POWDERY MILDEW (Erysiphe graminis). A trace was seen in 1/8 fields of winter rye examined in s. Alta. (J.T.S.).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was 5-tr./8 fields of winter rye in s. Alta. (J.T.S.). Infection was 2-tr. 4-sl. 1-mod./11 fields of rye examined in central Alta. and the Peace River district (W.P.C.).

STEM RUST (Puccinia graminis). A tr. was found in a single field nr. Alliance in central Alta. (W.P.C.). A very light infection was recorded in 3 fields in n.w. Sask. (H.W. Mead).

LEAF RUST (Puccinia secalina). A trace was found in 2/8 fields of winter rye in s. Alta. (J.T.S.). Infection was mod. to heavy in a field at Ste. Rose du Lac, Man.; a trace also occurred in one at Sidney (W.L. Gordon).

SPECKLED LEAF BLOTCH (Septoria secalis). A trace was recorded in 3/8 fields of winter rye in s. Alta. (J.T.S.). Infection was 2-tr. 5-sl./11 fields examined in central Alta. and the Peace River district (W.P.C.).

STEM RUST (Urocystis occulta). Infection was 1-tr. 1-mod./8 fields of winter rye in s. Alta. (J.T.S.).

CEREAL RUSTS IN WESTERN CANADA IN 1955

B. Peturson and T. Johnson

Cereal rusts overwintered abundantly in Texas during the winter of 1954-55, and subsequent spread during the early spring was rapid. The threat posed by this situation was reduced by severe frosts, which struck n. Texas and Oklahoma 20-26 March, and was further reduced by the disastrous drought that followed in much of the s. part of the winter wheat belt. Despite the rather slow spread of rust in April and May enough rust had developed in parts of Texas and in the e. parts of Oklahoma and Kansas to make possible a very considerable northward movement of rust spores by the end of May. These spores, brought in by persistent s. winds that blew from Texas northward across the Great Plains area of the U.S. and Canada, 30 May - 1 June were deposited chiefly over the eastern Dakotas, Man. and, to a lesser extent, e. Sask.

These spore showers, containing both stem rust and leaf rust, but principally the latter, initiated both stem and leaf rust, which became evident as scattered infections on wheat in s.-e. Man. during the third week in June. The initial spore shower in 1955, was relatively light as compared with the first important spore movement in 1954, which took place 4-8 June and deposited rust spores over large areas of Man. and Sask. Furthermore, the spore movement in 1955 was centered on Man. whereas, in 1954, the spore

movement was concentrated on central Sask. In 1955, leaf rust spores outnumbered stem rust spores by about 10 to 1 in the initial spore showers while in 1954, leaf and stem rust spores occurred in about equal numbers in the early spore showers.

Stem Rust of Wheat

In 1955, stem rust of wheat was first found in Western Canada, at Morris, Man., 13 June on durum wheat. At that time it was very scarce and a search of about half an hour was required to locate a single rust pustule. These scattered infections were, no doubt, initiated by the rust spores brought northward by the persistent s. winds about a fortnight previously. The subsequent development and spread of stem rust in Western Canada was greatly influenced by weather conditions as well as by the wheat varieties grown in the rust area. In Man., where the heaviest rust-spore shower occurred and where the first field infections were found, about 65% of the wheat acreage (1,250,000 acres) consisted of the stem-rust-resistant wheat Selkirk and there were 1,880,000 acres of this variety in the rust area of Sask. There were only tr. amounts of stem rust on Selkirk and no significant amounts of stem rust inoculum was produced on this variety. Temperature and precipitation favored rust infection and development from the beginning of the season until 15 July. Stem rust, during this period, became well established on susceptible wheats in Man. and e. Sask. and by mid-July a light sprinkling of rust was present on susceptible wheat throughout the rust area. From mid-July to the end of the season temperatures were above normal and precipitation below normal except for the last week in July, when precipitation in the prairie region equalled or exceeded the normal. During August, except for a few stations in s.-w. Man., precipitation was much below normal. Rainfall deficiencies ranged to upwards of 70% in Man. and e. Sask. For example, the total August rainfall for Morden, Roland and Winnipeg, in Manitoba, amounted to 0.8 in., 0.6 in., and 0.5 in., respectively.

The hot dry weather of the latter part of the season greatly hastened crop ripening and retarded rust development. When stem rust had reached its maximum just before the crops ripened infection on susceptible varieties, in Man., ranged from trace to about 15%, averaging about 7%. In e. Sask. stem rust averaged less than 5% and in w. Sask. and Alta. it occurred only in trace amounts. Stem rust on durum wheat in Man. was very variable. In some areas infections averaged less than 10% in early fields while in other areas infections in the later fields averaged upwards of 60%. In Sask. stem rust was light on durums.

