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## Assessment of morphological and yield parameters of seven commercial jasmine varieties

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### Abstract

The present study was conducted at the Department of Floriculture and Landscaping, Tamil Nadu Agricultural University, Coimbatore. The study was conducted with two year old plants grown under open field condition of seven commercial varieties of jasmine, viz., Ramanathapuram Gundumalli, Madanban, Single Mohra and Ramabanam of the species *Jasminum sambac*, CO.1 Mullai and Parimullai of *Jasminum auriculatum* and CO.1 Pitchi of *Jasminum grandiflorum* by adopting all the recommended cultural practices. The statistical design adopted was RBD. Observations were taken during the critical stages of growth and development namely, pre flowering, flowering, peak flowering and lean flowering stages for all the parameters. Significant variations were observed among the varieties for vegetative parameters during the critical stages of growth. Maximum plant height and plant spread was observed during lean flowering stage (Stage IV). Among all the varieties, the highest values for these were recorded in CO.1 Pitchi. Significant variations were observed among the varieties for yield parameters also. The highest estimated annual flower bud yield was recorded in CO.1 Pitchi whereas the highest hundred flower bud weight was found in Madanban during peak flowering stage (Stage III).

**Keywords:** Morphological, yield parameters, seven commercial jasmine varieties

### Introduction

Jasmine (Family: Oleaceae) is from Southeast and South Asia. Jasmines are found throughout the world's tropical and subtropical climates, but many of the species are concentrated in the areas that include India, China, and Malaysia (Anon., 1959) [1]. One of the earliest traditionally grown flowering crops. Jasmines have been used to decorate gardens for many years in various tropical and subtropical nations, including Central Asia, Afghanistan, Iran, Nepal, and many more. It is a highly prized ornamental plant for residential gardens as well as commercial production due to its appealing foliage and stunning white blossoms with a deep aroma. Its blooms are used to make garlands that are worn in worship, used to decorate women's hair, and used to make oils and cosmetics. More than 200 distinct species make up the genus *Jasminum*, which is primarily tropical in range (Dickey, 1970) [2]. Although there are many different species and varieties of jasmine, only a small number are grown for commercial purposes, including *Jasminum sambac*, *Jasminum auriculatum*, and *Jasminum grandiflorum*, which are all widely grown, and *J. multiflorum* (also known as *J. pubescence*), which is grown to a lesser extent. Tamil Nadu is home to many commercially grown *Jasminum* species, including the Ramanathapuram Gundumalli, Madanban, Ramabanam, Single Mohra, CO.1 Mullai, Parimullai, CO.1 Pitchi, and CO.2 Pitchi varieties. On the effectiveness of the various varieties under field cultivation, there is, however, either little or no scientific information available.

### Materials and Methods

Field studies were conducted at the Department of Floriculture and Landscaping, Tamil Nadu Agricultural University, Coimbatore. Two year old bushes of seven commercially cultivated varieties of three *Jasminum* species (Ramanathapuram Gundumalli, Madanban, Ramabanam and Single Mohra of *J. sambac*, CO.1 Mullai and Parimullai of *J. auriculatum* and CO.1 Pitchi of *J. grandiflorum*. CO.1 Mullai and CO.1 Pitchi) formed the plant material. The soil in the experimental field is sandy loam. In open field condition, the maximum temperature fluctuated between 25 °C and 35 °C with a mean of 30 °C. Minimum temperature ranged between 17 °C and 23.5 °C with a mean of 20 °C. Mean relative humidity was 75 percent. Plants of the varieties belonging to *J. sambac* were pruned during the last week of November, *J. auriculatum* during the last week of January and *J. grandiflorum* during the last week of

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December. The crop was irrigated depending upon the soil moisture status at an interval of 7 to 10 days. Hand weeding was carried out as and when required. The plants were periodically sprayed with chemicals to control pest and disease incidence. Observations on morphological, physiological and quality parameters were recorded at the following four critical stages of growth and development.

Description of stags

Stage	Description of stags
Stage I	Pre flowering
Stage II	Flowering
Stage III	Peak flowering / Peak season
Stage IV	Lean flowering / Lean season

### (A) Assessment of Morphological Parameters

#### Plant height

The height of the plant was measured from the base of the stem to the tip of the plant in the ten randomly tagged plants in each treatment and the mean values were expressed in cm.

#### Plant spread

The spread of the plant both in East-West and North-South directions were measured in the selected plants and the mean values were expressed in cm.

### (B) Assessment of Yield Parameters

#### Estimated annual flower bud yield per hectare

Estimated annual flower yield per hectare was calculated as a product of the annual flower yield per plant and number of plants per hectare.

#### Hundred flower bud weight

The weight of 100 flower buds collected from randomly selected ten plants in each treatment was recorded and expressed in g.

