inspected (Spring wheat)	Cars with kernel smudge	Percentage of cars with kernel smudge
1940	24,498	923	3.8%
1941	15,397	212	1.4

In 1941, the most severe infections of kernel smudge occurred in the crop districts of Russell in Man., and East Central (Yorkton) in Sask. There was only a very light infection of the disease in western Sask. with a bare trace appearing in most of the crop districts of Alta. Although Alternaria

spp. and Helminthosporium sativum were by far the most common fungi associated with smudged wheat kernels, H. sativum appeared to be responsible for the more severe forms of kernel smudge. An examination was made in 1940 and 1941 of the grain samples of several wheat varieties grown in co-operative wheat variety tests conducted at 16 different stations in the Prairie Provinces. The following results were obtained:-

Variety	Percentage of smudged kernels	
	1940	1941
Apex Selection	5.9%	7.2%
Thatcher Selection	2.4	3.0
Marquis	1.4	1.5
Red Bobs	0.8	0.7
Regent Selection	0.3	0.5
Renown Selection	0.6	0.4
Garnet	0.0	0.0

Kernel smudge was found to be more prevalent in the 1940 crop in Sask. judged from the laboratory examination of over 500 samples than it was in the 1939 crop (q.v. P.D.S. 19:11 and 20:4). Nevertheless the average infection was very slight. Apex and Thatcher showed more smudge than other varieties. Alternaria was commonly isolated from smudged kernels and fungi other than Helminthosporium predominated. According to Dr. R.C. Russell, several different types of dark discolorations appear on wheat in Sask., the area around the germ-end being particularly affected. Two types designated as "mild" and "severe" selected from the 1941 crop from the Laboratory's wheat plots at Indian Head, yielded 1% and 40% of H. sativum, respectively, when the kernels were placed on moist filter paper. Seed of the latter type germinated poorly in soil and considerable seedling blight developed, while the seed of the former type gave a stand which compared favourably with that obtained by using selected clean plump seed. Nigrospora sphaerica was also found on a high percentage of kernels showing certain types of discoloration selected from grain in the same plots.

TAKE ALL (Ophiobolus graminis) was found in 8 fields out of 81 examined in Alta.; the damage was a trace in 1 field, slight in 5 and moderate in 2. Its relatively rare occurrence this year was probably due to the dry conditions prevailing and to a large portion of the wheat being sown on summer fallow. No take all was found in Sask.; its absence was attributed to the extreme drought.

BASAL GLUME ROT (Phytomonas atrofaciens) was not recorded in Man. in 1941. (W.A.F. Hagborg)

BLACK CHAFF (Phytomonas translucens sensu lato). A field was slightly infected at Dewberry, Alta., and a trace was found on Apex and Reward selections at Beaverlodge.

Damage due to black chaff (Phytomonas translucens f. sp. undulosa) was apparently negligible in Man. The organism was isolated from two collections. (W.A.F. Hagborg)

STRIPE RUST (Puccinia glumarum) was general in a 10-acre field of fall wheat at Sumas, B.C. in June, and appeared to be causing moderate damage. A slight infection was observed on Regent at the Sidney Station.

STEM RUST (Puccinia graminis) was first found on winter wheat at Lethbridge, Alta., on July 18 and on spring wheat at Edmonton on July 23. Hot dry weather retarded its development until August. This is the first year on record that stem rust infection was more prevalent and also more abundant in southern Alta. than in the area north of Calgary. The infection centred at Lethbridge. In fields that matured relatively early, rust was absent or only a very slight infection developed. In late-maturing fields the infection was slight to moderate, but sometimes the rust was fairly heavy and caused some damage. Stem rust was unusually prevalent in the Peace River district, where a trace to a slight infection was found in most late stands.

Stem rust was found at Indian Head, Sask., on July 10. The infection remained very light until after the first week in August, when rust was present in epidemic formon susceptible varieties. Rain fell on 17 days between July 4 and August 4. A trace infection was observed at Saskatoon in July and rust became epidemic on late crops of susceptible varieties late in August. Rust was severe on Early Triumph at Unity on Aug. 7, and on Marquis at Shaunavon on the same date. Spread of rust was limited by hot dry weather and extensive sowing of resistant varieties.

Both temperature and moisture conditions were quite favourable for the germination of stem rust spores and the development of the fungus during most of the growing season throughout southern Man. in 1941. The only exceptions in the southern areas occurred in parts of the Red River Valley where rainfall was scanty during part of July. Temperatures ranged from 3° to 7° F. above normal throughout the agricultural area of Man. during May, June and July, except in the south east corner of the province where temperatures were 1° below normal for July. South of the Lakes region of Man., rainfall exceeded the normal amount by from 40 to 100% during May, and in the south west precipitation ranged from 20 to 40% in excess during June. However, along the Red River, the rainfall during June was from 10 to 20% below normal. Rainfall was very spotty in the southern part of the province during July, some areas receiving 40% less than normal and others as high as 70% above normal. Throughout the northern part of the agricultural area of the province, rainfall was considerably below normal during both June and July.

