METHODS OF ESTIMATING THE PERFORMANCE OF DOUBLE CROSSES IN CORN

MERLE T. JENKINS

In a recent publication it was demonstrated that inbred-variety crosses may be used efficiently for the preliminary testing of inbred lines of corn. If the lines are to be used eventually in double crosses, it is important to know whether the data from the comparison of inbred-variety crosses may be used to estimate the performance of the lines in double crosses. If so, it should be possible to eliminate entirely the laborious testing of single crosses and proceed directly from the testing of inbred-variety crosses to the testing of double crosses.

This paper presents data on four methods of estimating the performance of double crosses. Three of the methods utilize information on the single crosses of the parents and probably represent the methods of estimation in most common use. The fourth method utilizes only the information from the inbred-variety crosses of the parents.

MATERIALS AND METHODS

The crosses used for these studies were grown in a yield comparison in the season of 1930. The material included in this comparison comprised all but 2 of the 55 possible single-cross combinations among 11 inbred lines, the inbred-variety crosses of these lines, and 42 double crosses among them.

Data were taken on the acre yield and on a number of plant and ear characters. The characters studied were (1) percentage of plants with burned upper leaves, (2) height of the upper ear above the soil surface, (3) percentage of plants erect at harvest, (4) moisture content of the harvested ears, (5) shelling percentage, and (6) acre yield.

The actual performance of the double crosses for each of these characters was compared with its estimated performance using the four methods of estimation. For convenience in reference the different methods of estimation are designated A, B, C, and D. Each method utilizes information usually available in advance of the production or at least in advance of the testing of the double crosses.

The data on which this paper is based were obtained in connection with the corn improvement program at Ames, Iowa, conducted by the Division of Cereal Crops and Diseases, U. S. Dept. of Agriculture, in cooperation with the Farm Crops Subsection, Iowa Agricultural Experiment Station. Journal Paper No. B 110 of the Iowa Agricultural Experiment Station. Project No. 163. Received for publication April 13, 1933.