Leaf Rust of Wheat

Leaf rust, was first found at Winnipeg, Man., on 13 June, two weeks after spores in considerable numbers were caught in spore traps. Infection became quite general on susceptible wheats in the Red River Valley during the third week in June and ranged up to 30% by mid-July. Before harvest leaf

rust in Man. averaged about 65% on all plants. In e. Sask. leaf rust averaged about 35%, but in w. Sask. and Alta. infection was much lighter. When leaf rust infection had reached an intensity of 30-40% on susceptible wheats in Man., only trace amounts were present on Selkirk. Later, in some areas in that province, infection reached 40%. In all cases the pustules were small and apparently became established late. Many fields were examined which carried only traces of leaf rust. The infection on this variety averaged possibly 15% in Man. and owing to the late establishment of leaf rust on Selkirk it probably was only lightly damaged by this rust. In Sask. infection on Selkirk was much lighter than in Man. Variable leaf rust infection occurred on Lee wheat, but was in general somewhat lighter than on Selkirk. Lee comprised 16.8% of Manitoba's wheat acreage (327,000 acres), and in Sask. nearly a million acres of Lee were grown. Negligible amounts of leaf rust occurred on durum.

Stem Rust of Oats

Stem rust of oats was first found in Man. in 1955, on 20 June at Morden. This rust became more prevalent than wheat stem rust. Over half the oats grown in Man. and nearly all the oats grown in Sask. and Alta. were quite susceptible to one or more of the races of oat stem rust prevalent in 1955. A good deal of the oat crop was sown late. On this late crop stem rust developed extensively and mod. infection on susceptible varieties was found as far west as central Alta. while lighter infections occurred in w. parts of that province. The early oat crop, even in Man., carried only light rust infection. In late oats, in Man. and e. Sask. stem rust averaged about 30% on susceptible oats with lighter infections in w. Sask. and Alta. Fairly heavy stem rust infections occurred on the new resistant oats Garry and Rodney in Man. and e. Sask. Some late fields were seen which carried up to 50% infection of small rust pustules. This unusually sev. infection was possibly due to a partial breakdown in resistance as a consequence of the high August temperatures. Most of the oat rust present in Western Canada consisted of races 7 and 8 which at normal temperatures do not appreciably affect Rodney and Garry. Only a very few isolates of race 7A, which attacks Rodney, were found.

Crown Rust of Oats

Crown rust appeared in the field in Man. on 13 June. A quite heavy infection averaging about 40% developed on late oats in Man. and e. Sask. Light infection occurred in w. Sask. and a trace in Alta.

Rusts on Rye

Tr. amounts of stem rust were found on rye in Man. in n.-w. Sask. and central Alta. A mod. infection of leaf rust ranging up to 30% occurred on rye in Man. Traces were also noted in s. Alta.

Leaf Rust of Barley

A very light infection of leaf rust was observed on barley in Man. and e. Sask. and traces in Alta.

DAMAGE CAUSED BY WHEAT RUSTS IN WESTERN CANADA IN 1955

B. Peturson

The estimate of damage caused by leaf and stem rust of wheat to susceptible varieties in Western Canada in 1955 was made by comparing their yields with that of Selkirk wheat, which remained almost free of stem rust,