In spite of the favourable weather conditions which prevailed, particularly in southern Man. during the summer of 1941, stem rust of wheat made but little progress. There was practically no stem rust on susceptible bread wheats sown in Manitoba. However, most of the barley varieties grown are susceptible to stem rust and light infections of stem rust developed on these varieties throughout the whole of the province. Nowhere were the infections severe not even in the south where the weather was quite favourable for rust development. The infections generally ranged from 1-10% with infections exceeding 25% in only a few late fields. Similarly there was little more than a trace of stem rust on durum wheat in 1941.

The failure of stem rust to develop extensively was probably due to the fact that stem rust spores arrived from the south rather late, and suitable hosts for them to get established on to build up local inoculum were much more restricted than in former years owing to the replacement of the extensive acreage of susceptible wheats suitable for increasing rust inoculum by resistant wheat varieties. (B. Peturson)

A 25% infection was recorded on Garnet in the plots at Ste. Anne de la Pocatiere, Que., while stem rust was absent from most rust-resistant varieties. A 20% infection was observed on Huron in the plots at Lennoxville. Stem rust was recorded in 6 out of 19 fields examined in N.B. The heaviest field infection was 15% on Huron at Waterville; in addition, patches in a field at Canobie showed 25% with an average infection of 5% for the field. Garnet showed 65% of stem rust in the plots at Fredericton, but the rust-resistant varieties were virtually free from infection. Only a trace of rust was recorded even on susceptible varieties in the plots in P.E.I.

LEAF RUST (Puccinia triticina). A light infection was observed in the plots at the Sidney Station, B.C., and also in fields of spring and winter wheat at Lytton, Salmon Arm and Armstrong. Leaf rust first appeared in Alta. about July 15, and was unusually prevalent later in the season. Infection was moderate on late stands in southern Alta., slight to moderate in central Alta., and a trace to slight in the Peace River district. Leaf rust infection was very light in south and central Sask. in July and moderate in the north-east, south and south-west areas in late July and the first half of August. It was severe on Thatcher and other susceptible varieties at Indian Head on Aug. 12. Extreme drought during July undoubtedly limited infection. It was also severe on Sept. 4 on late blocks of Apex at Saskatoon. Leaf rust was first observed at Indian Head on July 7 and at Saskatoon on July 12.

Leaf rust (Puccinia triticina) was first observed in Man. during 1941, on June 3, fully two weeks earlier than normal. On that date, isolated primary infections were present throughout the south-eastern part of the Red River Valley. This rust spread rapidly and by the end of the second week in June it was present throughout the entire agricultural area of Man. and into eastern Sask. By mid-July, leaf rust infections had become quite heavy on Thatcher throughout the southern half of the province and when the leaf rust epidemic had reached its maximum, shortly before harvest, Thatcher wheat carried infections ranging from 60 to 90% in this area. The heaviest infections occurred in the south-eastern part of the province, but fairly heavy infections were quite general as far north as Dauphin. The varieties Regent and Renown were only lightly affected. Infections on these two varieties rarely exceeded 10% in intensity.

A comparison of the yield of sulphur-dusted and undusted plots of Thatcher and Renown located at Winnipeg, gave a rough measure of the damage caused to these varieties by leaf rust. In these plots, leaf rust reduced the yield of Thatcher by 20% and that of Renown by 4%. Only slight traces of leaf rust occurred on durum wheat. (B. Peturson)

A trace occured on winter wheat, then heading at Brucefield, Ont., on May 28. Leaf rust was heavy at Ste. Anne de la Pocatiere, Que., even on varieties usually but slightly affected elsewhere. Percentages as high as 65% were recorded on varieties generally showing not more than 5 to 10%. (C. Perrault). Leaf rust was observed in 8 out of 16 fields examined in N.B. with high infections at Buctouche (75%) and Jacksonville (45%); it was light in the plots (S.F. Clarkson). Leaf rust infection varying from 5 to 10% was recorded on August 7, on commercial Coronation in Queens Co., P.E.I. (R.B. McLaren). In the plots at Charlottetown no leaf rust was recorded on Coronation and but 5% was present on Garnet. (G.W. Ayers)

