A Partially Male-Sterile Character in Upland Cotton

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The first heritable male-sterile line of upland cotton was reported by Justus and Leinweber (1). It was a partially male-sterile, controlled by a single recessive gene, \( m_{s-1} \). Richmond and Kohel (5) reported the development of a completely male-sterile line, \( m_{s-0} \), also controlled by a single recessive gene. Meyer and Meyer (4) have reported cytoplasmic-genetic sterility developed from interspecific crosses in cotton. The purpose of this paper is to report results of a study of the inheritance of a second partially male-sterile character in upland cotton.

MATERIALS AND METHODS

The original partially male-sterile plant was found by the junior author in a D\(_{4}\) smooth progeny that had M8 (M8948) as a recurrent parent. Meyer (2) described the development of D\(_{4}\) smoothness. The partially male-sterile plant was morphologically normal except for flowers that lacked pollen or had a reduced amount.

The partial male-sterile plant or plants from its self-pollinated (SI) progeny were crossed to 5 normal lines: M8, Dixie Triumph, Acala W29-6, Delfos 9169, and Cook 307-6. M8 is a doubled haploid from Deltapine 14 (3) and the other four lines were from the Regional Collection of Upland Cotton. The resulting F\(_1\) progenies were self-pollinated and backcrossed to the partially male-sterile line. Each plant in the segregating generations was classified male-sterile or male-fertile based on the scale described by Justus and Leinweber (1) where 0 = no anthers dehisced, 1 = about 25% of anthers dehisced, 2 = about 50% of anthers dehisced, 3 = about 75% of anthers dehisced, and 4 = all anthers dehisced. Flowers from each plant were scored several times in 1958, a few times in 1959, and 5 times in 1960. A plant consistently scoring 4 was considered male-fertile, and plants scoring less than 4 were classed as partially male-sterile. Selected plants from the 1959 planting were moved to the greenhouse and self-pollinated seeds were obtained from them. The parent plants were again moved to the field and they and their progenies were scored for male-fertility and male-sterility.

RESULTS AND DISCUSSION

Data presented in Tables 1 and 2 indicate that the partial male-sterility in these populations is controlled by a single recessive gene. The symbol \( m_{s-3} \) is proposed for this gene. The 1958 backcross (BC\(_1\)) and F\(_2\) progenies involving partial male-sterile and M8 indicated a good fit to the expected ratios. The segregating progenies of the partial male-sterile crossed with the remaining 4 male-fertile lines

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