Indian J. Genet., 53 (1): 99–100 (1993)

GENETIC MALE STERILITY IN ASIATIC COTTON

D. P. SINGH AND R. KUMAR

Department of Plant Breeding, Haryana Agricultural University, Hisar 125004

(Received: March 13, 1992; accepted: October 24, 1992)

ABSTRACT

A complete genetic male sterility, governed by single recessive gene (ams1), was identified in *Gossypium arboreum* L. race *bengalense* var. DS-5. Genetic male sterility can facilitate hybrid seed production Asiatic cotton at low cost.

Key words: Genetic male sterility, *Gossypium arboreum*.

Hybrid cotton is grown in 25% of the total area under cotton in India and contributes to more than 42% of the total cotton production. Hybrid seed is produced mainly through manual emasculation and pollination. Cost of hybrid seed could be reduced considerably by eliminating manual emasculation, using male-sterile line [1–3]. Several workers have reported male sterility in American cotton [4–8]. Petalody, in which anthers are transformed into petal-like leafy structure, has also been reported in Asiatic cotton (*Gossypium arboreum* L.) [9–11]. Due to the unstable and partially male-sterile behaviour of Petalody, it has not been utilized for hybrid seed production programme. So it was imperative to establish a male- sterile line in Asiatic cotton.

IDENTIFICATION OF MALE STERILITY

The original male-sterile plant was found in the seed multiplication plot of commercially the cultivated variety DS-5 of *G. arboreum* L. race *bengalense* at the Haryana Agricultural University, Hisar. During the course of investigation, it was observed that all the plants of F_1 progeny (male sterile x male fertile analogues of var. DS-5) were male fertile. The F_2 generation segregated into 3:1 ratio of male fertile and completely male-sterile plants. Simultaneously, the BC_1 (male-sterile x fertile F_1) population produced male-sterile and male-fertile in 1:1 ratio, thereby indicating that the genetic male sterility (GMS) was governed by a single recessive gene (pair of alleles) at the same locus. The gene is designated as ams1 ams1 expressing completely male sterile condition and the heterozygous F_1 (male fertile) is designated as aMs1 ams1.

Simultaneously, work has been started to identify a suitable desi cotton hybrid with DS-5 (GMS) as one of the female parent of hybrid in Asiatic cotton suitable for the cotton growing zone of North India.

REFERENCES

1. M. S. Patil and V. K. Patil. 1973. A note on extent on boll setting in Varalaxmi seed production. Cotton Dev., 3(2): 15–16.

2. R. A. Sheriff and M. P. Shivanandaiah. 1974. Production of Varalaxmi hybrid cotton seed. Cotton Dev., 4(2): 12–14.

3. K. Srinivasan and K. N. Gururajan. 1974. Economics of production of hybrid cotton seed utilizing male sterile line. Cotton Dev., 4(3): 3–5.

4. N. J. Justus and C. L. Leinweber. 1960. A heritable partial male-sterile character in cotton. J. Hered., **51**: 1991–1992.

5. T. R. Richmond and R. J. Kohel. 1961. Analysis of a completely male sterile character in American upland cotton. Crop Sci., **1**: 397–401.

6. J. B. Weaver. 1968. Analysis of a double recessive completely male sterile cotton. Crop Sci., **8**: 597–600.

7. C. L. Rhyne. 1971. Indehiscent anther in cotton. Cot. Gr. Rev., **48**: 194–199.

8. E. L. Turcotte and C. V. Feaster. 1979. Linkage tests in American Pima Cotton. Crop Sci., **19**: 119–120.

9. J. B. Hutchinson and P. D. Gadkari. 1935. Note on inheritance of sterility in cotton. Indian J. agric. Sci., **5**: 619–623.

10. J. B. Hutchinson and R. L. M. Gose. 1937. Petalody in cotton. Curr. Sci., **6**: 99–100.

11. M. Afzel and S. Singh. 1939. The genetics of petaloid mutant in cotton. Indian J. agric. Sci., **9**: 787–790.