

Original Research Article

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Assessment of Qualitative, Quantitative and Visual Flower Quality Parameters of Certain Commercial Jasmine Varieties during Peak Flowering Season

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ABSTRACT

Study of flower quality parameters in jasmine is an important commercial aspect in marketing as well as export point of view. Jasmine is a commercially valued ornamental crop and is grown mostly in tropical and subtropical countries of the world. Although many varieties of *Jasminum* species are cultivated in India, but mainly seven varieties are commercially cultivated in Tamilnadu, i.e., Ramanathapuram Gundumalli, Madanban, Ramabanam, Single Mohra, CO.1 Mullai, Parimullai and CO.1 Pitchi. There is very less or no scientific evidence available about the flower quality parameters during peak flowering season. In this study, highest flower bud diameter (1.00 cm) recorded in Single Mohra whereas highest flower bud length recorded in CO. 1 Pitchi (4.10 cm). Highest hundred flower bud weight (30.80 g) and single flower bud weight (0.310 g) were observed in Madanban. Freshness index were highest in Single Mohra and lowest in Parimullai. It is important to study the qualitative quantitative and visual flower quality parameters of jasmine to gain profit in the flower export business as well as in value addition businesses. This study can do help in crop improvement programmes.

Keywords

Jasminum spp.,
Commercial varieties,
Quality parameters,
Peak flowering
season.

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Introduction

Jasmine (*Jasminum* spp.) is one of the traditionally cultivated flower crop belongs to the family Oleaceae and it is a native plant of South and Southeast Asia. The genus *Jasminum* comprises of about 200 plant species (Bailey, 1958). For the past several centuries, the gardens of Central Asia, South

Asia, Southeast Asia, Africa, warm temperate regions of Europe and many other tropical and subtropical countries are adorned with jasmine plants. India is an important center of origin for many of the *Jasminum* species (Veluswamy *et al.*, 1975). The attractive foliage and unique fragrant white flowers

make it a highly valued cultivated crop in India, Thailand, China, Sri Lanka and the Philippines. Jasmine has high commercial value as a flower crop for florists, landscape, perfumery, cosmetic, medicinal and pharmaceutical industries (Green and Miller, 2009). More than 2,000 species are known in world among which 40 species are identified in India and 20 species are found in South India region (Bhattacharjee, 1980). Commercial cultivation is confined to mainly three species (*Jasminum sambac*, *Jasminum auriculatum* and *Jasminum grandiflorum*) (Green and Miller, 2009) which are largely cultivated and *J. multiflorum* which is cultivated to a small extent. Jasmine flowers are mainly exported to countries like Singapore, Malaysia, Japan, UK, USA, Eastern European and Gulf countries. So, it is important to study the basic qualitative, quantitative and visual flower quality parameters to determine the flower quality of jasmine and to identify the best suitable variety for commercial growing in peak flowering season to maintain the uninterrupted supply chain to export market. Study of these parameters can also help in interspecific crop improvement programmes.

Materials and Methods

Fresh flowers of seven commercially cultivated jasmine varieties (Ramanathapuram Gundumalli, Madanban, Ramabanam, Single Mohra, CO.1 Mullai, Parimullai and CO.1 Pitchi) were collected in early morning hours from the experimental plots present in Botanic Garden, Department of Department of Floriculture and Landscaping, Tamilnadu Agricultural University, Coimbatore during flowering season from year 2012 to 2013. Different species have different peak flowering periods. May to August, June to September and July to October are peak flowering seasons for *J. sambac*, *J. auriculatum* and *J. grandiflorum* respectively.

Flower bud diameter (cm), open flower diameter (cm), flower bud length (cm) and corolla tube length (cm) were noted for assessment of qualitative quality parameters of flowers. Single flower bud weight (g) and hundred flower bud weight (g) were computed for assessment of quantitative quality parameters whereas freshness index (FI) was observed to determine the visual quality parameter in peak flowering season. Constant number of flower buds was taken for determination of freshness index. The number of flower buds which show freshness without visual showing of petal necrosis, wilting and browning were accessed by using the following score and expressed as percent fresh flowers or freshness index (Madhu, 1999). Freshness index were calculated in four time intervals (immediately after harvest, 10 hours after harvest, 20 hours after harvest and 30 hours after harvest).

