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INTERSPECIFIC HYBRIDIZATION IN *CHORISIA*

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Interspecific hybrids were raised for the first time between *Chorisia insignis* H.B. & K. and *C. speciosa* St. Hil., the two introduced ornamental arborescent species. Morphologically the F1 showed overall dominance of the male parent *C. speciosa*. However, the size of flower exceeded that of the parents. Both the parents had 43 II at metaphase with regular meiosis and high pollen fertility. The meiosis in F1 was also orderly with the highly fertile uniform pollen indicating very close genetic homology and ecospecific level of differentiation, between the two parental species.

Key Words : *Chorisia, hybridization.*

The role of trees in the improvement of rural and urban landscapes and environment at a relatively low cost cannot be over emphasized. In addition, these also yield the woody biomass. With this in mind, a programme of developing varieties of arborescent ornamentals with desirable qualities of being hardy, floriferous and long-blooming has been undertaken at this Institute. A number of interesting hybrids of ornamental shrubs and trees have already been introduced or developed (Khoshoo 1979, Srivastava 1979, Srivastava and Ram 1980 and Jalil *et al.*, 1982). The present communication reports the results of an interspecific hybrid between *Chorisia insignis* and *C. speciosa*.

Chorisia (Bombacaceae) is a small genus comprising about 9 species (Index Kewensis 1946 and Willis 1973) most of which are native to tropical South America. In India, the genus is represented by two species namely: *C. insignis* and *C. speciosa* originally introduced from Argentina. However, on account of their ornamental value in having large, beautiful and long-lasting flowers, these are often planted in gardens or in roadside avenues. Both the species are medium sized deciduous trees with overfat bottle shaped trunk which is covered with stout sharp woody cones or spines thus further adding a unique ornamental value. The spines also provide protection against damage by livestock.

MATERIALS AND METHODS

Seeds of both the species, obtained from Argentina, were sown at NBRI in 1969. The plants started flowering after nearly 5 years. The two species were hybridized in November-December 1979 using *C. insignis* as the female parent.

For hybridization flower buds of *Chorisia insignis* were emasculated a day before anther dehiscence and enclosed with cotton bags. Following day the emasculated flowers were pollinated with the *C. speciosa* pollen and the cotton covers were replaced. The stigma was receptive between 6 to 8 AM. A total of 15 flowers were crossed between November 25 to December 5, 1979. Out of the ten fruits which developed only 3 survived and matured in April 1980, yielding nearly 500 seeds-100 of which were sown in May, 1980. These gave rise to 80 seedlings of which 35 survived and flowered. Reciprocal cross was not performed. For meiotic studies, young flower buds were fixed in Carnoy's fixative. Anthers were squashed in acetocarmine. Pollen fertility data were based on stainability as observed in 1% carmine-glycerine mounts. For colour-Horticultural Colour Charts, RHS, 1938 and Danthenay 1905 were followed. The voucher specimens of the parents and the hybrid were depo-sited in the Herbarium LWG-67951-53.

RESULTS AND DISCUSSION

Details of the important morphological features of parents and the progeny have been summarized in Table 1. The F1 had an overall dominance of the male parent in the number and serrations of the leaflets, number of sepals, petals and stamens (Figs. 1-3). The colour of petals was intermediate. The size of flowers, however, far exceeded that of the parents. Both the parents had 43 II at meiotic metaphase I

