

FLORAL BIOLOGY STUDIES IN CERTAIN COMMERCIAL SPECIES OF JASMINE (JASMINUM SPP.)

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ABSTRACT

In any plant breeding program, knowledge of the floral biology of the species is an essential prerequisite. Floral biology studies and information on flowering and fruiting season are required for a comprehensive understanding of reproductive barriers. Jasmine is highly influenced by seasons, which profoundly affect the flowering and fruit set. The floral biology of certain popular varieties belonging to the three most commercially important *Jasminum* species has been documented and presented in this paper. Variations were observed for flower bud color, flowering season, pollen production and fruit set potential. Two morphotypes of carpel namely, 'pin' and 'thrum' was observed in the *J. auriculatum* genotypes.

KEYWORDS: Jasmine, Floral Dimorphism, Morphotypes & Seed Set

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INTRODUCTION

Jasmine (*Jasminum* spp.), is one of the oldest fragrant flowers cultivated by man. The different species of *Jasminum* are very favorite plants of horticulturists, chiefly due to the attractive fragrant flowers borne by them. They are extensively cultivated in gardens and nurseries throughout India, a factor which is largely responsible for the origin of a number of horticultural varieties of this genus.

Jasmine is widely cultivated in South India for use as garland, *gajra* and *veni* apart from concrete extraction. Jasmine belongs to the family Oleaceae. The Indian ornamental jasmine flower profusely, but set seed very rarely and are propagated chiefly by vegetative means. The facts of the antiquity of the genus and of its isolation from present day forms place it in a distinct morphological and cytological group, with an interesting floral biology.

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MATERIALS AND METHODS

The materials used for the study were three cultivars of *J. auriculatum*, two cultivars of *J. grandiflorum* and one cultivar of *J. sambac*. All the plants were grown in open field with uniform cultural conditions.

Observations were recorded on flower diameter (cm), corolla tube length (cm), calyx type, mature flower bud color, open flower color, number of whorls of the corolla, number of petals per flower, number of pistils, style type, stigma tip, the number of anthers, length of the stamen (cm), every type, flowering pattern, fruit setting potential and season of fruit set.

RESULTS AND DISCUSSIONS

The study of the factors influencing the adjustments of floral traits among species constitutes a central issue in comparative plant ecology. Knowledge on floral traits is essential for programming crop improvement through hybridization. Observations on the various floral biology parameters of jasmine genotypes are presented in Table 1.

All the genotypes studied had white flower buds except *J. grandiflorum* cv. CO.1 Pitchi, which was characterized by pink tinged buds. All the species consisted of two stamens (stamen length ranging from 1.24 to 1.72 cm) and a single pistil. The stamens of the three cultivars of *J. auriculatum* and the two cultivars of *J. grandiflorum* contained higher pollen content whereas the pollen load was less in *J. sambac*. In *J. auriculatum*, floral dimorphism with respect to carpel was observed. Two morphotypes of carpel namely, 'pin' and 'thrum' were observed. *J. auriculatum* cv. CO.1 Mullai and cv. Pachaimullai were characterized by 'pin' type carpel with long style and short filament, whereas *J. auriculatum* cv. Parimullai was characterized by 'thrum' type carpel with short style and long filament.

Floral dimorphism was reported in *J. auriculatum* by Raman *et al.* (1969). Bhupal Rao *et al.* (1977) reported floral dimorphism in *J. grandiflorum* and observed distinct differences in the flowering behavior of these two types. The long carpel (pin) type had prolific flowering, whereas the short carpel (thrum) type expressed shy flowering. Anthers are fixed onto the corolla by a very short filament. Two types of flower exist, always borne on separate plants. In the 'pin' form, the anthers are placed half-way down the corolla-tube, the mouth of which is occupied by the stigma tip protruding out, borne on the end of a long style. In the 'thrum' flowers, the positions of the sexual organs are reversed, the anthers being at the top of the corolla-tube while the stigma is half-way down it, since the style is relatively short.

The differences between morphs in stigma-anther separation were observed by Thompson (2000) in *J. fruticans*. The mutual relationship between the pin type and the thrum type flowers is improved as the stigma tip of long-styled plants, which is exerted beyond the mouth of the corolla and for a species with fixed anthers, that are already very close to the mouth of the corolla tube in short-styled plants, facilitating pollen flow among the morphs.

CONCLUSIONS

There was a marked variation in the period of peak flowering in the different genotypes (Figure 1). While the varieties of *J. auriculatum* recorded peak flowering during April to June, those of *J. grandiflorum* recorded peak flowering during August to January. The cv. Ramanathapuram Gundumalli of *J. sambac* recorded peak flowering during March to August. The seasonal variation of flowering in *Jasminum* species is due to the variations in photo-thermal units, which profoundly influence flowering. Similar findings were reported by Raman (1973) and Nedumaran (1977). Seed set was profuse in all the cultivars of *J. auriculatum*, whereas no seed set was present in the *J. sambac* cultivar. Similar findings were reported by Bhattacharjee (1978).