YELLOW LEAF BLOTCH (Pyrenophora Tritici-repentis (Helminthosporium Tritici-repentis) occured in epidemic form in many fields of wheat on stubble about Saskatoon, Sask., between Saskatoon and North Battleford, and between there and Lloydminster in June. None was encountered in Alta. In one field near Saskatoon, where the disease was closely observed, mature perithecia were abundant on the old stubble. Cultures obtained from the spots on the leaves of the wheat seedlings and from ascospores from the stubble were identical. Although the disease has been reported previously from Sask. (P.D.S. 19:12-14), it has never been quite so conspicuous. During the first few days of the browning root rot survey, fields affected with this trouble were occasionally mistaken for browning fields. An estimation of the effect that it might have on yield was interfered with by the extremely hot, dry weather which prevailed from mid-summer onwards (T.C. Vanterpool). Yellow leaf blotch infection was reported as slight at Virden, Man., moderate and general at Carman, Pipestone and Killarney and severe at Pierson.

BROWNING ROOT ROT (Pythium sp.). In a survey made in Alta. in late June, browning root rot was found in nearly all fields examined in the brown soil area between Trochu and Drumheller. The damage was estimated as follows: Trace in 6 fields, slight in 10, moderate in 7 and severe in 2. It also caused 25% damage in a field at Pine Lake. (G.B. Sanford)

A survey trip was made through Alta. from June 19 to 24. In general, browning infestation was light between Lloydminster and Edmonton, though field characters and root lesioning were fairly marked in fields near Kitscoty, Manville and Vegreville. Little was found near Edmonton where moisture conditions had been poor. Infestation was also generally light between Edmonton and Calgary, but increased somewhat north of Calgary. A severely attacked field was found near Didsbury. Both leaf and root symptoms indicated that much of the yellowing in barley and oat fields was due to Pythium. Root lesioning is not as conspicuous on these hosts as on wheat. There seemed to be relatively little wheat on this route and more oats and barley than one would have expected normally. This may partly account for the small amount of browning root rot on wheat observed between Edmonton and Calgary. The wheat was getting too far advanced to spot browning readily, while probably oats and barley were nearer the right stage.

Moderately attacked fields were found south from Calgary to Lethbridge, particularly at Midnapore, Black Diamond, Cayley and Claresholm. One gained the general impression that there was a moderately heavy infestation of browning root rot in the area from Calgary as far south as Granum. Disease symptoms were probably most conspicuous about 7 to 10 days earlier. Incidentally, there

was more wheat along the highway between Calgary and Granum than between Edmonton and Calgary.

Dr. G.B. Sanford made a survey of central and south central Alberta about June 24, and sent me some ten typical samples of wheat seedlings affected with browning root rot from Carbon, Ghost Pine, Grainger, Orkney, Trochu, Three Hills and Huxley.

In summarizing the Alberta situation, I would say that there was a moderately heavy infestation of browning in the crop area from Calgary south to Granum and north east to Drumheller. Elsewhere browning was light. (T.C. Vanterpool)

A limited survey was carried out by the Dominion Laboratory in southern Sask. A heavy frost on June 8 in the Indian Head-Regina area, caused the death of the leaves and thus masked the symptoms of browning root rot. Examination of roots from several areas showed the disease to be generally light. However, in the Regina district some fields were moderately to severely infected with the result that crop growth was retarded.

With the exception of some isolated areas in the black soil zone and a smaller number in the dark brown zone of Sask., above-ground symptoms of browning root rot on cereals were not conspicuous and infestation was slight. This is attributed to the good moisture conditions and the moderate temperatures which prevailed up to the middle of June. Under these conditions a damaged root system might still supply sufficient water for moderately good growth. With the onset of extremely high, intermittent temperatures and continued drought which began about June 22, browning symptoms soon merged into drought symptoms.

A visit at the end of June to districts which had been visited early in the month when moisture conditions were favourable, showed that the browning root rot areas were suffering more from the heat and drought than the normal areas, in spite of the better and often luxuriant growth in the normal areas. In this connection it should be mentioned that usually in early June, when browning root rot is most conspicuous in a wheat field on fallow, the soil in the diseased areas, at least to a depth of eight inches, is moister than that in normal areas; this difference is attributed to the more vigorous growth of the normal plants. These observations suggest that browning root rot increases the hazards from heat and drought, especially if these occur soon after the browning symptoms have appeared, which is usually around the second week of June.

Many wheat fields were again found to be affected with browning root rot in patches which were diseased in 1938, when these fields last carried a summerfallow crop. One of these fields was in barley this year and it also was affected with the disease.

