SIZE, SHAPE, AND REPLICATION OF PLATS FOR FIELD EXPERIMENTS WITH COTTON

E. B. REYNOLDS, D. T. KILLOUGH, AND J. T. VANTINE

A large amount of work on methods of conducting field plat experiments has been conducted in Europe and America. In this country the American Society of Agronomy, since its organization in 1907, has encouraged systematic studies on plat technic for various kinds of field experiments. The Society has adopted and published recommended standards for field experiments, together with a rather extensive bibliography (4). Although these standards provide guiding principles for conducting field experiments, there is little published information on methods of conducting field trials with cotton.

Recently, Ligon (5) in Oklahoma reported results on size and replication of plats for cotton. He concluded that the rows need not be longer than 100 feet and suggested three replications for variety tests of cotton.

Bailey and Trought (1) in Egypt published a paper on the error of field trials with cotton. Their work was conducted under irrigation and handled quite differently from the usual way of conducting cotton field trials in America. They concluded that 10 replications of plats about one-fifth of an acre in size should be used and the test repeated at least 3 years to give reliable results.

METHODS

In 1931 cotton yield data from a blank experiment were collected at the main experiment station, College Station, Texas, from 48 36-inch rows 300 feet long. The rows were harvested in 48-foot sections, making a total of 288 plats (rows) each 0.0033 acre in size. A similar blank experiment was conducted in 1932 at Substation No. 12, Chillicothe, Texas, on 48 rows, 282 feet long and 40 inches wide. The rows were harvested in 47-foot sections, making a total of 288 plats, each 0.0036 acre in size. The yield of cotton from the plats was stated in pounds of lint per acre.

Analysis of variance was used in making a statistical study of the data. No attempt is made to describe the details of the calculations since adequate discussions have been published by Fisher (2), Snedecor (6), and others. In each phase of the work the fields were divided into blocks that would have accommodated 12 varieties or treatments. The variety is constant so that the variance that would have been attributed to varieties or treatments in an actual experiment was not taken out. The variation within blocks was taken as

1Contribution from the Division of Agronomy, Texas Agricultural Experiment Station, College Station, Tex. Technical Paper No. 273. Received for publication October 31, 1933.
2Chief of Division of Agronomy, Agronomist, and Assistant in Agronomy, respectively. The authors are indebted to J. O. Beasley, Assistant in Agronomy, for valuable assistance in the statistical treatment of the data, and to J. R. Quinby, Superintendent, Texas Substation No. 12, Chillicothe, Tex., for obtaining the field data at that point in 1932.
3Figures in parenthesis refer to "Literature Cited," p. 734.