REACTION OF SOME VARIETIES AND STRAINS OF WINTER WHEAT TO ARTIFICIAL INOCULATION OF LOOSE SMUT

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DURING the period 1931 to 1939, inclusive, loose smut of wheat, caused by *Ustilago tritici* (Pers.) Rostr., caused an estimated annual loss in Texas of 454,000 bushels, or approximately 1.8% of the crop. Since the major portion of the wheat crop is grown in the less humid sections of the state where loose smut is a minor factor in production, it is evident that the disease is of considerable importance in the more humid sections of central and north central Texas. In these areas loose smut often causes losses on individual farms of from 5 to 10%, which are sufficiently high to be of serious economic importance to the individual farmer. All commercial varieties now grown are very susceptible to the disease. Because of the economic importance of loose smut in central Texas and the need for information on sources of resistance, and in order properly to plan the wheat breeding program at Texas Substation No. 6, Denton, Tex., tests of varietal resistance by means of artificial inoculations were started in the spring of 1937.

MATERIAL AND METHODS

The method of inoculation used in this study was the partial vacuum spore-suspension method devised by Moore (5). The apparatus was modified slightly by using a larger inoculating chamber and two openings in the rubber stopper, so that two spikes instead of one could be inoculated at one time. In 1937 inoculations were made at three stages of maturity to determine the optimum stage of growth for inoculating. Other tests were made to determine the best time of day for inoculating. In later seasons, inoculation of four heads gave ample seed for testing the resistance of the variety.

The inoculum was prepared by collecting smutted heads from several varieties of wheat on the station and from a number of farms in this region. A composite of this smut was prepared and used throughout the season so that all varieties were inoculated with the same inoculum.

Inoculated seed was space planted, 2 to 3 inches apart in 10-foot nursery rows, the following season. The number of plants tested per variety ranged from 25 to 50 each season, although in a few instances poor stands reduced this number. In 1940 and 1941, the test was dusted with sulfur to reduce rust infection and allow normal growth of the plants.

The percentage of smut infection was computed from counts of smutted and smutfree culms in 1938. In all other seasons, the calculations were based on plant counts.

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3Figures in parenthesis refer to "Literature Cited", p. 204.