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APPENDICES

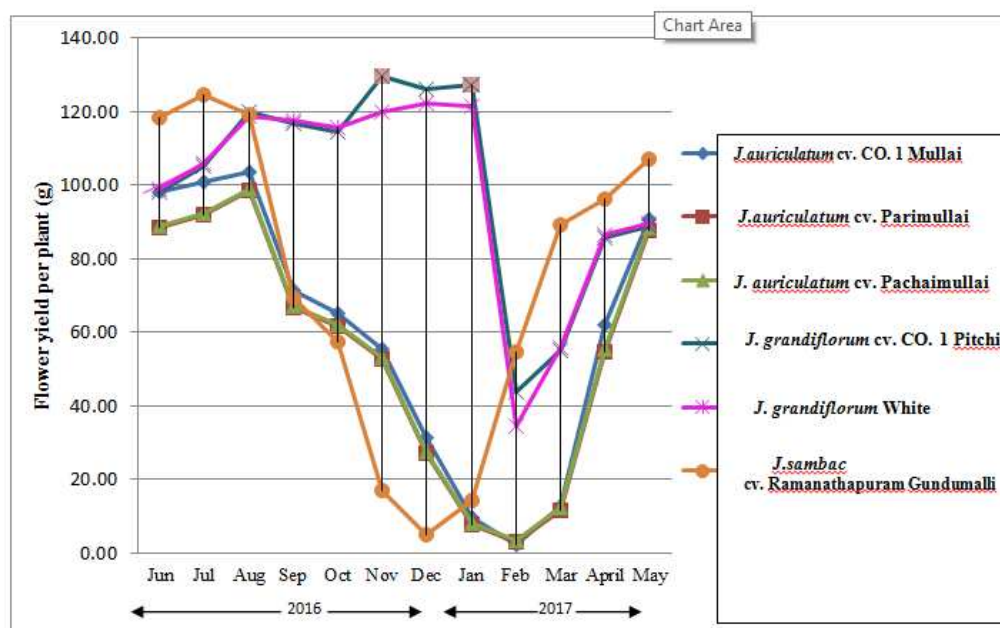


Figure 1: Monthly Flower Bud Yield Per Plant (g) of Jasmine Genotypes

Table 1: Floral Biology Studies in Certain Commercial Genotypes of Jasmine (*Jasminum* spp.)

| Characters | <i>Jasminum</i> species | | | | | |
|-----------------------------|--|---|---|---|-------------------------------------|--|
| | <i>J. auriculatum</i> cv. CO.1 Mullai | <i>J. auriculatum</i> cv. Parimullai | <i>J. auriculatum</i> cv. Pachaimullai | <i>J. grandiflorum</i> cv. CO.1 Pitchi | <i>J. grandiflorum</i> cv. White | <i>J. sambac</i> cv. Ramanathapuram Gundumalli |
| Flower diameter(cm) | 2.64 | 2.51 | 2.62 | 3.60 | 3.90 | 2.80 |
| Corolla tube length | 1.82 | 1.94 | 1.81 | 2.32 | 2.45 | 1.36 |
| Calyx type | Rudimentary | Rudimentary | Rudimentary | Well developed | Well developed | Well developed |
| Mature flower bud colour | Creamy white | Creamy white | White with greenish tinge | Pink | White | White |
| Open flower colour | White | White | White | White | White | White |
| Number of whorls of corolla | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of petals per flower | 7 | 7 | 7 | 5 | 5 | 8 |
| Number of pistils | 1 | 1 | 1 | 1 | 1 | 1 |
| Style type | Exerted | Inserted | Exerted | Exerted | Exerted | Inserted |
| Stigma tip | Undivided | Undivided | Undivided | Undivided | Undivided | Undivided |
| Number of anthers | 2 | 2 | 2 | 2 | 2 | 2 |
| Length of stamen (cm) | 1.24 | 1.46 | 1.35 | 1.72 | 1.63 | 1.39 |
| Ovary type | Bilocular | Bilocular | Bilocular | Bilocular | Bilocular | Bilocular |
| Flowering pattern | | | | | | |
| (i) Peak flowering | Apr - Jun | Apr - Jun | Apr - Jun | Jul - Jan | Jul - Jan | Mar - Aug |
| (ii) Lean flowering | Dec - Feb | Dec - Feb | Dec - Mar | Feb - May | Feb - May | Sep - Oct |
| (iii) No flowering | Dec-Jan | Dec-Jan | Dec-Jan | - | - | Nov-Jan |
| Fruit setting potential | Profuse | Profuse | Profuse | Sparse | Sparse | Absent |
| Season of fruit set | Jun - Nov | Jun - Nov | Jun - Nov | Mar | Mar | Absent |