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INTERSPECIFIC HYBRIDIZATION IN THREE SPECIES OF *SESAMUM*

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ABSTRACT

Fruit setting was obtained when B-67, a cultivar of *Sesamum indicum*, was used as female in the crosses with *S. mulayanum* (2n = 26) and *S. laciniatum* (2n = 32). The F_1 hybrids of B-67 x *S. laciniatum* died before flowering, while those of B-67 x *S. mulayanum* were characterized by pansy violet corolla colour (intermediate between parents), having mostly four univalents at MI (n = 13) and resembling the wild parent in insect (*Antigastra catanaulis*) resistance, black reticulated seed coat, and violet marking along longitudinal anther wall. Like B-67, seed shape was narrowly ovate. It is indicated that *S. indicum* and *S. mulayanum* are closely related and insect resistance of the latter is transferable.

Key words: *Sesamum indicum*, *S. mulayanum*, *S. laciniatum*, interspecific hybridization.

Sesamum indicum L., the cultivated sesame is an important oil plant and every year it suffers considerable yield loss due to attack of the insect *Antigastra catanaulis*, although resistance to the latter is noted in its wild relatives: *S. laciniatum* Klein and *S. mulayanum* Nair [1, 2]. Previously, transfer of this trait has been claimed through the cross *S. orientale* x *S. laciniatum* [1], while *S. indicum* x *S. mulayanum* cross was sterile [3]. Since resistance to the said insect is lacking in the cultivated varieties, an investigation was undertaken to assess the possibility of incorporation of this trait into the recommended variety B-67 of sesame through interspecific hybridization with *S. mulayanum* and *S. laciniatum*.

MATERIALS AND METHODS

Seed materials of the *S. indicum* cultivar B-67 was obtained from the Pulses and Oilseed Research Station, Berhampore, West Bengal. *S. mulayanum* and *S. laciniatum* were collected from their natural habitats at Kalyani and Mandar Hills, Bihar, respectively.

For hybridization, flowers of the female parent were emasculated in the afternoon and covered with polythene bags. They were pollinated with the desired male parent the

follwoing morning before 7 A.M. The pollinated flowers were bagged for 2-3 days, after which the bags were removed to record fruit setting. The F_1 plants were raised in the field along with their respective parents. Horticultural colour chart was used for identification of flower colour [4].

Meiotic study was carried out with the flower buds fixed in propionoalcohol (1 : 3) and smearing the same in 1% propionocarmine solution.

RESULTS AND DISCUSSION

The cultivated variety B-67 of *S. indicum* (2n = 26) can be easily identified from both the wild species by the light mauvette colour of its corolla. Interspecific crosses between *S. indicum* (cv. B-67) and the two wild species *S. mulayanum* (2n = 26) and *S. laciniatum* (2n = 32), were successful only when B-67 was used as the female parent. This finding indicates that nuclear–cytoplasmic interaction might have played a key role.

Table 1. Distinguishing features of *S. indicum* (cv. B-67), *S. mulayanum*, and their F_1 hybrid

Character	*S. indicum*	*S. mulayanum*	F_1 hybrid
Corolla colour	Lighter than mauvette 537/3*	Violet 36/3	Pansy violet 33/3
Colour marking along longitudinal line of anther	No colour marking	Methyl violet 39 marking	Methyl violet marking
Seed coat: colour	Brown	Blackish	Blackish
surface	Smooth	Reticulate	Reticulate
Seed shape	Narrowly ovate	Broadly ovate	Narrowly ovate
Pollen sterility, %	25.3	29.3	36.2
Response to *A. catanaulis*	Susceptible	Resistant	Resistant

*Refers to [4].

Among the 40 crosses made between B-67 and *S. mulayanum*, only 15 fruits (37.5%) set and reached maturity. These fruits contained 192 well-filled seeds, which yielded 28 seedlings (14.58%). The F_1 hybrids showed intermediate corolla colour (pansy violet), but resembled the wild male parent by the presence of methyl violet colour marking along the longitudinal line of dehiscence of anther, black reticulation of seed coat, and resistance to the insect *Antigastra catanaulis* (Table 1). The only resemblance to female parent was in narrowly ovate shape of seed.

Meiotic studies, carried out only on a limited scale due to paucity of flower buds, revealed n = 13 in the gametic complements of hybrid and parents. Frequently, however,

two pairs of chromosomes were found to remain unpaired. The cross *S. indicum* x *S. mulayanum* was unsuccessful earlier [3].

Cross B-67 x *S. laciniatum* yielded only one fruit with 8 filled seeds, of which 3 died prematurely. Success has been reported in the cross *S. indicum* x *S. laciniatum* earlier [5, 6]. However, only sterile hybrids from the same cross were obtained by others [7].

Failure of fruit setting in the reciprocal crosses between *S. mulayanum* and *S. laciniatum* indicated their distant relationship. On the contrary, both of them showed close relation with the cultivated species. On the basis of high crossability, hybrid performance, and chromosome pairing in F_1, it is suggested that *S. indicum* is closer to *S. mulayanum* than to *S. laciniatum*. It is, therefore, inferred that insect resistance in *S. mulayanum* can be transferred to cultivated sesame through successful interspecific crosses.

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