Components of Earliness in Upland Cotton Varieties

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UPLAND cotton (Gossypium hirsutum L.) is a perennial sub-shrub grown as an annual in the cotton belt of the United States. Its productiveness depends upon the yield per boll and on the number of bolls matured per acre in the growing season available. Prior to about 1900, United States cotton was generally slow fruiting, producing large plants with the majority of the bolls set late in the season (1). With the appearance and spread of the boll weevil, emphasis was placed on selection for plants blooming rapidly early in the season. The necessity for early destruction of cotton plants as a means of controlling pink boll worm along with the present trend toward mechanical harvest both by pickers and strippers, has resulted in additional emphasis on breeding early cotton. Whereas early fruiting alone was considered by Bennett (1) to be sufficient to escape weevil injury, these latter considerations bring in other components of earliness which contribute to early boll opening.

The study reported here was initiated in order to determine which components of earliness caused differences in maturity in three varieties of upland cotton and to determine the mode of inheritance of boll period; i.e., the length of time from blooming to boll opening.

REVIEW OF LITERATURE

Ewing (3) has presented an excellent discussion of the fruiting of cotton. He covered the growth pattern of the cotton plant in relation to the reproductive cycle of the boll weevil. Extensive data concerning factors influencing earliness of cotton varieties. Factors considered important to weevil avoidance were length of boll period, relation to the beginning of flowering, relative rapidity of flowers of flowers in terms of lint which would be produced if bolls matured, and amount of shedding relative to flowering on ten varieties. Ewing concluded that early varieties tended to shed a higher percentage of varieties flowering somewhat later but more slowly less were more efficient in the production of cotton.

Consistent differences for square period, or the time between the appearance of a square and its subsequent blooming, were found in four varieties at Sacaton, Ariz., by Ballard and Simpson (7). Loomis (4) obtained similar results. McNamara, Hubbard and Beckett (10) observed that unthinned cotton which was not thinned had a longer square period than spaced at 12 inches. However, Ludwig (6) concluded that plants had no appreciable effect on either the square or the boll period.

Martin, Ballard and Simpson (7) studied boll growth rates in Pima and Sea Island (G. barbadense) and Mesopotamian cotton. They found that green weights of green bolls reached a maximum weight at the age of 40 days, and gain in weight was most rapid up to 25 days, after which gain was negligible. Differences were found by Ewing (3) and Meade in the rate of growth of green bolls, with Pima cotton having larger bolls generally requiring a longer development period than Sea Island varieties flowering somewhat later but more slowly.

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