

How Rust Spreads on Wheat

Interesting Data Regarding Red and Black Rust Prevalent in This Year's Crops

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Until recent years there was only supposed to be one rust of grains, i.e., the red rust, which was, of course, recognized as one of the stages in black rust disease. But of recent years some are inclined to think that one stage may exist without the others, i.e., that we may have black rust on stubble without having had red rust on the straw, and others are inclined to think that sometimes the leaves rust independently of the stems. But all these are hair-splitting differences and I am inclined to think that they are all stages and degrees of the same disease, *Puccinia Graminis*, the life-history of which is as follows:

Developing from the red rust spores which occur on the leaves and stems of cereals during the winter weather about this time of the year, there is produced a second growth or stage in the disease capable of living on the dead stubble. This stage, is therefore, saprophytic, living on dead tissue, and only harmful in so much as it produces spores which winter over.

These spores are black and as they are so well pronounced have given name to the disease, "Black Rust."

Resists Severe Winters.

They constitute the winter stage, having thick walls and powers of resisting our most severe winters. In the spring these spores germinate on the ground and on the dead stubble and grass that may be turned under, and produce other spores, much more numerous and smaller, which germinate on the tender wheat seedlings, or, as has long been thought the nature and complete cycle, they are wind-blown to the barberry bush, on the leaves of which they germinate and rapidly develop, producing an orange-colored spore called the cluster cup stage. From the millions of spores that come from these clusters on the barberry, there starts the red rust proper on wheat and other cereals. The objection to this supposedly normal cycle is that wheat rust is bad in Australia where there is no barberry. It is thought in this case to short circuit the barberry stage. Even in western Canada there is very little barberry, and certainly not enough to harbor the disease to the extent to which it sometimes occurs.

Two years ago you will recall that during the three or four sultry days following a heavy rain on August 4 there developed an enormous amount of wheat rust. The conditions were favorable and the rust developed. There is a danger of similar conditions this year; today is just such a day as wheat rust would develop. The spores the omnipresent, simply awaiting suitable conditions for their development. As occurred two years ago, the early sown wheat was sufficiently developed as not to be injured by the rust on August 5 to 8, whereas wheat sown late was considerably damaged; and a rust at this time would do more harm than a frost as it would be more general and affect all stages of growth. The annual loss through grain rust is said to exceed \$100,000,000.

Precautions.

There are no means to eradicate it, but there are some precautions, which tend to lessen its baneful effect, such as:

1—Burning stubble, wild grass and dead hay which serve to harbor the black rust stage and assist in wintering it over.

2—Early sowing and good cultivation to give strong healthy plants that will resist the disease.

3—Growing the more resistant varieties. Fife wheat is very susceptible to rust; Marquis slightly freer from it; Fife or Minnesota 163, 10 per cent resistant; Minnesota 188, corresponding to our Marquis, 30 per cent resistant. The only wheats that are at all entirely resistant are the Durum wheats, and Emmers or Native Indian.

4—Destruction of the barberry. In 1903 Ontario passed a barberry act, which said that if ten farmers petitioned the destruction of a barberry hedge, the same must be destroyed and compensation given.

We are finding now, however, that rust can be had in Ontario in spite of the barberry, as it is in the west, and I believe that unconsciously the burning of the stubble, thought to be so wasteful, is a very great factor in lessening rust. But, of course, our chief protection against it is our drier climate, clear sky, open weather, winds and lack of sultry days.

NEWFOUNDLAND TRADE NOTES.

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work will doubtless be confined to herring packing chiefly, as the codfishery will be practically over by the time the machinery is installed.

The big project at Catalina which owes its inception to Mr. Coaker President of the F. P. U. has been launched; and a Construction Company is now erecting the first of a series of buildings—a large salt store with a capacity of 8,000 tons. Clearings are being made for the Shipbuilding Plant and the Marine Railway; and Catalina is already becoming a busy place. This is the largest enterprise ever undertaken by any local organization; and when completed will effect a revolution in our fishing industry. Hitherto we have been rather conservative in our methods of handling and marketing our produce; but the Export Company at Catalina will introduce features into the fish trade which will have far-reaching results.

The Imperial Oil Company has purchased the premises known as "The Dundee Room" on the south side of St. John's and will erect an extensive plant for the handling of its products, for the local market. This will consist of tanks with a storage capacity of approximately 1,000,000 gallons, a warehouse, office, and a large cooperage where they will make their own packages.

We seem to be attracting the attention of foreign investors these days; and yesterday a letter was received by the Board of Trade from Kirkwood & Sons, of Toronto, who represent themselves as agents for a large British Syndicate, intimating that they are prepared to establish "the largest flour mill in America", provided the Board of Trade can induce the Government to guarantee the interest on the bonds of the Company.

The Company would guarantee to operate a line of steamers to carry Newfoundland products from St. John's to Quebec, Montreal, Kingston, Toronto, Rochester, New York, Hamilton, Buffalo, Chicago, and Fort William. In addition to this extensive program the proposition sets forth that these steamers will bring to our shores a large number of American tourists.

