The Adaptation to Small Samples of the Pearling Test
For Kernel Hardness in Wheat

H. H. Kramer and H. R. Albrecht

The barley pearler has come into prominence as a measure of kernel hardness in wheat since its use for that purpose was first proposed by Taylor, Bayles, and Fifield (4) in 1939. They showed that the pearling index is closely correlated with the particle size index developed by Cutler and Brinson (1), and found fair agreement between the pearling index and the fermentation time test suggested by Cutler and Worzella (2). The pearling test as now generally used was standardized by McCluggage (3) who studied the effects of such factors as temperature, speed of stone, moisture content, pearling time, and type of screen on the pearling index.

In soft wheat breeding programs it is frequently necessary to use varieties of hard red wheat to obtain the winter hardiness and disease resistance desired in soft wheats. It is desirable, therefore, that tests for kernel hardness be adapted for use in early segregating generations where the quantity of wheat available for such tests is limited.

The standard procedure recommended by McCluggage requires a 20-gram sample which limits its use for this purpose. In adapting the pearling test for use with smaller samples, three factors are of major importance, viz., (a) the lower limit of sample sizes which will give reliable results, (b) the effect on pearling index of samples having mixtures of hard and soft wheats such as would be found in samples of segregating generations, and (c) the changes required in pearling time as the sample size is reduced in order to keep the pearling index within reasonable limits. These considerations depend upon the action of the barley pearler. Data having a bearing on these problems are reported in this paper. In addition, the effect of moisture content in soft wheats on pearling index is reported.

MATERIALS AND METHODS

A Strong-Scott barley pearler, model 38, without timer, equipped with a No. 30 grit stone and 10-mesh wire screen Tyler code "Fijor" and having a running speed of 1,725 revolutions per minute, as suggested by McCluggage (3), was used in all experiments. The suggested standard technic was used as a check, viz., 20 grams of cleaned unsized wheat were placed in the machine with the stone running at full speed. The slide outlet was opened after 60 seconds of pearling and 10 seconds later the motor was stopped. The pearled wheat was sifted over a 20-wire screen and weighed.

Variations from this technic included variation in size of charge and length of time pearled and are described along with the presentation of the data. For studies on the effect of moisture content on pearling index, the initial moisture...