

**PERFORMANCE OF DIFFERENT VARIETIES OF JASMINE (*Jasminum sambac*)
UNDER PRAYAGRAJ AGRO-CLIMATIC CONDITIONS**

ABSTRACT

The present investigation entitled **Performance of different varieties of jasmine (*Jasminum sambac*) under Prayagraj agro-climatic conditions**, was undertaken in the Department of Horticulture, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj, during August, 2021 to October, 2022. The experiment was laid out in Randomized Block Design (RBD) with 07 varieties, replicated thrice. The variety V4 (U.P. Local) performed significantly better for all the growth parameters like plant height (95.57 cm), number of leaves (118.50), plant spread (60.45 cm), and number of branches (24.50), and the variety V5 (Gundumalli) was found superior in terms of bud diameter (24.83 mm), shelf life (5.58 days), average flower bud weight (0.75 g), flower yield per plant (1.46 kg), flower yield per hectare (58.4 q), and Benefit cost ratio (4.15). Can be used while for better quality, flower yield and benefit cost ratio, variety V5 (Gundumalli) can be recommended for commercial cultivation under Prayagraj agro-climatic condition.

Keywords: *jasmine, varietal evaluation, genotypes, growth, yield and quality*

INTRODUCTION

Jasmine is a genus of shrubs and vines in the olive family (Oleaceae). Jasmines are widely cultivated for the characteristic fragrance of their flowers. The flowers are also used for the production of perfumed hair oils and attars. Jasmine essential oil has a sweet and floral aroma. It is regarded as unique, as it blends well with other floral extracts and which is highly valued throughout the world for its high-grade perfumes, which is used in soap and cosmetic industries and in flavouring mouth wash liquids. It is a highly valued ornamental plant for home gardens and commercial cultivation. Flowers and buds are used for making garlands, bouquets and for religious offerings, while vein is used as hair adornment. Jasmines are commercially cultivated for their flowers in the Southern and Eastern parts of India. Major jasmine producing states in India are Tamil Nadu and Karnataka. Karnataka, is known for cultivation of jasmines due to its versatile utility as fresh flowers in ceremonies, religious offerings and perfuming the hair oils etc. India is one of the centers of origin of jasmine. For the past many centuries' jasmines have adorned the gardens of central and South East Asia, Afghanistan, Iran, Nepal and many other tropical and sub-tropical countries and many of the jasmine species are native of India and have their origin in the southern foothills of the Himalayas.

Gundumalli, Mogra, Virupakshi, Sujimalli, Madanabanam, Ramabanam these are varieties of *Jasminum sambac*. *Jasminum sambac* is a small shrub growing up to 0.5 to 3m (1.6 to 9.8 ft)in height. It is widely cultivated for its attractive and sweetly fragrant flowers. The flowers may be used as fragrant ingredient in perfumes and jasmine tea.in India it is very popular and is known as Mogra. It is the national flower of the Philippines, where it is known as Sampaguita, as well as being one of the three national flowers of Indonesia, where it is known as MelatiPutih. It has many medicinal properties like anti-depressant, antiseptic, cicatrisant, aphrodisiac, expectorant, antispasmodic, galactagogue, sedative, parturient, uterine, etc. The flower is used for removing intestinal worms and is also used for jaundice and venereal diseases. It is a species of jasmine native to tropical Asia, from the Indian subcontinent to south-east Asia.it is cultivated in many places in India, especially across much of South and south-east Asia. Its phenotypes are generally classified based on the number of petal whorls present *viz.*, single-whorled, double whorled and multi whorled types. Single whorled and double whorled cultivars are the commonly cultivated types. The single whorled cultivars are highly fragrant and utilized in the perfume industry while, the double whorled cultivars yield the highest number of flowers.

MATERIALS AND METHODS

This chapter contains the details of the materials used and the methods adopted in the present study entitled “Performance of different varieties of jasmine (*Jasminum sambac*) under Prayagraj agro-climatic conditions” was carried out during August, 2021 to October, 2022 in the Department of Horticulture, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj. The planting material was collected from Kerala Agricultural College, Mannuthy, Thrissur. The plants were planted in Horticultural Research Field. The study comprised of 7 varieties and 3 replications. The experiment was laid out in RBD.

Table1. List of different varieties

| Varieties No. | Varieties |
|---------------|---------------|
| V1 | SINGLE MOGRA |
| V2 | ARKA ARADHANA |
| V3 | DOUBLE MOGRA |
| V4 | U.P. LOCAL |
| V5 | GUNDUMALLI |
| V6 | IRUVATCHI |
| V7 | ERKIL JASMINE |

RESULTS AND DISCUSSION

Performance of Jasmine cultivars for vegetative parameters

There were significant differences among the varieties concerning vegetative parameters (Table 2). Significantly taller plants (95.57 cm) were reported in variety V4 (U.P. Local), followed by variety V5 (Gundumalli, 90.54 cm) while shorter plants (54.53 cm) were observed in variety V2 (Arka Aradhana). The significant variation concerning plant height among the chrysanthemum varieties was also noticed by **Joshi *et al.*, (2010)** Significantly a greater number of leaves (118.50) per plant were reported in variety V4 (U.P. Local), followed by variety V5 (Gundumalli, 116.50) while lesser number of leaves (99.50) was observed in variety V2 (Arka Aradhana). Similar observations were observed by **Karthikeyan *et al.*, and Jawaharlal *et al.*, (2013)** in carnation and **Vedavathi *et al.*, (2015)** in Asiatic lily. The variation in number of leaves per plant under different varieties, might be due to difference in their genetic inherit capacity and suitability under this climate. Significantly wider plant spread (60.45 cm) were recorded in variety V4 (U.P. Local), followed by variety V5 (Gundumalli, 58.46 cm) whereas smaller plant spread (42.70 m) was obtained in variety V2 (Arka Aradhana). The difference in plant spread among all the varieties may be due to their genetic makeup and development of a greater number of secondary branches in the varieties thereby increasing the plant spread. Similar results were recorded in chrysanthemum by **Henny *et al.* (2021)**. Significantly a greater number of branches (24.50) were recorded in variety V4 (U.P. Local), followed by variety V5 (Gundumalli, 23.42) while lesser number of branches (16.50) was observed in variety V2 (Arka Aradhana). The difference in number of primary branches may be due to the genetic makeup of the varieties and due to environmental conditions. Similar results were recorded in chrysanthemum by **Henny *et al.* (2021)**.

