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Evaluation of *Jasminum sambac* accessions for flower bud yield and floral quality parameters to identify a promising genotype for loose flower cultivation

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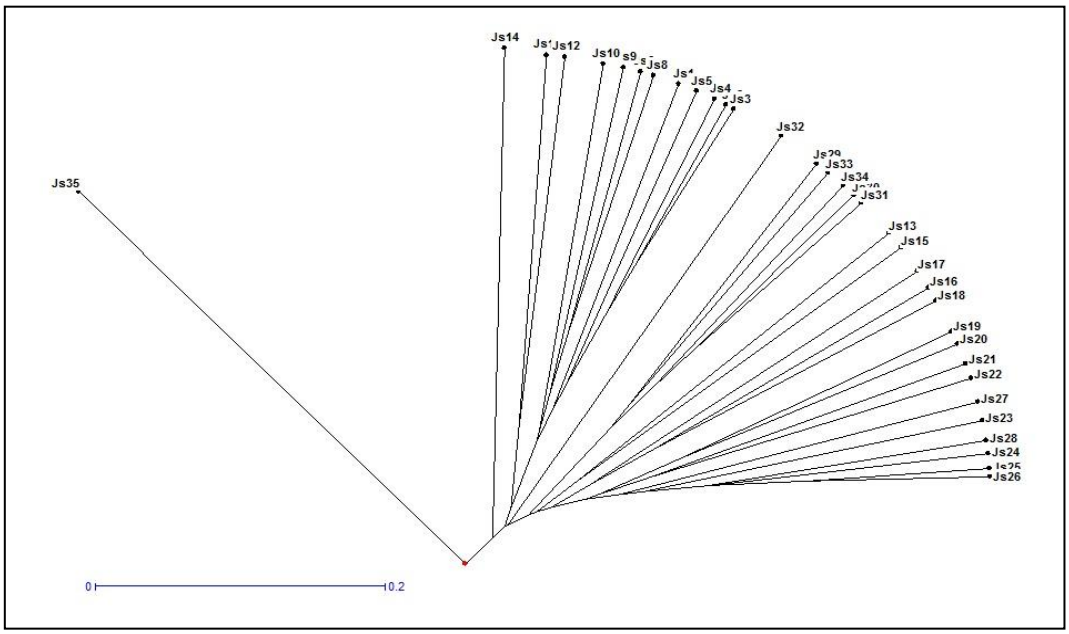
Abstract
The present experiment was carried out at the Department of Floriculture and Landscape Architecture, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, with the objective of identifying new promising genotypes for commercial cultivation as loose flower, since there is only a single popular cultivar of *Jasminum sambac viz.*, Ramanathapuram Gundumalli, being cultivated commercially on a large scale since many decades. Fifteen genotypes of *J. sambac* from the jasmine germplasm maintained at the Department of Floriculture and Landscape Architecture were evaluated in this study. These genotypes had been collected from various parts of Tamil Nadu. Flower bud yield and floral quality parameters were assessed in these genotypes. The study revealed that among the fifteen genotypes evaluated, Acc.Js-35 proved to be significantly superior for flower bud yield and floral quality parameters. The values recorded by Acc.Js-35 were the highest for annual flower bud yield (1333.06 g/plant/year), estimated flower bud yield (8.53 t/ha/year), hundred flower bud weight (58.762 g), flower bud length (2.70 cm) and corolla tube length (1.13 cm). The genotype Acc.Js-35 was found to be statistically superior to the standard check cultivar Ramanathapuram Gundumalli for the above said yield and quality parameters. Fragrance level of the accession Acc.Js -35 was also found to be strong and on par with Ramanathapuram Gundumalli. Based on its performance, Acc.Js -35 has been identified as a suitable genotype for loose flower cultivation.

