The Correlation of Certain Characters with Yield in Barley Strains

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I t has long been agreed that it would be highly desirable in small grain breeding to be able to select for high yield on the basis of some closely correlated character, preferably one which could be determined before threshing. An opportunity to search for this character was offered by observing 75 strains of barley grown at Michigan State College in 1946.

REVIEW OF LITERATURE

Correlations of yield with various agronomic characters have been rather widely reported. The majority of the work has been done with oats and wheat and comparatively few results have been reported with barley. The following is a summary of the work with barley.

Sir Humphrey Davy (2) remarked that it was unfortunate that so many high-yielding grains preferred to lie upon the ground.

Graber and Olsen (4) reported that they found no significant correlation between yield and lodging in a study involving 15 strains of barley.

Kohls (6), working with seven varieties, found positive correlations between yield and test weight and between yield and height of plant.

At the Colorado Experiment Station, Robertson, et al. (7) found a positive correlation between yield and test weight. In a test including 41 varieties, they also found a positive correlation between yield and height of plant or lodging, but they did find a positive correlation between yield and test weight.

Kiesselbach, et al. (5) found no correlation between yield and either height of plant or lodging, but they did find a positive correlation between yield and test weight.

METHODS OF EXPERIMENTATION

Seventy-five mildew-resistant strains of barley were grown at East Lansing, Mich. in 1946. They were planted in 15 six by six latin squares; five strains being planted in each square with Bay barley as a standard variety. Each plot consisted of five rod rows.

Notes were taken on six characters, viz., percentage of loose smut, extent of lodging, height of plant, length of head, strength of straw, and test weight of grain. Counts of loose-smut infected heads were made on each plot. The number of smutty heads in two counts of 100 heads each were averaged, giving the percentage of loose-smut infection for the plot.

Lodging was estimated with classes from o through 3. Zero was taken as erect; 1, culms inclined from 0 to 30 degrees from the vertical; 2, culms inclined from 30 to 60 degrees; and 3, culms inclined over 60 degrees. With the above classification in mind, plot values were assigned by inspection, with no attempt to split the classification where parts of a plot fell into different classes. The larger area controlled the class value for the plot. No attempt was made to get a precise lodging index as did Clark and Wilson (1). The plots ripened with remarkable evenness, probably due to the lack of rainfall during the latter part of the growing season. Normal rainfall at East Lansing from March 1 until July 15 is 9.73 inches. In 1946, the rainfall during this period totaled only 5.42 inches, with no rain after June 20.

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Figure in parenthesis refer to "Literature Cited", p. 373.