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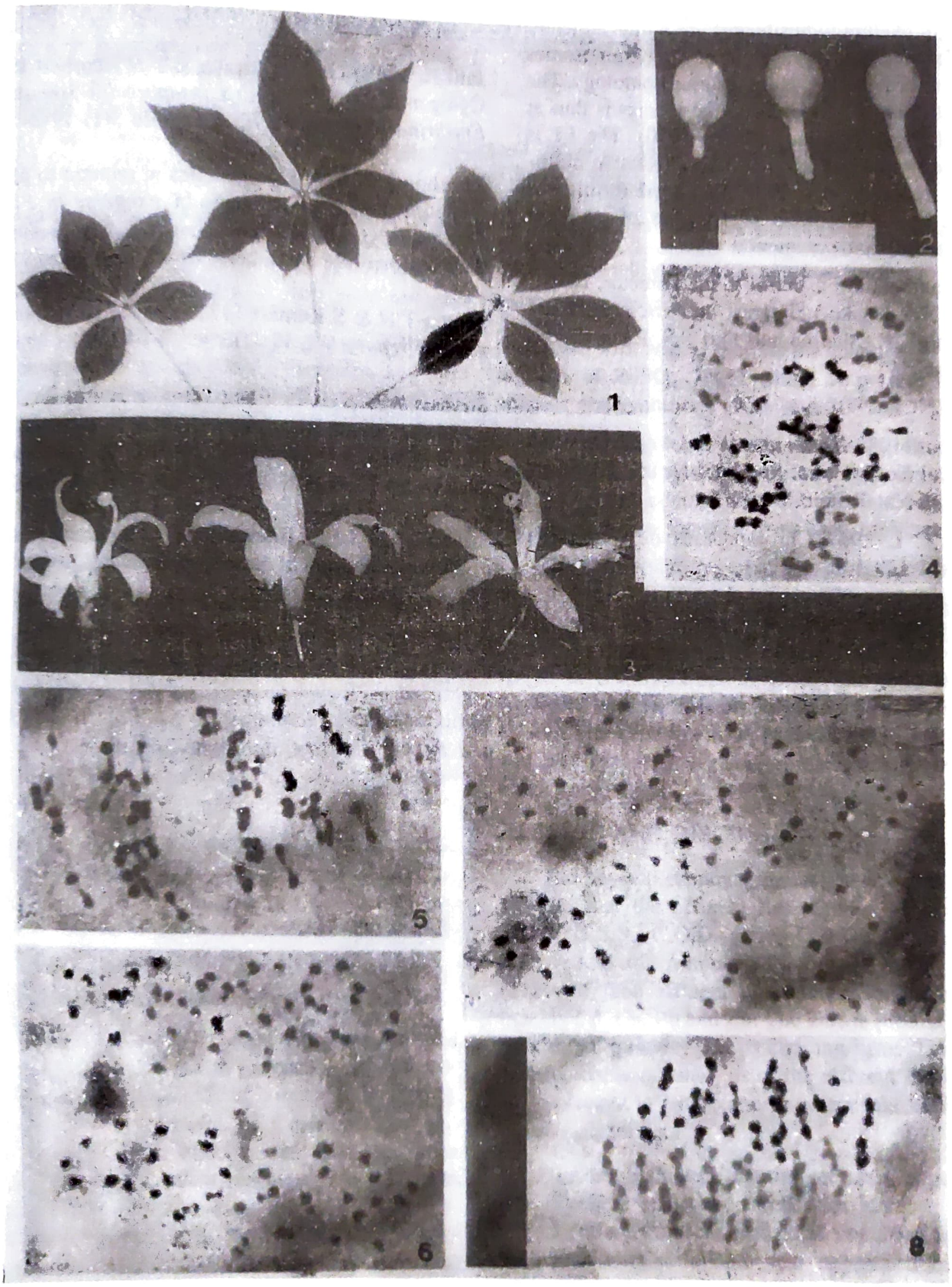
Table 1. Morphological features of *C. insignis*, *C. speciosa* and their F1 hybrid.