Shipments of wheat will be made here during the season of navigation and the mills would be in operation during the entire year. This is a very attractive proposition; but it will demand a good deal of consideration. So far, as a local newspaper remarks "it is too much in the air"; and before we advance any further, the Board of Trade will make enquiries as to the financial standing of the promoters.—P. W. B.

THE PATRIOTIC ACRE FLOUR.

The gift of flour from the grain growers of the Province of Saskatchewan to the Patriotic Fund has attracted much interest.

At the outbreak of the war in Europe the farmers of Saskatchewan realized their responsibility and launched a scheme which will long be remembered to their credit. The Saskatchewan Grain Growers' Patriotic Acre fund was initiated at the annual convention at Regina, in February, 1915. The results of this scheme have recently been made public.

The vigorous canvas of the province brought promises of 6,740 acres, and when the contributions began to come in it was seen that the fund was going to swell to enormous proportions. Many sent in money, but the majority sent in the graded storage tickets for wheat or other grains which had been stored throughout the province. The total of both reached 84,000 bushels of grain in addition to \$29,000 in cash.

The question was then taken up as to the milling of the wheat and its subsequent transportation to England. The wheat contributed was of various grades, so a sufficient quantity was disposed of to enable the organizers, the Saskatchewan Grain Growers' association, to purchase 80,000 bushels of No. 1 Northern wheat, which was turned into 3,200,000 pounds of the best flour obtainable. It was decided that the shipment should be made in one trainload, and instructions were given to the millers, the Robin Hood Mills Company, to that effect. The shipment left Moose Jaw on August 9th. An order was placed with a Winnipeg firm for 40,000 special bags, each inscribed with the words, "Saskatchewan flour milled from No. 1 Northern wheat, grown and donated to the Empire by the Saskatchewan Grain Growers' Association, Regina, Sask., Canada." Each of the cars was decorated with banners and bore the emblem of the association.

The flour was presented to the Government by the representatives of the Association and will be shipped across the Atlantic at once.

United States as a Sugar Exporter

Since the outbreak of war the United States has become the world's largest exporter of refined sugar. In the last fiscal year, that is the second year of the war, the exports from the United States were over 1½ billion pounds, against about ½ billion pounds in the first year of the war, and less than 1-10 of a billion in the year immediately preceding the war. This marked change in the status of the United States as a sugar exporter is due to the fact that the world's greatest exporters of refined sugars are now cut off from the foreign markets. According to a compilation of the foreign trade department of the National City Bank of New York, Germany, Austria-Hungary and Russia have been in the past the world's chief exporters of refined sugar. The exports of Germany were, in 1913, 2,460,000,000 pounds; Austria-Hungary, 2,369,000,000 pounds, and Russia, about 1,000,000,000 pounds. France in normal years exports about 400,000,000 pounds, but is now importing from the United States about as much as she normally exports, her sugar production having been cut down more than one-half by the war. Belgium, which normally exported about 350,000,000 pounds, is now exporting none, and the exports of the Netherlands, usually about 400,000,000 pounds are now below normal.

These six European countries, Germany, Austria-Hungary, Russia, France, Netherlands and Belgium, have been in the past the world's chief exporters of refined sugar. The sugar supplied by them is produced from beets and exported in the refined state. Their exportations of sugar aggregate, under normal conditions, about 7,000,000,000 pounds annually. The cane sugar of the world, chiefly produced in Cuba, Porto Rico, Hawaii, Java and India, when exported from the places of production goes in the

unrefined state, that of Cuba, Porto Rico and the Hawaiian Islands being sent to the United States for refining, that of Java largely to Hong Kong, China, Japan and India also in the raw state, while India, although producing large quantities, has practically none for exportation. With the European exports of refined sugar practically suspended, the sugar consumers of the world have been compelled to call upon the United States, now the only country able to supply any considerable quantity of refined sugar.

About one-half of the 40,000,000,000 pounds of sugar produced in the world under normal conditions is from cane, and only a very small proportion of it refined, in the place of production. Cuba, which produces about 6,000,000,000 pounds, sends practically all of her crop in unrefined state to the United States, and this is also true of Porto Rico and Hawaii, which now produce in combination about 2,000,000,000 pounds, Java's product is about 3,000,000,000 pounds, mostly exported in the raw state, and that of India about 3,000,000,000 pounds, but none for exportation.

This unusual demand upon the United States for refined sugar has materially increased the importation of raw sugar, the quantity brought into continental United States in the past year having been about 7½ billion pounds, of which over 5 billions was from Cuba, more than a billion from Hawaii and nearly a billion from Porto Rico. In addition to this, the production in continental United States was about 1½ billion pounds of beet sugar and a half billion of cane, making a grand total of over 9,000,000,000 lbs. refined in the United States, of which amount about 1,650,000,000 were exported, against 601,000,000 pounds in 1915, 97,000,000 pounds in 1914 and 66,000,000 pounds in 1913.