BREEDING WHEATS RESISTANT TO BUNT BY THE BACK-CROSS METHOD

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The production of agronomically desirable varieties of wheat resistant to bunt, *Tilletia tritici* (Bjerk.) Wint., should be of great value in materially reducing the enormous annual losses due to this disease. The average annual loss of wheat from bunt in the United States for the 10-year period 1918-1927 was approximately 17,000,000 bushels. This is second to an average yearly loss of about 26,000,000 bushels of wheat from stem rust in the same period. Besides the reduction in yield, there is a large loss from dockage owing to the presence of smut, and in the cost of cleaning smutty grain. According to Meier, the dockage at the Kansas City market from July to October, 1926, amounted to $272,210, an average of more than $10 a car.

Bunt may be controlled in most regions by the use of fungicides, but the most economical and satisfactory control lies in the use of resistant varieties, which eliminates the expense and inconveniences of treatment, and also takes care of situations where treatment is ineffective.

EXPERIMENTS AT DAVIS, CALIFORNIA

In the spring of 1922, the bunt-resistant variety Martin was crossed with most of the important varieties of wheat grown commercially in California. The plan was to back-cross to the commercial variety until the final progeny should be essentially the same as the commercial parent, with the bunt resistance of Martin. Theoretically, this result should be possible except for factors closely linked with the bunt-resistant factor. Martin was chosen for the resistant parent because it had been completely resistant to bunt in the Pacific Coast states and because the data available indicated that it con-