A SIMPLE MEASURE OF KERNEL HARDNESS IN WHEAT

J. W. TAYLOR, B. B. BAYLES, AND COLBURN C. FIFIELD

ANY simple test that will aid the wheat breeder in measuring characteristics of grain is of value in increasing the efficiency of the breeding program. In the eastern soft wheat region hard wheats are being used extensively as parents to secure resistance to various diseases and a simple test is especially needed for identifying, in the early generations, hybrid lines with soft grain. Hard wheats in general produce coarse granular flour and soft wheats fine smooth flour. The particle size index test developed by Cutler and Brinson appears to differentiate varieties in a very satisfactory way so far as this character is concerned. It is slow, however. The doughball time test has also been suggested by Cutler and Worzella as a measure of quality for small samples. Since the degree of granulation of a flour seems to be related to hardness of the grain, it occurred to the authors that a pearler such as is used in the inspection of barley and which has also been used for studies in the milling of parboiled rice, might be useful in estimating the hardness of wheat samples. Some preliminary trials seemed to verify this assumption and hence a more extensive investigation was planned and carried out. The results appear promising enough to justify presenting the results.

MATERIALS AND METHODS

The pearler consists of an enclosed grinding stone attached to a 1/4 h. p. direct-drive electric motor. An interval timer, a balance sensitive to 0.01 gram, and a set of Tyler screens completes the apparatus necessary for the pearling test.

Preliminary tests were made on grain of varieties grown in field plats at the Arlington Experiment Farm, Arlington, Va. Later samples from the varieties in the uniform soft winter wheat nurseries grown at several stations in the eastern states were studied. Also, in order to obtain data with a wider range of kernel types, samples of a few winter and spring varieties grown in field plats at experiment stations in the western United States were included.

The wheat was stored for two months or more prior to pearling in an ordinary seed storage room. The moisture in the grain varied between 10 and 11% and no shriveled or badly broken grain was used. The procedure used in the test was as follows:

1. Approximately 100 grams of wheat were placed on a No. 6 Tyler screen held over a No. 8. After shaking a definite number of times by hand, three 20-gram samples were weighed from the grain remaining on the No. 8 screen.

2. A sample was placed in the pearler and the latter started and run exactly 3 minutes.