Freshness index (FI) was computed using the following formula:

$$FI = \frac{(7 \times X_1) + (6 \times X_2) + (5 \times X_3) + (4 \times X_4) + (3 \times X_5) + (2 \times X_6) + (1 \times X_7)}{(X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7) \times 7} \times 100$$

The statistical design adopted was RBD and CD values were analysed for five percent (0.05) probability and the results were interpreted. Statistical analysis was done by AGRES software package.

Results and Discussion

Flower bud diameter, open flower diameter, flower bud length and corolla tube length are commercially important qualitative parameters to determine flower quality (Khan *et al.*, 1970). Variations were observed among the varieties in qualitative flower quality parameters. Highest flower bud diameter (1.00 cm) recorded in Sigle Mohra variety

whereas lowest (0.44 cm) noticed in Parimullai. Highest open flower diameter (6.20 cm) recorded in Ramabanam variety and lowest open flower diameter (2.10 cm) noted in Parimullai variety (Table 1). CO.1 Pitchi variety had highest Flower bud length (4.10 cm) and Corolla tube length (2.10 cm). Lowest flower bud length (1.65 cm) and lowest corolla tube length (0.80 cm) recorded in Single Mohra (Table 1). This variation in qualitative parameters may be due to the genetic influence of the genotypes and environmental modulations (Singh and Singh, 2005).

In the present study, variation was observed in hundred flower bud weight (g) under field conditions. Highest hundred flower bud weight (30.80 g) was recorded in Madanban and the lowest (7.30 g) in Parimullai (Table 1). The mean individual flower weight is another yield determining component of quantitative flower parameter. Weight of individual flowers also varied significantly and the highest single flower bud weight noted in Madanaban (0.310 g) and the lowest (0.068 g) in Parimullai (Table 1). Individual flower bud weight and hundred flower bud weight are dependent on each other.

These variations in the yield may be due to the genetic makeup of the varieties and also may be due to the seasonal effects. Similar observations have also been made earlier by

Raman *et al.*, (1969) in varieties of the four commercial species namely *J. sambac*, *J. auriculatum*, *J. grandiflorum* and *J. multiflorum*. Seetharamu *et al.*, (2002) also observed a similar trend in these four commercial species of jasmine. The varietal yield differences among the varieties may be due to the additive gene effect (Hemalata *et al.*, 1992). Similar observations were also recorded in chrysanthemum (Rao and Pratap, 2006). May to August, June to September and July to October are the peak flowering seasons for *J. sambac*, *J. auriculatum* and *J. grandiflorum* respectively. Different peak flowering durations in these three species are the result of seasonal influence. Variation in photothermal units in different seasons affect the flowering behaviour of *Jasminum* species (Nedumaran, 1977).

Freshness index of seven varieties of three *Jasminum* species were computed to determine the commercially acceptance periods of flowers after harvesting during peak flowering seasons. The freshness index decreased with increase in senescence. Except Ramanathapuram Gundumalli all other varieties showed high freshness index (> 85 percent) after 10 hours of harvest. Ramanathapuram Gundumalli showed 56.50 percent freshness index whereas Parimullai had 25.50 percent freshness index. Single Mohra had highest freshness index (77.56 percent) after 20 hours of harvest (Table 2).