Keywords: *Jasminum sambac*, genotype, yield, quality, fragrance

1. Introduction
Arabian Jasmine is botanically known as *Jasminum sambac* (L.) Aiton. 'Jasmine' is a word derived from the Persian term *'Yasmyn'* which means fragrance. The crop belongs to the family Oleaceae. Jasmine is native to the warm and temperate regions. India is a significant focal point for origin of a large number of the *Jasminum* species (Velusamy *et al.*, 1975) [15]. Around 40 species are indigenous to India and of these 40 species, 20 are grown in South India (Bhattacharjee, 1980) [1]. Jasmine has a high business esteem as a blossom crop for flower vendors, perfumery, restorative, therapeutic and drug ventures (Green and Miller, 2009) [2]. The concentrates of jasmine are utilized for seasoning of 'Jasmine scented Tea' in China and 'Jasmine rice' in Bangkok, Thailand. Tamil Nadu is the leading producer of jasmine in the country with an annual production of 1,36,901 tonnes from an area of 13,246 ha with a productivity of 11.21 t/ha (Hort. Tech, 2018) [4]. For many decades, only a single cultivar of *J. sambac*, Ramanathapuram Gundumalli is being cultivated commercially. The availability of an array of diverse improved cultivars with high flower production efficiency and improved floral quality traits would be a boon to the jasmine cultivators. With this perspective, the present study was taken up to identify promising genotypes of *J. sambac* which can be promoted for commercial scale cultivation and for use in crop improvement research.

2. Materials and Methods
This research was carried out at Department of Floriculture and Landscape Architecture, Horticultural College and Research Institute, Tamil Nadu Agricultural University. The geographical location of the experimental site is 11º01´N and 76º55´E. The experiment was laid out in randomized block design involving 15 genotypes raised in two replications under open field conditions. These genotypes had been collected from various parts of Tamil Nadu. Molecular characterization of the *J. sambac* genotypes of the jasmine germplasm of the

Department of Floriculture and Landscape Architecture, Coimbatore has earlier indicated that the accession Acc.Js-35 was genetically distinct from the remaining accessions as observed in Figure 1 (TNAU Horticultural Crop Scientists' Meet Report, 2021) [14]. The genotypes were raised with the a spacing of 1.25 m x 1.25 m following the recommended cultural practices as per the Crop Production Guide of the Directorate of Horticulture and Plantation Crops, Govt. of Tamil Nadu and Tamil Nadu Agricultural University (2020).



Source: TNAU Horticultural Crop Scientists' Meet Report, 2021

Fig 1: Molecular characterization of *J. sambac* genotypes

The flower bud yield parameters studied included annual flower bud yield per plant and estimated annual yield per hectare. The flower bud yield per plant was recorded month-wise and using these data the estimated annual yield per hectare was computed. The most economically important floral quality parameters namely, hundred flower bud weight (g), flower bud length (cm), corolla tube length (cm) and fragrance score (using 1- 4 scale) were recorded during the peak flowering season (May to August). Statistical analysis of the data on various parameters was done as per the method suggested by (Panse and Sukhatme, 1978) [9].

3. Results and Discussion

The results of the study revealed that the accession Acc.Js-35 was superior to the remaining 14 genotypes which also included the standard check variety Ramanathapuram Gundumalli (Acc.Js-1). With respect to flower yield parameters, the accession Acc.Js-35 recorded the highest annual flower bud yield per plant (1333.06 g/plant/year) and estimated flower bud yield per hectare (8.53 t/ha/year) and these values were higher than the yield recorded by the standard check (1316.65 g/plant/year and 8.43t/ha/year) (Table 1). The lowest flower bud yield was observed in Acc.Js-23 (647.00 g/plant/year and 4.14 t/ha/year). Variation in the yield among the genotypes may be due to the genotypic influence as well as seasonal factors.

Table 1: Flower yield parameters of *Jasminum sambac* genotypes

S. No.	Genotype	Annual flower bud yield (g/plant/year)	Estimated flower bud yield (t/ha/year)
1.	Acc.Js -1 Standard Check Variety Ramanathapuram Gundumalli	1316.65	8.43
2.	Acc.Js-2	951.01	6.09
3.	Acc.Js -3	965.50	6.18
4.	Acc.Js -6	867.61	5.55
5.	Acc.Js -8	1093.54	7.00
6.	Acc.Js -9	1106.44	7.08
7.	Acc.Js -12	839.36	5.37
8.	Acc.Js -13	686.43	4.39
9.	Acc.Js -14	840.41	5.38
10.	Acc.Js -22	860.80	5.51
11.	Acc.Js -23	647.00	4.14
12.	Acc.Js -28	976.46	6.25
13.	Acc.Js -29	1103.28	7.06
14.	Acc.Js -33	984.91	6.30
15.	Acc.Js -35	1333.06	8.53
SEd		38.51	-
CD(P=0.05)		82.61	-

