THE EFFECT OF LATENT INFECTION ON THE SMUT-RESISTANT MARKTON OAT

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The question has arisen, Is there a crop variety so resistant to a disease that no injury whatever will result from its contact with the causal organism under conditions normally favorable to infection? The Markton oat, from all outward or visible appearances, is highly resistant to the smuts found in the United States. A study was begun on the effects of systemic smut infection in Markton grown on irrigated land. Idamine, a variety very susceptible to the smuts of oats, was grown as a control.

Bayles and Coffman first found some evidence of injury in a resistant variety when grown from inoculated seed. Hubbard and Stanton have shown that under dry-land conditions at Mandan, N. D., smut-resistant varieties grown from inoculated seed were adversely affected regardless of the absence of smut sporulation in the panicles. The present investigation was started by Loren L. Davis at the Aberdeen Substation, Aberdeen, Idaho, in 1930. It was continued by the writer in 1932, 1933, and 1934.

When the smuts are present as mycelium in the culms of oat plants without external manifestation or sporulation in the panicle, it is known as "latent" infection.

METHODS

Three seed treatments were used, viz., (1) no inoculation with smut spores or other treatment; (2) no inoculation with smut spores and treated with a solution of 1 pint of formaldehyde (standard formaldehyde, 37% formalin) to 40 gallons of water; and (3) inoculation with smut spores, hulled (dehulled) seed being used exclusively.

Inoculation for treatment 3 was accomplished by applying a small portion of inoculum to seed in the coin envelopes in which it had been prepared for seeding. The inoculum was applied just before seeding and the envelopes were shaken vigorously to blacken all seeds thoroughly with smut spores. Covered smut, Ustilago levis (Kell. and Sw.) Magn., with some slight contamination of loose smut, U. avenae (Pers.) Jens., was used in this experiment.

Each year 500 seeds for each treatment and each variety were sown. Each seed was spaced 3 inches apart in 5-foot rows and the rows spaced 1 foot apart. The seed was sown in soil containing sufficient moisture to insure germination of the seed and growth of seedlings until first irrigation.

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