Four samples of wheat seedlings with characteristic Pythium lesioning on the roots were received from Senate and Claydon, in the extreme south-west corner of Saskatchewan. Samples are rarely received from the drier areas of the light brown soil zone in the south-west, but the disease

is known to be present there when moisture conditions are suitable. (Cf. P.D.S. 20:7-8)

Strains of Pythium arrhenomanes Drechsl., P. aristosporum Vanterpool, and P. graminicola Subram. were isolated from young lesioned roots of field samples of brome grass, crested wheat grass and slender wheat grass collected in June in the western sections of zones 2 and 3. A single examination of the young roots which developed on these grasses at Saskatoon after the fall rains showed them to be free from Pythium.

In early August, Dr. Roderick Sprague of the Federal Station at Mandan, N.D., visited Saskatoon for a week, and together we made a laboratory survey study of some 160 isolates of Pythium obtained from cereals and grasses in the Dakotas and Montana. The large majority of the definitely pathogenic forms we considered as belonging to P. arrhenomanes. A large-spored pathogenic strain of P. aristosporum was encountered in two localities. Some slightly pathogenic forms we referred to P. deBaryanum, P. ultimum and close allies. The remainder were forms non-pathogenic to wheat seedlings in small flasks. We considered that the results showed that Pythium damage to cereals and grasses is just as common and serious in North Dakota as in Sask. (vide Sci. Agric. 20:735-749. 1940) and that, as has been previously pointed out (loc. cit.), the parasitic species concerned are indigenous on our native grasses. T.C. Vanterpool and R. Sprague, Phytopath. 32:327-328. 1942) (T.C. Vanterpool).

GLUME BLOTCH (Septoria nodorum). A trace was present in 24 fields and slight in 2 out of 81 fields examined in Alta. The affected fields were located largely in the Peace River district and a trace was found on several varieties at Beaverlodge. A trace of glume blotch was found in a field at Nipawin, Sask. and on Huron in Queens Co., P.E.I.; slight to moderate infections were noted on several varieties in the plots at Palmer Road and Rose Valley.

SPECKLED LEAF BLOTCH (Septoria nodorum and S. Tritici). A trace was recorded in 19 fields, slight in 9, and moderate in 3 out of 81 fields examined in Alta.; a trace to slight infection occurred in the plots at Lacombe, Lethbridge and Beaverlodge. Septoria Tritici was present on leaves of winter wheat collected at Brucefield, Ont., May 28; a 20% infection was also recorded at Neguac, N.B.

BUNT (Tilletia caries and T. laevis). A summary of the bunt situation in Western Canada was prepared from the records of the Western Inspection Division and kindly supplied by Wm. Popp.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1, 1940 to July 31, 1941 and from August 1, 1941 to October 31, 1941.

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Smutty	Cars Inspected	Cars Graded Smutty	Per-centage Smutty
	Aug. 1, 1940-July 31, 1941			Aug. 1, 1941-Oct. 31, 1941		
Hard Red Spring	166,040	443	0.3%	44,719	69	0.2%
Amber Durum	4,407	35	0.8	469	2	0.4
White Spring	1	0	0	-	-	-
Alberta Red Winter	278	16	5.8	233	4	1.7
Garnet	3,863	4	0.1	290	0	0
All Classes	174,589	498	0.3	45,711	75	0.2

About 1% of the plants were bunted in a field of Ridit at Armstrong, B.C.; the seed had been treated with Ceresan. In general, the disease was quite widespread and severe in the district this season; 75-80% of the plants were affected in some fields of Jones Fife, a very susceptible variety of fall wheat. The bunt was determined as T. caries (G.E. Woolliams). A trace of bunt was observed in 2 fields, and infection slight in 8 and moderate in 2 out of 81 examined in Alta. Out of 110 fields bunt infected 1% of the heads in a field at Sceptre, Sask., and a trace in two others. Out of 562 samples of foundation, elite, and registered seed wheat from the 1940 crop examined in the laboratory, 46 samples were found lightly infected with spores. Most of the affected samples were from zones 1 and 4. A trace of bunt was present on Huron wheat at the Charlottetown Station, P.E.I. (Bruce McLaren)

LOOSE SMUT (Ustilago Tritici) was recorded as follows: Trace on Red Bobs at Salmon Arm, B.C.; trace to slight in plots at Lacombe and Lethbridge, Alta., being severe on Dicklow at Lethbridge; present in 5 out of 110 fields in Sask. and in a guard strip of Garnet at Indian Head; 10% in several fields in Ont.; traces in the plots at Ste. Anne de la Pocatiere, Que., and 3% in 2 out of 19 fields in N.B.; 0.5% in Huron in Queens Co., P.E.I.

