

Forecasting Loose Smut In Wheat¹

By W. E. Brentzel²

Development of seed borne diseases can be predicted in some cases with considerable accuracy. An exception is covered smut of wheat, which depends very materially upon weather conditions at the time the grain is germinating. Loose smut apparently is not very much affected by temperature and humidity conditions during the growing season.

Mida wheat is very susceptible to loose smut. In spite of this weakness it has many other advantages which keep it on the preferred list of varieties for this region. Due to its susceptibility to loose smut, many growers have complained of heavy losses and would like some method of combating the disease. Seed treatments have not proved very satisfactory. At this time it seems the best approach to control is through selection of smut free seed. This is easier to suggest than to practice. The problem is where to obtain and how to recognize smut free seed. Realizing the difficulty of the problem, the department of plant pathology, in cooperation with North Dakota Agricultural College Extension Service and county agents, is trying to locate suitable seed sources.

During the winter of 1949, William R. Page, county agent for Grand Forks county, N. D., supplied the plant pathology department with approximately 40 samples of Mida wheat from fields which had more or less loose smut. These were planted in the pathology greenhouse and grown to the heading stage. The smutted heads were counted. It was not known whether this would be an accurate representation of what might be expected from field plantings, therefore the same samples were sown in the field the following spring for comparison. Results of these comparative tests are shown in Table 1.

Smut readings from the field are in reasonably close agreement with the greenhouse readings, although there is some variation. This is due, it is believed, to the small amount of the samples tested in the greenhouse (200 seeds), whereas, the field counts were taken from rod rows, replicated 10 times. It seems that the tests in the greenhouse gave a reasonably accurate indication of what might be expected from the seed if sown in the field for commercial purposes.

Tests of this kind require considerable greenhouse space, although this was reduced to a minimum by sowing the seed thick

¹ Wm. R. Page, county extension agent, Grand Forks county, had an active part in this work, urged the undertaking and supplied a large number of samples of wheat from his county. Russel Widdifield, extension agronomist, cooperated in the work, contacted county agents in the several counties and helped in many ways to get the work going. The work of these men and of all county agents and growers who supplied samples for testing is gratefully acknowledged.

² Plant Pathologist.

in rows which were spaced closely together. With the aid of artificial lights the plants were brought into the heading stage within six to eight weeks.

Table 1. — Comparing the percentages of loose smut in samples of Mida wheat grown in the greenhouse and in the field.

Lot No.	Source	% Loose Smut Greenhouse Test	Smut Field Test
1	Northwood	6	4
2	Niagara	12	9
6	Emerado	9	8
7	Manville	5	5
11	Grand Forks	8	7
12	Thompson	2	2
15	Gilby	16	12
23	Beach	2	2
35	Glenburn	4	5
38	Minot	10	8
Mean		7.4%	6.2%

Laboratory examination, rather than tests in the greenhouse, could be used but if this method were followed there are more complicated factors to be considered. It is entirely possible to detect the smut fungus in the embryos of seed or in the growing parts above the seed by using a microscope, but the seed must first be prepared for examination and until we know more of the resistance of varieties and the physiologic races of smut, wide errors may be expected. Seeds that are infected may not in all cases develop smutty heads.

LOOSE SMUT IN MIDA WHEAT*—1950

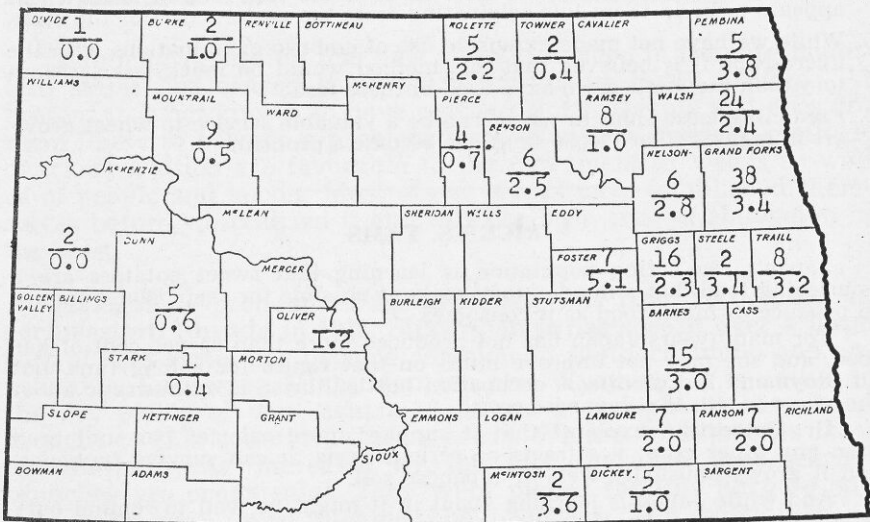


Figure 1.— Showing the number of Mida wheat samples tested for loose smut and the mean percentages of smut in the samples from each county. Upper number shows the number of samples tested. Lower number the mean percentage of loose smut.

During the winter of 1950-51 these testing experiments were continued and expanded, and included about 200 samples of Mida wheat from different counties in the state. The samples were grown in the greenhouse to the heading stage and were sown in the field the spring of 1951 for a field reading of smut. Greenhouse tests indicate both the amount of loose smut in individual samples and the sections of the state in which most smut was found (Fig. 1).

Figure 1 indicates that the damage from loose smut may run somewhat lower in 1951 than in 1950 and that the greatest concentration of infested seed is in the eastern part of the state. Mida wheat is not grown very extensively in the western part of the state but the samples which were obtained from the western counties carried relatively small amounts of loose smut.

Wheat growers who have had losses are eager to find smut free seed and much of the Mida wheat which was produced in the western part of the state will be sown in the Red River Valley this year.

SUMMARY

1. Loose smut has caused considerable damage in susceptible varieties of wheat in North Dakota during the past several years.
2. The practice of sowing smut-free seed is the best method for dealing with this problem.
3. Comparative tests of seed lots in the greenhouse and in the field show that the greenhouse tests, under the conditions used, are a reasonably accurate index to what may be expected from the seed under field conditions.
4. The greatest concentration of loose smut in the 1950 crop of Mida wheat appears to be in those lots originating from the eastern part of the state.
5. While we have not made extensive use of embryo examinations with the microscope it is believed that this method would be much less satisfactory than the method we have used in these tests.
6. Predicting loose smut in wheat can be a valuable service to wheat growers in regions where loose smut has become a problem.

RICE VS. YAMS

Japan's rice-eating population is learning that sweet potatoes are a nourishing food that some day may make it possible for their island empire to produce as much food as it consumes.

For many years Japan has not produced more than 85 per cent of her food, and she may not improve much on that figure for a long time, but Dr. Raymond E. Culbertson, occupation horticulturist, is enthusiastic about the sweet potato as a Japanese crop.

Dr. Culbertson explains that it supplies more calories per unit area than any other crop; it attracts no serious pests; it can survive typhoons, and it grows unusually well in Japanese soil.

And while Japan is learning about it, it might be well to remind ourselves that we in the United States could eat more sweet potatoes than we do, without suffering in any way.

And while on the subject of potatoes, did you know that the familiar old spud, or Irish potato, can be prepared and served in more than 250 ways? (JB)