

### CYTOPLASMIC GENIC MALE-STERILITY IN AMERICAN COTTON (*GOSSYPIMUM HIRSUTUM* L.)

A CYTOPLASMIC genetic male sterile cotton plant which turned to be heterozygous for okra leaf character was observed. Its cytoplasmic male sterile nature has been confirmed. A source for restoring fertility in this plant was also identified. It appears that two duplicate dominant factors may be controlling restoration of fertility. Detailed work on the genetic analysis of this male-sterility system is in progress.

Cases of alloplasmic male-sterility in *G. hirsutum* cotton have been reported by Meyer and Meyer<sup>1</sup> and Meyer<sup>2</sup> by transfer of *G. hirsutum* nuclear genes into the cytoplasm of the wild species *G. anomalum* and *G. harknessii*, respectively. Partial-fertility restoring genotypes are reported to be available in the case of the male sterile on the *G. harknessii* cytoplasm background. However, the results of the work done elsewhere, so far, to transfer the sterility and the fertility restorer genes of this system in local cultivars do not seem to have been encouraging.

A peculiar single plant was noticed in the summer of 1976 in the germplasm accession No. GH: 572/76. The plant was at the Cotton Improvement Project, MPKV, Rahuri, okra leaved in an otherwise entire leaved line of *G. hirsutum*. It produced non-dehiscent anthers, devoid of any pollen. Cytological studies indicated that PMCs were not formed and that the tapetum persisted. Murthi and Weaver<sup>3</sup> recorded a similar observation in the study of the male-sterile line with *G. harknessii* cytoplasm. Large numbers of bolls were set on this plant through natural out-pollination. Pollen from fifteen different cotton varieties was transferred to this male-sterile plant during the same crop season. The boll and seed setting was about 70% indicating considerable female fertility. One of the fifteen pollinators included fertile segregates from a known genic male-sterile source.

The seeds from open and artificially cross-pollinated bolls were planted progeny-wise in the summer of 1977. All the open and artificially pollinated progenies, except one, from artificial cross-pollination were fully male-sterile. In the single progeny, obtained from the case where pollen of fertile segregates of the genic male-sterile sources referred to above were used a 3 fertile : 1 male-sterile segregation was observed. These fertile segregates produced normal PMC and good fertile pollen. These fertile segregates were selfed and also mated with their male-sterile sibs.

All the open and cross-pollinated progenies on the okra male-sterile, proved in the next generation to be completely male-sterile; those from selfings of the fertile segregates gave 15 fertile : 1 male-sterile and 3

fertile : 1 male-sterile whereas its sib-mated progenies segregated in 3 fertile : 1 male-sterile and 1 fertile : 1 male-sterile ratios, respectively. It could thus be tentatively concluded that the male-sterility in this okra leaf male-sterile plant is cytoplasmically conditioned and that fertility can be restored by a set of two duplicate dominant factors present in the "restorer" line. However, this male-sterility can be maintained by pollination with any of the *G. hirsutum* cultivars possessing recessive factors for male-sterility.

The present authors think that this is the first case of auto-cytoplasmic-genic male-sterility in American cotton (*G. hirsutum*) for which sterility-maintainer and fertility-restorer genic systems have been identified. These findings would be very useful in building up a commercial hybrid seed production programme in *G. hirsutum* cotton. The original male-sterile plant segregated in a 1 normal leaf : 1 okra leaf ratio in all F<sub>1</sub>s studied. This marker gene would be useful in developing commercial hybrid cotton.

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1. Meyer, J. R. and Meyer, V. G., *Crop. Sci.*, 1965, 5, 444.
2. Meyer, V. G., *Ibid.*, 1973, 13, 778.
3. Murthi, A. N. and Weaver, J. B., *Ibid.* 1974, 14, 658.

### RECORD OF FOUR ORCHID DISEASES IN ASSAM

THIS note describes four diseases of orchids which have been noticed in different parts of Assam. Among the diseases, only *Colletotrichum orchidearum* has been recorded earlier from India but on a different orchid host *Phalaenopsis* sp.<sup>2</sup> and the rest new records.

*Anthraco*se of *Cymbidium aloifolium* (L.) Sw.

The disease was recorded in April 1978 at Diphu. Spots on the leaves were light brown to brown with ten coloured margins, oblong (margin bulged at certain places) or semi-circular when developed at the edge, up to 22 mm long and 8 mm broad. The causal organism was identified as *Colletotrichum orchidearum* Allesch. The fungus agrees closely with Saccardo<sup>3</sup> except that length of conidia lies slightly on a lower range (9.3-18.6 against 12-20 μ).