### Results and Discussion

#### (A) Assessment of Morphological Parameters

##### Plant height

Significant differences were observed among the varieties for plant height during the critical stages of growth. In Ramanathapuram Gundumalli, the plant height ranged between 52.76 cm and 82.50 cm. In Madanban, Single Mohra and Ramabanam, the plant height ranged between 53.98 cm and 88.89 cm, 54.06 cm and 86.62 cm and 53.17 cm and 83.52 cm respectively. In CO.1 Mullai, Parimullai and CO.1 Pitchi the plant height ranged from 48.11 cm to 84.80 cm, 50.09 cm to 87.34 cm and 46.95 cm to 105.24 cm respectively (Table.1).

**Table 1:** Plant height (cm) of jasmine varieties

S. No.	Varieties	Plant height (cm)			
		Stage I	Stage II	Stage III	Stage IV
1.	Ramanathapuram Gundumalli ( <i>Jasminum sambac</i> )	52.76	59.14	64.59	82.50
2.	Madanban ( <i>Jasminum sambac</i> )	53.98	65.28	71.92	88.89
3.	Single Mohra ( <i>Jasminum sambac</i> )	54.06	66.82	72.40	86.62
4.	Ramabanam ( <i>Jasminum sambac</i> )	53.17	64.34	68.50	83.52
5.	CO.1 Mullai ( <i>Jasminum auriculatum</i> )	48.11	56.87	67.79	84.80
6.	Parimullai ( <i>Jasminum auriculatum</i> )	50.09	59.74	72.73	87.34
7.	CO.1 Pitchi ( <i>Jasminum grandiflorum</i> )	46.95	56.88	84.78	105.24
	SEd	0.213	0.310	0.478	0.633
	CD (P=0.05)	0.465	0.675	1.042	1.379

#### Plant spread

There were significant differences among the varieties for plant spread. In Ramanathapuram Gundumalli, Madanban, Single Mohra and Ramabanam plant spread ranged from 43.78 cm to 61.10 cm, 50.32 cm to 84.60 cm, 34.80 cm to

67.80 cm and

55.28 cm to 85.25 cm respectively. In CO.1 Mullai, Parimullai and CO.1 Pitchi, plant spread ranged from 36.30 cm to 88.13 cm, 38.68 cm to 103.25 cm and 36.40 cm to 203.15 cm respectively during the critical stages (Table.2).

**Table 2:** Plant spread (cm) of jasmine varieties

S. No.	Varieties	Plant spread (cm)			
		Stage I	Stage II	Stage III	Stage IV
1.	Ramanathapuram Gundumalli ( <i>Jasminum sambac</i> )	43.78	49.90	52.10	61.10
2.	Madanban ( <i>Jasminum sambac</i> )	50.32	62.85	67.65	84.60
3.	Single Mohra ( <i>Jasminum sambac</i> )	34.80	52.05	59.20	67.80
4.	Ramabanam ( <i>Jasminum sambac</i> )	55.28	74.38	79.13	85.25
5.	CO.1 Mullai ( <i>Jasminum auriculatum</i> )	36.30	42.80	63.38	88.13
6.	Parimullai ( <i>Jasminum auriculatum</i> )	38.68	52.50	85.00	103.25
7.	CO.1 Pitchi ( <i>Jasminum grandiflorum</i> )	36.40	46.50	154.67	203.15
	SEd	0.486	0.785	2.579	3.444
	CD (P=0.05)	1.060	1.712	5.619	7.505

A significant variation in growth was observed among the varieties with regard to plant height, and plant spread under open field condition. These variations may be attributed to the fact that the varieties belong to three different species (*Jasminum sambac*, *Jasminum auriculatum* and *Jasminum grandiflorum*) and even within a single species, the varieties

have diversified origin.

Plant height is one of the fundamental characters which is taken into account for growth analysis of genotypes. It is one of the principal components by which the growth and vigour of the plant can be measured. In the present study, among the genotypes, CO.1 Pitchi was the tallest and Ramanathapuram

Gundumalli was the shortest whereas, the other genotypes Madanban, Single Mohra, Ramabanam, CO.1 Mullai and Parimullai were medium in terms of plant height. Being a genetically controlled factor, plant height varied among the genotypes. Similar variation in plant height due to genotypes was also observed in chrysanthemum (Dilta *et al.*, 2005 and Manohar Rao and Pratap, 2006) [3, 6]. The variety CO.1 Pitchi recorded the maximum plant spread and number of branches per plant. The difference of the varieties could be due to the influence of genetic makeup of the genotypes and environmental modulations. This finding is in accordance

with the earlier observations of Rangaswami (1989) [8] in *Jasminum* spp.

