Chromosomal Constitution of “Stag” Plants of *Gossypium hirsutum* ‘Acala 4-42’

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**ACALA** 4-42, a commercial variety of American Upland cotton, *Gossypium hirsutum*, is grown principally in the San Joaquin Valley of California. Associated with Acala 4-42 since its introduction 15 years ago has been an off-type plant designated "stag" (Figure 1). There is considerable variation in the frequency of occurrence of stag plants from field to field and from year to year, but the over-all frequency is low (estimated: 1 stag in 20 to 40 acres). Since stag plants occur in such relatively low numbers it is difficult to imagine how they could cause measurable reductions in the yield of the commercial crop or could adversely affect the quality of the lint. But stag plants are objectionable because they give fields a "ragged" appearance and raise questions about the quality of the seed stocks.

As the name implies, stag plants are highly female-sterile. Many young flower buds are aborted. The few bolls produced have blunt tips and sunken sides due to the high frequency of aborted ovules. In contrast to the female-sterile nature of stag, the production of well-filled anthers is 2 to 3 times normal. Other distinguishing characteristics of stag are thicker and taller central axis, smaller and fewer branches, shorter sympodia, darker green foliage, and folded or fluted leaves. Stag plants are more noticeable in the fall, because they remain green and continue to grow after normal plants are senescent. The present paper reports a cytogenetical investigation of stage material.

**PROCEDURE AND RESULTS**

Seed harvested from a number of stag plants were planted at the U. S. Cotton Field Station at Shafter, California, for study of their breeding behavior. Several generations of progenies were grown from selfed seed of stag plants in an effort to establish a line true-breeding with the stag phenotype. However, the character could not be stabilized into a true-breeding line as shown by the stag self progenies of families 214-3, 214 and 215-A in Table 1. Furthermore, in outcrosses of stag plants to normal plants, segregation occurred in the F₁ generation, and in this and later generations inconsistent ratios of stag to normal plants were obtained. Furthermore, the ratios of stag to normal plants did not conform to a pattern characteristic of Mendelian inheritance (Table 1). Such breeding behavior suggested that the stags could be caused by some type of gross change within the chromosome complement.

![Figure 1—Stag plants of Acala 4-42 cotton surrounded by normal plants.](image-url)