A Study of Heterosis in Upland Cotton
I. Yield of Hybrids Compared with Varieties

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CONSIDERABLE interest exists among cotton breeders and geneticists in the expression of heterosis within the upland cotton species (Gossypium hirsutum L.). In recent years, heterotic effects from intra-species hybrids have been reported from several locations (1, 2, 4, 5). Older observations of hybrid performance, as well as recent investigations on this subject, have been adequately reviewed by Loden and Richmond (3).

Further study is needed on several problems relative to heterosis in addition to the search for a technique to produce hybrid cottonseed on an economically feasible basis. One such problem is the evaluation of yield potentialities with intra-species hybrids. The logical approach for such an evaluation is to compare hybrid combinations with the highest yielding commercial varieties. A high degree of hybrid vigor is often exhibited by combining two low-yielding inbreds, but such hybrids usually fall below the yield level of adapted varieties. On the other hand, two inbreds of mediocre yield may give hybrids which outyield the locally adapted varieties.

This report is from a study of heterosis in which seven inbred strains of upland cotton were used in all possible combinations. The purpose of this phase of the study was to obtain estimates of yielding ability of hybrid cotton by comparing hand-produced hybrids with the best varieties.

MATERIALS AND METHODS

The seven inbred lines used to develop the study and their main characteristics are listed in Table 1. The lines were designated as "selected" inbreds following a screening test conducted in 1947 with 492 hybrid combinations involving 70 inbreds of diverse background (5). The four best hybrids in the 1947 test were combinations of these seven inbreds.

Crosses were made in 1948 to obtain sufficient seed of the 21 possible combinations from the "selected" inbreds. Greenhouse plantings furnished seed of the F2 generation. Seed was secured direct from the breeders to plant the variety check plots. Only the

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