FALSE BLACK CHAFF (Non-parasitic). All plants of Reward were moderately to severely affected in the plots at Beaverlodge, Alta. (W.C. Broadfoot)

OATS

HEAD and STEM DISCOLORATION (Alternaria spp.) was severe on all the varieties except Victory in the plots at Currieburg, N.B., on Aug. 9; it was also noted in 3 fields during the Survey. (S.F. Clarkson and T. Johnson)

ANTHRACNOSE (Colletotrichum graminicola). A trace was found on wild oats at Bremner, Alta. (A.W. Henry)

POWDERY MILDEW (Erysiphe graminis) was reported as follows: Slight on all varieties at the Sidney Station, B.C.; slight on 10% of the plants at Lytton on Victory, etc; trace in 2 fields in N.B.

COMMON ROOT ROT (Fusarium spp. chiefly). A prematurity form of root rot was common in Sask. causing moderate damage particularly in zones 1 and 2. The plants became bleached early and were rotted at the base. Of 165 samples of foundation, elite, registered and certified seed from the 1940 crop, 35 yielded Helminthosporium sativum in culture.

LEAF BLOTCH (Helminthosporium Avenae). A trace was reported in one field out of 38 examined in Alta.; and a trace from Thornhill and Virden, Man. It was general and abundant everywhere in Que.; the average percentage of leaf area affected was found to be 3.51% in 1941 in comparison with 3.12% in 1940, an increase of 0.32%. It was again more prevalent than Speckled Leaf Blotch (q.v.) (I.H. Crowell and D. Leblond). In the plots at Ste. Anne de la Pocatiere, Que., leaf blotch infection differed widely according to the variety, but in general speckled leaf blotch was the more prevalent, as the tabulation below shows:-

Variety	H. Avenae	S. Avenae
Mabel	0	5.0
Erban	2.1	6.7
Lasalle	0.7	5.4
Banner	9.7	4.0
Gopher	1.0	23.6
Ajax	2.9	4.5
Ripon	1.1	11.2
Roxton	0	3.1

Leaf blotch was recorded in 114 out of 137 fields examined in N.B.; the average infection was 5%, reaching as high as 50%, and was recorded much more frequently than speckled leaf blotch. Very little leaf blotch was recorded in the plots (S.F. Clarkson). Leaf spot was generally slight to moderate on the varieties at Charlottetown, P.E.I. Elsewhere, slight infections were occasionally noted (G.W. Ayers). Examination of a sample of Victory from these plots showed both H. Avenae and S. Avenae equally prevalent.

NEMATODES (Heterodera schachtii). The nematode situation in Ont. appears to have changed little from that observed in former years. The area of infestation has neither increased nor diminished in Waterloo Co. Some farmers in the country are avoiding nematode injury by crop rotation. No new outbreaks have been reported from any part of the province in the past year. (J.E. Howitt)

HALO BLIGHT (Phytomonas coronafaciens). A trace was observed in 15 fields and a slight infection in 11 out of 38 examined in Alta.; infection ranged from a trace to slight in the plots at Edmonton and Lacombe and from a trace to severe at Beaverlodge. Halo blight was seldom encountered in north-central Sask. in June. Its absence was noteable considering its general prevalence in 1939. Although June was generally moist, the prevailing cool temperatures may have influenced infection (T.C. Vanterpool). Halo blight was

very prevalent in Man. in 1941. A few fields were severely retarded early in the season. All the plants were severely attacked in one field at Eden in June. Severe leaf reduction occurred at Winnipeg in July, on many varieties due to the disease. No halo blight was observed in the numerous leaf samples examined from fields and plots in N.B. (W.A.F. Hagborg)

CROWN RUST (Puccinia coronata). A very light infection was recorded in 3 fields in eastern Sask. and none was found in the west. Crown rust of oats was quite prevalent in Man. in 1941. The heaviest infections occurred in the south-eastern part of the province, where infections averaged 60% on late crops. Early sown oats carried infections averaging 5 to 15% (B. Peturson). The average percentage of leaf area affected by crown rust in the fields surveyed in Que. was 1.05% in 1941 compared to 1.96% in 1940, a decrease of 0.91% (I.H. Crowell and D. Leblond). Crown rust in general only slightly infected oats in Western Quebec, with somewhat higher infections at Lennoxville (F.S. Thatcher). Crown rust was more severe in N.B. in the areas where it was found than in 1940. Out of 137 fields examined, no rust was found in 60, traces in 24, but infection ranged from 45 to 90% in 12. Aecia were abundant towards the end of June in the Springhill area and a severe local epidemic developed. Crown rust was also epidemic in the Shediac area embracing Moncton Road, Gilbert's Corner, Shediac Corner, Scoudouc and Shediac, infection ranging from 65 to 90%. Heavy infections have been recorded in the area since 1937 (100% Shediac, 1937; 45% Gilbert's Corner, 1939). Mr. R.P. Gorham, Division of Entomology, found the common buckthorn this past summer at the Welling Farm, Gilbert's Corner. Rhamnus cathartica was also located at Dorchester, where a 90% infection was recorded at no great distance from the bushes (S.F. Clarkson). There was very little crown rust on oats in P.E.I., except on late fields, which were moderately infected (R.R. Hurst). It was first observed in the plots at Charlottetown on July 24 (Bruce McLaren). Infection ranged from 20 to 60% in the plots at Palmer Road, but elsewhere it was negligible. (G.W. Ayers)

