FIELD STUDIES OF SMUT RESISTANCE IN OATS

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The two oat smuts, *Ustilago avenae* (Pers.) Jens. and *U. levis* (Kell. and Sw.) Magn., are prevalent in most years throughout the United States and reduce the yield and quality of the crop. The two methods of control are (a) seed treatment with formaldehyde, Ceresan, or other disinfectants, and (b) the growing of resistant varieties.

Following the discovery, about 20 years ago, of high resistance to the smuts in varieties such as Markton, Black Mesdag, and Navarro, extensive hybridization experiments were conducted in an attempt to transfer this resistance to leading commercial types of oats. Many new varieties and selections with high resistance have been developed from such crosses, several of which already are in commercial production. The most promising strains have been grown in uniform nurseries under a wide range of environment where they were tested for resistance to smut, particularly to specialized races of smut that appeared in certain sections.

**SCOPE OF THE EXPERIMENTS**

The first uniform oat smut nurseries were grown in 1935 in cooperation with nine agricultural experiment stations. In the 4 years following, data were obtained from 13 to 15 nurseries each year. The location of the experiment stations and the names of the cooperators are given in Table 1. Their assistance in making these investigations possible is hereby gratefully acknowledged.

**MATERIAL AND METHODS**

The same list of resistant varieties was grown at all stations in a given year, but the number of varieties in the nurseries varied from 20 to 38 in different years. In addition, six or seven susceptible check varieties were grown each year.

Seed for the uniform tests usually was grown at Aberdeen, Idaho. All seed was hulled by hand, divided into lots, and sent from Washington, D. C., to the different stations. There it was dusted with smut spores collected locally the previous season. Sixty seeds of each variety were planted approximately 3 inches apart in rows 15 feet long, or slightly longer. At harvest, counts were made of the number of smutted and smut-free plants in each row. When smut infection occurred at a particular station in varieties previously resistant, specimens were collected for making physiologic race determinations.

**EXPERIMENTAL DATA**

The average smut infection of each of 75 oat varieties grown in the uniform nurseries is shown by years in Table 2. The varieties and

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