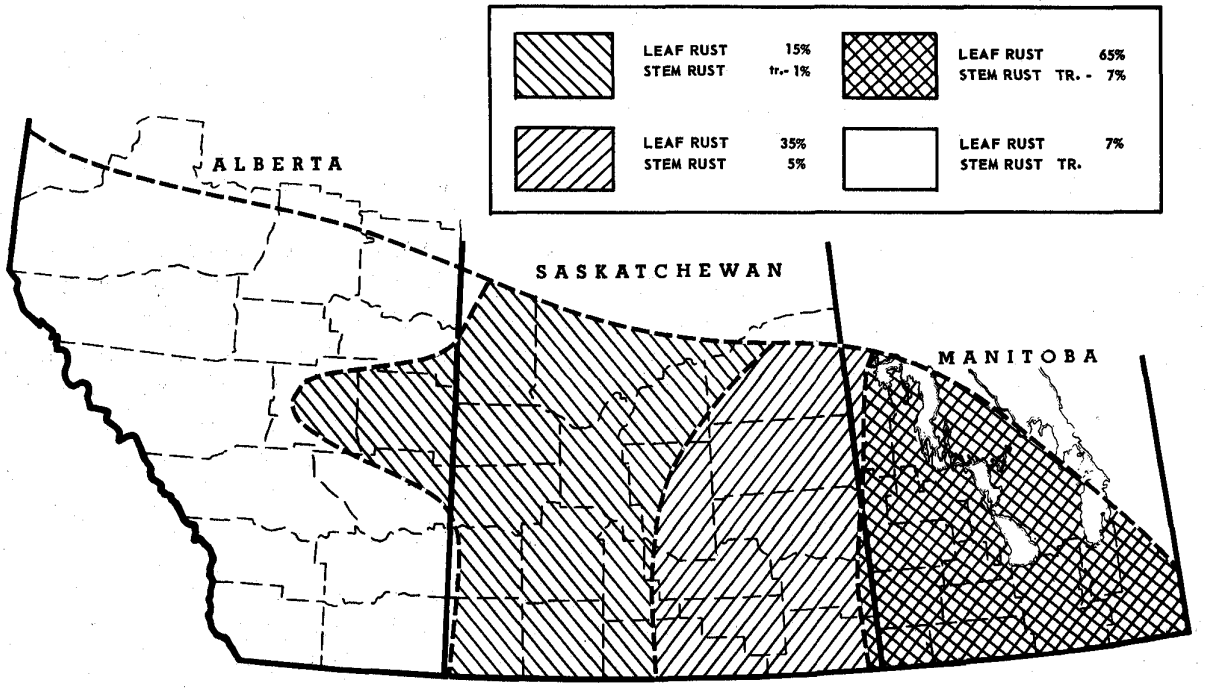

Fig. 1. Map of the Prairie Provinces showing approximate average intensities of leaf rust and stem rust in 1955 on susceptible common wheat.

carried only very light leaf rust infections, and sustained negligible rust damage. Yield information was obtained by United Grain Growers, Ltd., from farmers who, in 1955, grew Selkirk wheat and one or more of the varieties Thatcher, Redman, and Lee, on comparable land, sown about the same date.

In Man., where Thatcher and Redman carried light stem rust infections and heavy leaf rust infections, they yielded 15.3% less than Selkirk; in the e. half of Sask. where both stem and leaf rusts were considerably less prevalent than in Man., Thatcher yielded 7.7% less than Selkirk; and in the

w. half of Sask., where stem rust occurred in trace amounts only and where leaf rust was quite light, Thatcher yielded 1.3% less than Selkirk. Lee yielded 6.2% and 3.6% less than Selkirk in Man. and e. Sask., respectively. These two varieties were equal in yield in w. Sask. When the acreages of various wheat varieties grown in the three areas mentioned above and the differences in yield between them and Selkirk the most rust resistant variety grown are taken into account, it is estimated that yield losses due to leaf and stem rust amounted to 1 1/2 million bushels in Man., 6 million bushels in e. Sask. and 2 million bushels in w. Sask., a total of 9 1/2 million bushels for Man. and Sask., or 2.8% of the total crop for these two provinces. Wheat did not suffer any appreciable rust damage in Alta.

The areas, in the Prairie Provinces chiefly affected by stem rust and leaf rusts of wheat are indicated on the accompanying map (Fig. 1).

RUST NURSERIES IN CANADA IN 1955

B. Peturson, G. J. Green, T. Johnson and A. M. Brown

The introductory sections, Cereal Rusts in Western Canada in 1955 and Damage Caused by Wheat Rusts in Western Canada in 1955, of Report 12, issued by the Plant Pathology Laboratory in December 1955, have been reproduced as separate reports under their respective authors in the preceding pages. Here will be given the sections on Cereal Rusts in the Rust Nurseries and Diseases Other than Rusts with the last of the 5 tables as Table 2.

Cereal Rusts in the Rust Nurseries

The following varieties were used in the rust nurseries in 1955: Wheat: McMurachy, Lee, Kenya Farmer, Little Club, Marquis, Mindum, Thatcher, Selkirk, Redman, Exchange, and Frontana. Oats: Bond, Trispernia, Exeter, Garry, Clinton, Landhafer, and Rodney. Barley: Montcalm, Black Hulless, Vantage, and Feebar. Rye: Prolific.

Wheat Stem Rust

Heavy, or even mod., stem rust infection was largely confined to the central part of Canada, roughly from Fort William, Ont. to e. Sask. E. of Mindemoya, Ont., stem rust infection was generally light. The mod. to heavy infection which occurred on Lee, Mindum, Thatcher and Redman in the nurseries in the central part of the country is an indication of the predominance of race 15B in the area. This race, though present throughout Canada, was less prevalent in the far east and the far west. For example, the data from Kentville, N.S., where the above-mentioned varieties bore no more than a trace of rust while Little Club and Marquis bore 50 and 30 per cent, respectively, show that races other than 15B were principally present. From this station