For floral quality parameters also, the accession Acc.Js-35 was found to be superior to the remaining 14 genotypes. Accession Acc.Js-35 recorded the highest hundred flower bud weight (58.76 g), the longest flower buds (2.70 cm) and the longest corolla tube (1.13 cm) (Table 2 and Plate 2). These values were higher than those (44.31 g, 2.23 cm and 1.01 cm respectively) of the standard check variety Ramanathapuram Gundumalli (Acc.Js-1). The least hundred flower bud weight was recorded in Acc.Js-13 (15.72 g). The lowest flower bud length (1.63 cm) and corolla tube length (0.58 cm) were recorded in Acc.Js-23.

(Check Variety - Ramanathapuram Gundumalli)

Fig 2: Flower buds of Acc.Js-35 and Check Variety

Thus the present study revealed significant differences among the jasmine genotypes evaluated for yield and quality traits. Such variations in jasmine were also reported earlier by (Khan *et al*. 1970, Muthuswamy 1975, Nirmala *et al.* 2017, Lakshmi *et al.* 2017 and Ganga *et al.* 2019) [5, 7, 8, 6, 3]. Khan *et al*. (1970) reported marked variations among 15 varieties of *J. sambac* for traits which are important for flower trade, including length of corolla tube, size and shape of flower bud, etc. Muthuswamy (1975) also reported that wide variations existed among genotypes of *J. auriculatum* for economically important traits namely, flower bud length, corolla tube length, flower bud diameter, *etc*. Variations in floral quality parameters among jasmine genotypes were also reported earlier by Safeena *et al.* (2013) [11].

Similar findings for variations in flower yield and floral quality parameters have also been reported in other loose flower crops including marigold (Singh and Singh, 2005) [10], chrysanthemum (Thiripurasundari *et al*., 2021) [13] and rose (Soujanya *et al*., 2018) [12].

Table 2: Floral quality parameters of *Jasminum sambac* genotypes

S. No.	Genotype	Flower bud length (cm)	Corolla tube length (cm)	Hundred bud weight (g)	Fragrance scoring[a]
1.	Acc.Js -1 Standard Check Variety Ramanathapuram Gundumalli	2.23	1.01	44.31	3
2.	Acc.Js -2	2.06	0.94	36.89	2
3.	Acc.Js -3	2.11	0.98	35.86	2
4.	Acc.Js -6	1.90	0.85	30.29	2
5.	Acc.Js -8	2.34	1.02	44.83	3
6.	Acc.Js -9	2.26	1.03	46.74	2
7.	Acc.Js -12	1.86	0.84	27.75	2
8.	Acc.Js -13	2.12	0.82	15.72	2
9.	Acc.Js -14	1.94	0.75	26.91	2
10.	Acc.Js 22	1.92	0.78	28.31	2
11.	Acc.Js -23	1.63	0.58	16.5	2
12.	Acc.Js -28	2.13	0.97	35.78	3
13.	Acc.Js -29	2.51	0.99	45.12	3
14.	Acc.Js -33	2.11	0.96	38.47	3
15.	Acc.Js -35	2.70	1.13	58.76	3
SEd		0.069	0.036	3.008	-
CD(P=0.05)		0.148	0.077	6.453	

[a]Fragrance scoring with 1-4 Scale: 1- Least; 2- Mild; 3 - Strong; 4 - Very strong

4. Conclusion

From the present study, it could be inferred that the genotype Js-Acc-35 had superior traits namely high flower bud yield (1333.06 g/plant/year and 8.53 t/ha/year), hundred flower bud weight (58.76 g), bolder flower buds (flower bud length of 2.70 cm), longer corolla tube length (1.13 cm) and strong fragrance (with score of 3), making it a suitable genotype for commercial cultivation as loose flower.

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