Hybrid Vigor in Upland Cotton

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Hybrid vigor or heterosis is usually most pronounced in crosses between species, but occasionally crosses within the species show very definite increases in growth or yield. Hybrid corn is the most outstanding example of this, and is by far the most important from the economic standpoint. During recent years hybrid vigor has also been reported in crosses between varieties or lines of self-pollinated crops within species. In a few instances definite increases in yield have been recorded in the F1 and later generations of crosses between sib lines.

Hybrid vigor in cotton has been reported by a number of workers. Most of these investigations were with interspecific hybrids, and marked increases in plant growth were recorded in most instances, especially in the F1 generation of crosses between American Upland, Gossypium hirsutum, and Sea Island and Egyptian cotton, G. barbadense.

The effect of crossing within the Upland species of cotton has received very little attention. Breeders have made thousands of such crosses to combine desirable characters. General notes were taken on the F1, but careful measurements or tests to compare the F1 with its parents were seldom made, probably because the F1 populations were usually too small. Large increases in growth do not occur in Upland crosses and increases in other characters, such as yield, are not readily detected by observation.

Since crossing within the species of other crops has given increased yields in the F1, it is logical to believe that Upland cotton might respond in the same way. An experiment to study the effect of hybridization on the yield and other characters of the F1 and later generations was begun in 1942.

LITERATURE REVIEW

Balls (1) observed an increase in plant height, time of flowering, length of lint, and size of seed in an Upland-Egyptian cross. He (2) reported an increased number of nodes and greater internodal length. Cook (7) observed an increase in several characters in a cross between Egyptian and Kekchi, a Guatemalan cotton belonging to the Upland species. Jenkins, Hall, and Ware (10) report that hybrid vigor in plant size and other characteristics is very pronounced in crosses between the North and South American types, rather evident in crosses between Upland and Hopi, G. hopi, and negligible within the Upland species. Kearney (11) crossed the Holden Upland with Pima Egyptian and found that the F1 exceeded the greater (Pima) parent in plant axis length, internodal length, leaf length and

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3 Figures in parenthesis refer to “Literature Cited”, p. 317.