STEM RUST (Puccinia graminis) was extremely scarce in Alta. A trace was found in the plots at Edmonton and Lacombe, and it was detected with difficulty in several late-maturing fields in southern Alta. A 5% infection was recorded in a field at Wawato, Sask. and a trace in 3 other fields out of 30 examined. Stem rust was present on susceptible varieties throughout Man. However, infection was generally light. In the early sown crop stem rust infection ranged from a trace to 10%, but in late fields it was much heavier, varying from 10 to 40% (B. Peturson). In Que., stem rust infected 0.51% of the stem area in the fields surveyed (I.H. Crowell and D. Leblond). Light infections were recorded in the plots and fields at Ste. Anne de la Pocatiere, Que. (R.O. Lachance). Only a slight infection of stem rust was observed in general in Western Que., although it was somewhat higher in the plots at Lennoxville (F.S. Thatcher). Stem rust was recorded in only 14 fields out of 142 examined in N.B., but in 6 fields infection ranged from 20 to 45%. Aecia were abundant on the barberry hosts at Hartland in the early summer, and 45% infection was present on oats in the milk and dough stage of maturity on Aug. 13. No aecia were present on the barberry at Rothesay, but no grain was grown near the bushes in 1940. The absence of grain growing near the alternate hosts, both barberry and

buckthorn, is quite commonly observed. In the few cases, where grain was sown near the alternate hosts and only a trace of rust developed on the grain, it was noted that only a trace of aecia had developed on the barberry or buckthorn, and the grain crop had been sown late and may have escaped aecial infection. The farmers of Pomeroy Ridge and Scotch Ridge, two places on parallel roads, about a mile apart, have experienced great difficulty in growing grain because of rust damage. Both barberry and buckthorn are suspected to be present from information in hand. New locations of barberry were found at Fredericton and at Lincoln in 1941. (S.F. Clarkson)

In the plots at Charlottetown, P.E.I. Erban showed a trace and Ripon a 2% infection on Aug. 30; no rust was in plots elsewhere. Some reports of stem rust damage on oats sown early were received in August, but in general, oats was unusually late this year and little stem rust developed. However, severe rust damage was found in several late fields on Oct. 12 and may have been quite widespread. (R.R. Hurst)

SPECKLED LEAF BLOTCH (Septoria Avenae) affected 0.37% of the leaf area in the fields surveyed in Que. this year as against 0.83% in 1940 (I.H Crowell and D. Leblond). It affected 3-40% of the leaf area at Lennoxville (F.S. Thatcher). The disease was recorded in 16 fields out of 142 examined in N.B., infection varying from a trace to 25%. It was heavy in the plots at Nashwaaksis, but only small amounts were recorded elsewhere. (S.F. Clarkson)

SMUT (Loose Smut, Ustilago Avenae and Covered Smut, U. Kolleri) affected a trace of the heads in 8 fields and 2-3% in 2 others out of 38 examined in Alta. Covered smut was recorded in 10 fields and louse smut in 3 out of 30 examined in Sask.; the average infection was less than 1%. Of 165 samples of foundation, elite, registered and certified seed samples grown in 1940, 111 carried smut spores and 12 were severely smutted. Smut was recorded in 13 fields out of 17 examined in Man., the average infection being 5% and the heaviest 25%. Smut was recorded in 37 out of 141 fields examined in N.B.; the average infection of covered smut was 0.5% and loose smut a trace, a decided reduction over last year. The highest infection was 10% of covered smut at Head of Millstream (S.F. Clarkson). Smut was recorded from 2 fields in N.S. - 10% of loose smut at Clifton and 10% of covered smut at Scott's Bay (W.K. McCulloch). Loose smut infection varied from a trace to 40% in P.E.I.; indeed in one field 75% was recorded. (R.R. Hurst)

BLAST (non-parasitic) was present in all fields examined in Alta. - 5% in 4 fields, 10% in 10, 15% in 9, 20% in 10 and 25% in 4, and from 10 to 25% in the plots at Lacombe and Lethbridge and from 10 to 35% at Beaverlodge; less severe in Sask. than in 1940; 0-14% in the plots at Ste. Anne de la Pocatiere, Que.; in all fields in N.B., averaging 15% and occasionally reaching 35%; 2-30% blast recorded in plots at Charlottetown and Rose Valley, P.E.I., with smaller amounts recorded elsewhere.