Freshness index

Condition of flowers	Score	Number of flower buds under this score
Almost all buds turgid	7	X ₁
Partial to half open flowers, turgid	6	X ₂
Half to full open flowers, turgid	5	X ₃
Partial to half open flowers, slightly wilted	4	X ₄
Half to full open flowers, slightly wilted	3	X ₅
Partial to half open flowers, fully wilted	2	X ₆
Half to full open flowers, fully wilted	1	X ₇

Table.1 Assessment of qualitative and quantitative flower quality parameters of certain commercial jasmine varieties during peak flowering season

S. No.	Varieties	Flower bud diameter (cm)	Open flower diameter (cm)	Flower bud length (cm)	Corolla tube length (cm)	Single flower bud weight (g)	Hundred flower bud weight (g)
1.	Ramanathapuram Gundumalli (<i>Jasminum sambac</i>)	0.69	2.52	2.30	1.30	0.207	18.64
2.	Madanban (<i>Jasminum sambac</i>)	0.83	5.40	3.50	1.32	0.310	30.80
3.	Single Mohra (<i>Jasminum sambac</i>)	1.00	3.00	1.65	0.80	0.292	29.10
4.	Ramabanam (<i>Jasminum sambac</i>)	0.90	6.20	3.05	1.62	0.230	21.82
5.	CO.1 Mullai (<i>Jasminum auriculatum</i>)	0.49	2.25	2.63	1.82	0.092	8.31
6.	Parimullai (<i>Jasminum auriculatum</i>)	0.44	2.10	2.58	1.50	0.068	7.30
7.	CO.1 Pitchi (<i>Jasminum grandiflorum</i>)	0.58	4.40	4.10	2.10	0.086	8.72
	SEd	0.017	0.122	0.059	0.035	0.008	0.733
	CD (P=0.05)	0.038	0.265	0.128	0.077	0.019	1.598

Table.2 Assessment of visual flower quality parameters of certain commercial jasmine varieties during peak flowering season

S. No.	Varieties	Freshness index (%)			
		Immediately after harvest	10 hrs after harvest	20 hrs after harvest	30 hrs after harvest
1.	Ramanathapuram Gundumalli (<i>Jasminum sambac</i>)	100.00	56.50	26.50	21.80
2.	Madanban (<i>Jasminum sambac</i>)	100.00	97.00	62.90	28.70
3.	Single Mohra (<i>Jasminum sambac</i>)	100.00	98.00	77.56	46.10
4.	Ramabanam (<i>Jasminum sambac</i>)	100.00	97.50	68.89	32.70
5.	CO.1 Mullai (<i>Jasminum auriculatum</i>)	100.00	89.80	28.76	6.67
6.	Parimullai (<i>Jasminum auriculatum</i>)	100.00	85.66	25.50	5.98
7.	CO.1 Pitchi (<i>Jasminum grandiflorum</i>)	100.00	90.50	47.63	18.78
	SEd	0.000	1.077	1.077	1.040
	CD (P=0.05)	0.000	2.347	2.347	2.266

Even after 30 hours of harvest Single Mohra showed highest freshness index (46.10 percent) when all the other varieties almost lost freshness and some wilted completely. Lowest freshness index observed after 30 hours of harvest.

Variations observed among the varieties in different intervals. Freshness index were highest in Single Mohra and lowest in Parimullai in all four time observations (Table 2). Decrease in freshness index observed with progress of time is due to the enhanced water loss and increased rate of senescence and browning of flowers. Similar observations were recorded by Wills *et al.*, (1998).

Flower yield is dependent on seasonal variation and this was reported earlier by Guenther (1960). Weather conditions play an important role in the flower production of jasmine. Warm weather and sufficient

sunshine can produce more yield and good quality of flowers with fragrance.

In the present study qualitative and quantitative flower quality parameters of certain commercial jasmine varieties during peak flowering season were studied which is going to help further not only in concentrating in value addition businesses during this season to check the wastage of surplus flowers but also in export businesses and in crop improvement programmes.

As the peak flowering seasons are different for different species, the present study can help to identify the potential variety for availing more yield in different months of a year to maintain a year round uninterrupted flowering cycle. Study of visual quality parameter helped to identify the commercial acceptance periods of different varieties during different time intervals.

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