Character	*C. insignis* (female parent)	*C. speciosa* (male parent)	F1 hybrid
1. Trunk	Dark green heavily covered with brown, stout and pointed spines	Light green covered with scattered blackish and pointed small spines	Dark green, heavily covered with brown, stout pointed spines
2. Leaf	Stipulate, petiolate, palmately compound	Stipulate, petiolate, palmately compound	Stipulate, petiolate, palmately compound
Stipule	0.6 cm long, linear, erect and caducous	0.6 cm long, linear reflexed and caducous	0.8 cm long, linear reflexed and caducous
Petiole	Cylindrical, 15 cm long, 0.25 cm across	Cylindrical, 20 cm long, 0.25 cm across	Tetrangular, 20 cm long, 0.35 cm across
Leaflets	5, rarely 6 or 7 unequal, middle larger (9x4 cm) ovate, acute apex, serrate margin towards the apex and entire towards the base	7, rarely 5 or 6 unequal middle larger (11 x 5 cm) ovate, acute apex, margin throughout serrate	7, rarely 5 or 6 unequal, middle larger (13 x 5 cm) elliptic-lanceolate, acuminate, margin throughout serrate
3. Flower dia	12 cm.	16 cm	20 cm
Calyx	2-3 sepals greenish-white-1 united to form calyx tube (3 x 1.8 cm)	4-5 sepals, greenish white-1 united to form calyx tube (2 x 1.6 cm)	4-5 sepals greenish white-1 united to form calyx tube (2.5 x 1.5 cm)
Corolla	4-5 petals, each 12 x 3 cm, free sulphury white-2	5 petals each 12 x 2.2 cm free bicoloured: half portion towards the tip mallow purple-630 and the rest sulphur yellow - 1/32 with petunia purple-32 streaks	5 petals, each 13.5 x 3.2 cm, free biocoloured: half portion towards the tip violet rose-1 and rest sulphur yellow 1/3 with mallow purple 630 streaks
Androecium	8-10 stamens, monadelphous, staminal tube 10 x 0.4 cm, sulphury white-1	10 stamens, monadelphous, staminal tube 9 x 0.5 cm, rhodamine purple - 29/2	10 stamens, monadelphous, staminal tube 10 x 0.3 cm, sulphury white-1
Staminodes	8-10, arranged in 4-5 pairs forming an outer sulphur yellow - 1/3 sterile staminodal ring	10, arranged in 5 pairs forming an outer peony purple-729 sterile staminodal ring with white hairs	10, arranged in 5 pairs forming an outer sulphur yellow 1/3 sterile staminodal ring with white hairs
Gynoecium	4-5 carpels syncarpous superior, style (12 x 0.13 cm) enclosed in the staminal tube; stigma 4-5 lobed, sulphury white-1	5-carpels syncarpous superior, style (10 x 0.1 cm) enclosed in the staminal tube; stigma 5 lobed, rhodamine purple 29/3	5-carpels syncarpous superior, style (11 x 0.1 cm) enclosed int he staminal tube; stigma 5-lobed, sulphury white-1
4. Chromosome number (2n)	86 (43 II)	86 (43 II)	86 (43 II)
5. Pollen size (μm)	58 x 64	61 x 67	61 x 68
6. Pollen fertility %	99	72	70
7. Fruit size (average)	12 x 6.3 cm	13.5 x 7 cm	17 x 6.5 cm
8. Seeds/fruit (average)	56	65	106
9. Seed germination %	66	27	80

(Figs. 4-7). Majority of bivalents were rod shaped with a single chiasma. The meiotic course was normal with regular anaphase distribution (43:43) and high pollen fertility (Table 1). Meiosis in F1 was also characterized by 43 II (Fig. 8) and orderly separation of chromosomes at anaphase I with high pollen fertility. There was normal fruit and seed development in the F1 hybrid.

The present studies represent the first report of an interspecific hybrid in the genus. The easy crossability of the two species indicates a close genetic relationship. The observations on the chromosome number for *Chorisia speciosa* are in agreement with those of Sareen and Kumari (1973). However, for *C. insignis* the present observations (n=43) are at variance with the only earlier report of 2n=88 for the species (Cristobal 1967). It is not possible to state precisely at present whether the difference is the result of erroneous observation or natural variation. The haploid number n = 43 indicates an ancient



Figures 1-3 Leaf, young bud and flower (L-R) in female parent, F1 and male parent respectively. Figs. 4-5 Metaphase I-43 II in *C. insignis* and *C. speciosa*.. Figs. 6-7 Anaphase I-43:43 in *C. insignis* and *C. speciosa*.. Fig. 8. Metaphase I-43 II in F1.

polyploidy. The normal meiosis in the hybrid associated with the highly fertile uniform pollen indicates orderly pairing and segregation of the chromosomes and further proves close chromosomal homology. The genetic differentiation between the species is thus at ecospecific level (sensu Stebbins 1950). The F1 is quite ornamental and amenable to vegetative multiplication (Das *et al.*, 1978). The seed fertility as observed in the F1 offers possibilities of evolving novel recombinant ornamental types.

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