### (B) Assessment of Yield Parameters

#### Estimated annual flower bud yield/ha

Estimated flower bud yields for Ramanathapuram Gundumalli, Madanban, Single Mohra Ramabanam, CO.1 Mullai, Parimullai and CO.1 Pitchi were 5.20 t/ha, 4.25 t/ha, 3.96t/ha, 4.34t/ha, 4.27t/ha, 3.97t/ha, 5.65t/ha respectively (Table.3).

**Table 3:** Estimated annual flower bud yield (t/ha) of jasmine varieties

S. No.	Varieties	Estimated annual flower bud yield (t/ha)
1.	Ramanathapuram Gundumalli ( <i>Jasminum sambac</i> )	5.20
2.	Madanban ( <i>Jasminum sambac</i> )	4.25
3.	Single Mohra ( <i>Jasminum sambac</i> )	3.96
4.	Ramabanam ( <i>Jasminum sambac</i> )	4.34
5.	CO.1 Mullai ( <i>Jasminum auriculatum</i> )	4.27
6.	Parimullai ( <i>Jasminum auriculatum</i> )	3.97
7.	CO.1 Pitchi ( <i>Jasminum grandiflorum</i> )	5.65
	SEd	0.048
	CD (P=0.05)	0.104

#### Hundred flower bud weight

Significant differences were noticed among varieties for this character during critical growth stages. Hundred bud weight of 16.99 g to 18.64 g, 26.38 g to 30.80 g, 25.9 g to 29.10 g and 18.30 g to 21.82 g were recorded for Ramanathapuram

Gundumalli, Madanban, Single Mohra and Ramabanam respectively. In CO.1 Mullai, Parimullai and CO.1 Pitchi, 6.36 g to 8.31 g, 5.88 g to 7.30 g and 7.00 g to 8.72 g weight were recorded respectively (Table.4).

**Table 4:** Hundred flower bud weight (g) of jasmine varieties

S. No.	Varieties	Hundred flower bud weight (g)			
		Stage I	Stage II	Stage III	Stage IV
1.	Ramanathapuram Gundumalli ( <i>Jasminum sambac</i> )	16.99	17.17	18.64	18.50
2.	Madanban ( <i>Jasminum sambac</i> )	26.38	28.60	30.80	27.84
3.	Single Mohra ( <i>Jasminum sambac</i> )	25.90	27.80	29.10	26.63
4.	Ramabanam ( <i>Jasminum sambac</i> )	18.30	19.40	21.82	20.11
5.	CO.1 Mullai ( <i>Jasminum auriculatum</i> )	6.36	7.82	8.31	6.81
6.	Parimullai ( <i>Jasminum auriculatum</i> )	5.88	6.80	7.30	6.12
7.	CO.1 Pitchi ( <i>Jasminum grandiflorum</i> )	7.00	7.80	8.72	7.20
	SEd	0.684	0.693	0.733	0.706
	CD (P=0.05)	1.491	1.510	1.598	1.540

In the present study, significant variations were observed for both yield parameters under field condition. Among the varieties, the highest estimated annual flower bud yield was recorded in CO.1 Pitchi and the second highest was in Ramanathapuram Gundumalli, while the lowest was observed in Single Mohra. The estimated annual flower bud yield was recorded during different growth stages and highest found in CO.1 Pitchi. Weight of individual flowers also varied significantly among the genotypes with the highest in Madanaban and the lowest in Parimullai, so the hundred flower bud weight differs accordingly. In stage III, highest hundred flower bud weight recorded among all stages and that was due to the seasonal variation. Such a kind of seasonal variation in the flower yield was reported at earlier by

Guenther (1960) [4] according to whom, weather conditions play an important role in the flower production of jasmine, warm weather and ample sunshine producing a much larger flower crop.

These variations in the yield characteristics may be attributed to the genetic nature of the varieties and also the effect of agroclimatic conditions. Similar observations have also been made earlier by Raman *et al.* (1969) [7] in varieties of the four commercial species [*J. sambac*, *J. auriculatum*, *J. grandiflorum* and *J. pubescense* (Syn: *J. multiflorum*)] as well as in other *Jasminum* spp. namely, *J. calophyllum*, *J. rigidum* and *J. flexile*. Further corroboration for this observation comes from the reports of Seetharamu *et al.* (2002) [9] who observed a similar trend in the four commercial species of

jasmine. The varietal differences for yield potential may also be attributed to additive gene effect (Hemalata *et al.*, 1992)<sup>[5]</sup>.

### Conclusion

Morphological and yield parameters can provide a unique identification of cultivated varieties. These reflect not only the genetic constitution, but also the interaction of the genotype with the environment within which it is expressed. So, the initial studies are required before proceeding towards the breeding programme and varietal identification.

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