Effect of Environment and Source of Seed on Yield and Other Characters in Rice

Jenkin W. Jones, C. Roy Adair, N. E. Jodon, H. M. Beachell, and Loren L. Davis

ONE of the basic requirements for successful rice production is the use of good seed, that is, relatively pure and viable seed of varieties adapted to the prevailing climatic and soil conditions. It is customary among some rice growers to purchase new seed every few years because of a belief that their seed has deteriorated or "run out." Often the new seed is purchased from other states. This is more expensive than home-grown seed because of transportation costs. The seed of rice, as that of other self-pollinated crops may deteriorate in quality as a result of mechanical mixture of varieties, natural crossing, disease infection, and contamination with weed seeds. The need for purchasing new seed can usually be eliminated, however, by more careful attention to maintaining the purity and quality of home-grown seed.

To determine the effect of source of seed on yield and other characters in rice, an experiment was conducted at four rice experiment stations from 1937 to 1941, and the results are reported here.

MATERIAL AND METHODS

The Caloro (short-grain), Early Prolific (medium-grain), and Fortuna (long-grain) varieties were used. Caloro is the principal variety grown in California, and Early Prolific and Fortuna are important commercial varieties grown in the southern states. Each year seed of Caloro and Early Prolific was exchanged between the four rice stations located at Stuttgart, Ark., Crowley, La., Beaumont, Tex., and Biggs, Calif., and seed of Fortuna was exchanged between the three southern stations.

In 1937, the seed of Fortuna from Arkansas was a slightly earlier strain than regular Fortuna, and in 1940 the seed of Early Prolific from Texas was not entirely typical of this rather non-uniform variety. It is not likely, however, that these minor differences had any marked effect on the average results obtained. The results for 1940 in Louisiana are omitted because the crop was badly damaged by floods.

The experiment was designed to give accurate yield comparisons of the crops grown from seed of the same variety but from different sources. Thus, all plots of the same variety were grown in a group. The lots were randomized within each group and the varieties were randomized within each of the four replications.

The analysis of variance method was used to analyze the yield data. The F test was employed to determine whether a variation was significant. The t test was used to compare the means when the variation in yield was shown to be significant by the F test. For the other characters studied, the t test for small numbers was used to determine whether a difference was significant.

After storage for several weeks under like conditions, composite grain samples of each variety for each source of seed and from each station were well mixed,