BLIGHTING. Following extreme heat on July 19 (over 100°F.) the upper two inches of the flag leaf sheath was whitened on that side facing the south-west on about 10% of the plants in a field at Dafoe, Sask.

GREY SPECK (manganese deficiency) was reported by J.D. MacLachlan

(Sci. Agric. 22:201-207. 1941) in a localized area in a field at the Ont. Agricultural College, Guelph. Grey speck has also been reported to occur on some of the plots at the Experimental Farm, Ottawa (P.D.S. 4:19), at Macdonald College, Que. (l.c. and P.D.S. 18:13), and the Lake St. John region (P.D.S. 20:14). What is apparently the same trouble has also been observed on other areas at the Farm according to R.Derick, and on some of the low areas in the Ottawa River Valley below the City. As MacLachlan points out, the trouble is probably more widespread than the present records indicate. (I.L. Conners)

BARLEY

SMUDGE (Helminthosporium sativum, Alternaria) affected a trace to 20% of the kernels in 40 samples out of 63 of foundation, elite, registered and certified seed examined from the 1940 crop in Sask.; 18 of these samples yielded H. sativum, although several clean looking samples did so also. All samples yielded Alternaria, and no apparent relation was discovered between presence of Alternaria and discoloration of the seed.

ERGOT (Claviceps purpurea) affected 1-2% of the plants in a field of Colsess barley at Armstrong, B.C.; 3-5% of the plants in a fallow field of Prospect barley and a lesser amount in an irrigated field at Swift Current, Sask.; a trace at Moose Jaw and in plots at Prud'homme; Sphacelia stage on Colsess barley received from Glen Bain; slight infection in plots at Winnipeg, Man.; one head in plots at Fredericton, N.B.; trace in 4 fields in Kings Co., P.E.I.

POWDERY MILDEW (Erysiphe graminis) was moderate on Colsess barley at Armstrong, B.C., and a trace on Olli at Vernon; 50-75% infection on lower leaves at Lorette, Man., with lesser amounts at Tyndall and Ste. Annes; general in Que. in August, 3.49% of leaf surface affected in the fields surveyed in 1941, compared to 5.28% in 1940; infection trace to moderate in plots at Ste. Anne de la Pocatiere; slight to moderate infection in 25 fields examined in P.E.I.

HEAD BLIGHT (chiefly Fusarium spp.). A trace was observed at Swift Current, Sask.; a few infected kernels in almost every head at McCreary, Man. (F. Poae and Alternaria sp.); out of 15 fields in N.B., traces were found in 3 located at Drummond (F. Poae), The Barony (F. Poae) and Lower Millstream (F. Poae, F. avenaceum and Epicoccum purpurascens). The fungi recorded were isolated and determined by Dr. W.L. Gordon.

STRIPE (Helminthosporium gramineum). A trace was found in 2 fields in Alta., and a slight infection in the plots at Edmonton; severe in a field at Oxbow, Sask.

SPOT BLOTCH (Helminthosporium sativum). A trace was recorded in 8 fields, slight infection in 4 and moderate in 1 out of 31 examined in Alta.; moderate infection at McCreary, Man.

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). A trace was reported in 6 fields and a slight infection in 13 out of 31

examined in Alta.; present in all 10 fields examined in Sask., causing moderate damage. Root rot (Fusarium spp.) was prevalent at Lennoxville, Que. About 50 to 60% of the area in small plots and 20% of a large field were rendered worthless. The disease was conspicuous because of the abrupt demarkation of the affected areas. Apparently local soil conditions exerted a predisposing influence. (F.S. Thatcher)

NET BLOTCH (Helminthosporium teres). A trace was present in 5 fields and slight infection in 4 out of 31 examined in Alta., with a trace also present in the plots at Edmonton; moderate infection in a field near Sutherland, Sask.; infection general in the Red River Valley, Man., the interlake area and the Portage plains, but elsewhere scattered, with severity usually slight, but occasionally severe; 1.62% of the leaf area affected in the fields examined in Que. in 1941 compared to 2.26% in 1940; trace to severe in the variety plots at Ste. Anne de la Pocatiere; 15-85% infection in the plots at Lennoxville, being most severe on Byng; infection usually slight in N.B.; apparently uncommon this year in P.E.I., traces being observed in 2 fields in Queens Co.

