

SHORT COMMUNICATION

Identification of Male Sterile Strain in American Cotton with Red Pigmented Plant Body and Petal Spots

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The cost of hybrid seed production in cotton can be scaled down considerably by eliminating manual emasculation using a male sterile line (Patil and Patil, 1973; Sheriff and Shivanandaiah, 1974; Srinivasan and Gururajan, 1974). Several workers have reported male sterility in American cotton (Justus and Leinweber, 1960; Richmond and Kohel, 1961; Weaver, 1968; Turcotte and Feaster, 1979). The main reasons for high cost for hybrid seed production in North Zone are: (i) short duration of flowering period (40-50 days) in comparison to central and south zones; (ii) boll setting period coincides with cloudy weather i.e., less number of sunny days during monsoon period and (iii) high wages of labour.

For successful development of hybrid an agronomic base of female line, preferably a male sterile line, as one of the parents of hybrid is desirable. For the purposes of maintaining the purity of a new variety in the seed production process, prominent morphological differences among varieties have to be found. Morphological features are indicative of the genetic make up of plant, and it is usually not difficult for breeders to identify their own varieties even with minor differences from other varieties. Seed production systems all over the world are still based on visual differences. Off types-deviations from the variety norm are eliminated, and it is assumed that the rest of the population is pure (ICAC 1996). Several workers have reported that morphological characters such as red plant body, frego bract, okra leaf, nectariless etc. are associated with resistance to cotton bollworms which is a major damaging insect pest in the country. Genotypes with these morphological traits have higher amount of gossypol, reducing sugar, flavonol and phenol contents (Lukefaher *et al.*, 1969; Brewer *et al.*, 1984; Ahuja *et al.*, 2001). Research efforts, therefore, are required to develop/ identify suitable male sterile lines with these morphological characteristics which could produce high yielding and superior fibre quality hybrids.

Seed of red plant body strain (popularly called as Lal Kapas by the farmers) was collected from farmer's field of village Nezađela, 10 km. from Sirsa (Haryana) in the *kharif* 2003-04. The farmer informed that the red *kapas* plants were observed in a mixture of another variety purchased from a local seed seller. The seed of this strain was sown in *kharif* 2004-05 on May 24th. A total of 25 plants were raised. During a visit in the field in the month of September it was observed that there was no boll setting in one of the plants of Red Kapas strain. On examination of its flower it was found that there was no pollen in the bright noon. There was abundance of pollen in the other plants of this strain. To confirm sterility in this plant its flower was used as pollinator in the month of September, October and November on the variety RS-2013 and other fertile plants of this strain. There was no boll formation. Buds of this plant were selfed and it was found that there was no boll setting. On pollinating this plant with fertile flowers of other Red Kapas plants, there was setting of bolls. Boll setting was also obtained by pollinating RS2013 and CISV-24 strains. These observations indicated that this strain can be used as sterile female for hybrid seed production. In the crop season maximum and minimum temperature during the flower development period varied in different months (August: 36.3 to 25.2°C, September: 36.8 to 21.9°C, October: 32.4 to 11.7 °C and in November: 31.3 to 8.8°C. In visual observations there was no pollen grain formation with the downfall of the maximum and minimum temperature also there was no boll setting on selfing. Therefore, it has been presumed that sterility identified was not a case of Gene-environment induced male sterility (TGM or PGMS). The above mentioned crosses attempted with this sterile plant will be sown separately to confirm further the type of sterility.

For majority of the traits this plant had similar characteristics (Table 1) like other Red Kapas plants *viz.* presence of petal spots, small flowers with red /pinkish

Table 1. Characteristics of red pigmented sterile and normal red pigmented plant

Character	Red pigmented sterile plant	Red pigmented normal plant
Plant type	Lanky	Lanky
Plant height(cm)	110	65-95
Leaf colour	Red	Red
Leaf size	Small	Small
Stem colour	Reddish	Reddish
Petal spot	Red petal spot present on each of the petal	Red petal spot present on each of the petal
Degree of redness of petal spot	Increases with the age of the flower	Increases with the age of the flower
Petal colour	Yellow with red margin	Yellow with red margin
Pollen colour	Pollen grains absent	Light yellow
Monopods/plant	1-9	3
Sympods/plant	3-11	6
Days to maturity	170-175 days	150-160 days
Bolls/plant	–	25-45
Seed cotton yield/plant	–	75 g to 135 g
GOT (%)	35*	35
Seed	Fuzzy*	Fuzzy
Lint colour	White*	White
100 seed weight (g)		
Boll weight (g)	3.40*	3.23
Boll shape	Oval pointed tip*	Round with tip
Locules /boll	4*	4
Seeds/boll	24-28*	25-28
Seeds/locule	6-8*	6-8
Disease reaction	Tolerant to CLCuV	Tolerant to CLCuV
Insect pests incidence	Tolerant	Tolerant

* Observations recorded in cross bolls

margins, etc. but differed in boll shape and blooming duration.

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