LEAF RUST (Puccinia anomala) was found in several fields in Man.- in most, infection was a trace, but in a few fields it averaged 5%. Leaf rust affected 0.07% of the leaf surface in fields examined in Que. in 1941 compared to 0.22% in 1940 (I.H. Crowell and D. Leblond); a trace recorded in one field in N.B.; 2% infection found in rod rows at Charlottetown, P.E.I.

STEM RUST (Puccinia graminis). A trace was found in 3 fields in Alta. and a slight to moderate infection in late-maturing plots at Edmonton. A trace was present in southern Sask. during July, and it was severe at Indian Head on late sown varieties on Aug. 12.

Experiments conducted in Man. in 1940 show that a stem rust infection of 25% severity reduced the yield by 15% and the amount of "heavy grade" barley, the type required for malting, by the same percentage and caused a reduction of quality of one grade. In past years, an infection of this severity has been frequently regarded as of little significance. (see also under Wheat Stem Rust)

The percentage of stem area affected by stem rust in the fields examined in Que. was 0.13%; a trace to a light infection occurred on most varieties at Ste. Anne de la Pocatiere. Traces of stem rust were present on all varieties except Olli, which was already ripe, at Fredericton, N.B. on Aug. 5. Stem rust was virtually absent in P.E.I., but traces to 10% were present in most fields still standing on Oct. 12. (R.R. Hurst)

SCALD (Rhynchosporium Secalis) was severe on Olli, and Olli hybrids at Sidney, B.C. in June (W. Jones). A trace was found in 4 fields, slight infection in 11 out of 31 examined in Alta.; it was slight in the plots at Edmonton and Lacombe and severe on several varieties at Warburg.

COVERED SMUT (Ustilago Hordei). About 5% developed in a field of Olli in the interior of B.C., although the seed had been treated with Ceresan; a trace was also noted in 2 other fields (G.E. Woolliams); present in 10 out of 31 fields examined in Alta., average infection 1.6%, highest, 25% in a field at Innisfail. Out of 63 samples of foundation, etc., seed from the 1940 crop in

Sask., 27 carried a light load of spores; present in 24 out of 53 fields examined in Man., with average infection 1.2%, highest 19%, at Franklin. Covered smut was present in all varieties at Lennoxville, Que.; the highest infections were 4% in O.A.C. 21, 12% in Charlottetown x Velvet 14-2-2, and 15% in Byng x Lennoxville Hulless 9-4 (F.S. Thatcher). A trace occurred in one field and 1% in another out of 15 examined in N.B.

LOOSE SMUT (Ustilago nuda). A 1% infection was noticed in Colsess at Armstrong, B.C. with lesser amounts in 2 other fields; loose smut was severe in a field at Wayne, Alta., while traces were present in 2 other fields; slight infection on Sanalta at Lethbridge, trace at Lacombe, slight infection at Edmonton; infection less than 1% in 2 fields out of 11 examined in Sask.; recorded in 8 fields in Man. - usual infection a trace, heaviest 10%; trace to 5% in 4 out of 14 fields in N.B.; 5% recorded at Great Village, N.S.; 2% infection noted in head rows at Charlottetown, P.E.I. on July 21. (B. McLaren)

FALSE STRIPE (non-parasitic) was general on Trebi in the plots at Agassiz and Sidney, B.C. (W. Jones)

TIP STERILITY (non-parasitic) affected 2% of the heads in a field near Montague, P.E.I. The trouble has not been noticed previously, and may have been due to the very wet and cool summer this year. (R.R. Hurst)

RYE

ERGOT (Claviceps purpurea). A trace of infection was found in one field in Alta. and in the plots at Lacombe; a trace was present at Battleford and Swift Current, Sask., and 0.5 to 1% infection on Prolific Spring at Indian Head; a trace to moderate infection was present in all 12 fields examined in Man.; less than 1% of the heads were affected in fields examined in Queens and Prince Counties, P.E.I.

BACTERIAL BLIGHT (Phytomonas translucens f. sp. undulosa) caused slight damage in one field out of 5 examined in Man. It should be noted that the pathogen was f. sp. undulosa, not f. sp. secalis. (W.A.F. Hagborg)

STEM RUST (Puccinia graminis) slightly infected rye at Winnipeg, Man.; traces were present on a few varieties at Fredericton, N.B.

LEAF RUST (Puccinia secalina). A trace was found in the plots at Edmonton and Lacombe, Alta.; slight infections were recorded at 4 points in Man.; traces were present on most varieties in the plots at Fredericton, N.B.; traces were also present in Queens Co., P.E.I.