Performance of Jasmine cultivars for floral parameters

There were significant differences among the varieties concerning floral parameters (Table 3). Significantly plants having shorter days to first flower bud initiation (93.42 days) were observed in V1 (Single Mogra). followed by variety V4 (U.P. Local, 103.50 days) while longer days for the first flower bud initiation (130.50 days) was recorded in variety V3 (Double Morgia). Flower bud initiation had significantly differed and the difference may be due to the inherent character and genetic makeup of the variety. Similar results were recorded in chrysanthemum by **Kumar *et al.*, (2020)**, **Pandey**

et al., (2012). Significantly a greater number of flower buds (3675.25) were recorded in variety V1 (Single Morga), followed by V4 (U.P. Local, 2998.67) while a smaller number of flower buds (1335.17) was obtained in variety V3 (Double Morga). There was significant difference in number of flowers per plant. This difference may be due to the difference in the genetic makeup and due to environmental conditions. Similar results were recorded in chrysanthemum by **Thiripurasudari *et al.* (2021)**. Significantly long days for 50% flowering (102.75 days) were reported in variety V1 (Single Morga), followed by variety V4 (U.P. Local, 97.33 days) while plants with short days to 50% flowering (82.25 days) was observed in variety V3 (Double Morga). Days taken to 50% flowering of all plants were differed significantly. This difference may be due to the difference in the varietal character and habitat type. Similar results were recorded in chrysanthemum by **Kumar *et al.* (2021)**. Significantly longer duration for flowering (204.42 days) was reported in variety V1 (Single Morga), followed by variety V4 (U.P. Local, 192.42 days) while plants having short duration of flowering (162.58 days) was observed in variety V3 (Double Morga). The difference in the flowering duration may be due to the varietal character, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Srilatha *et al.* (2015)**.

Performance of Jasmine cultivars for quality characters

There were significant differences among the varieties concerning quality parameters (Table 4). Significantly larger flower bud length (2.59 cm) was reported in variety V7 (Erkil Jasmine), followed by variety V5 (Gundumalli, 2.26 cm) while shorter flower bud length (1.37 cm) was observed in variety V1 (Single Mogra). The difference in flower bud length may be due to the inherent character and genetic makeup of the varieties and environmental conditions similar results were recorded in Asiatic Lily by **Barik *et al.*, (2013)**, **Pandey *et al.*, (2012)**, **Sindhu *et al.*, and Singh *et al.*, (2012)**. Significantly larger flower bud diameter (24.83 mm) was reported in variety V5 (Gundumalli), followed by V4 (U.P. local, 17.08mm) while small flower bud diameter (2.25 mm) was observed in variety V2 (Arka Aradhana). The difference in flower diameter may be due to the variation in the genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Siddiqua *et al.* (2018)**. Significantly more average bud weight (0.75 g) was reported in variety V5 (Gundumalli), followed by variety V3 (Double Mogra, 0.41g) while lesser Average bud weight (0.16 g) was observed in variety V2 (Arka Aradhana). The difference in the

flower weight may be due to the varietal character, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Patil et al. (2017)**. Significantly more shelf life (5.58 days) was reported in variety V5 (Gundumalli), followed by variety V3 (Double Mogra, 4.17 days) while less shelf life (2.25 days) was observed in variety V7 (Erkil Jasmine). The difference in the shelf life of flowers may be due to the evaporation rate, transpiration rate of the varieties and also may be due to the varietal character, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Roopa et al. (2018)**.

Performance of Jasmine cultivars for yield characters

There were significant differences among the varieties concerning yield parameters (Table5). Significantly higher flower yield per plant (1.46 kg) were reported in variety V5 (Gundumalli), followed by variety V1(Single Mogra, 1.21kg) while low flower yield per plant (0.37 kg) was observed in V2 (Arka Aradhana). The difference in the flower yield per plot may be due to the varietal character, habitat type and genetic makeup of the varieties. Similar results were recorded in chrysanthemum by **Srilatha et al. (2015)**. Significantly higher flower yield per hectare (58.4 q) were recorded in variety V5 (Gundumalli), followed by variety V1(Single Mogra, 48.4 q) while less flower yield per hectare (14.8 q) was observed in variety V2 (Arka Aradhana). The difference in the yield per hectare may be due to varietal character, habitat type and genetic makeup of varieties. Similar results were recorded in chrysanthemum by **Singh et al. (2017)**, **Sindhu et al., (2006)**.

Table.2 Performance of Jasmine cultivars for vegetative parameters under Prayagraj agro-climatic conditions.

| VARIETY | PLANT HEIGHT | NUMBER OF LEAVES | PLANT SPREAD | NUNMBER OF BRANCHES |
|-------------------|---------------------|-------------------------|---------------------|----------------------------|
| SINGLE MOGRA | 78.47 | 115.50 | 50.58 | 22.25 |
| ARKA ARADHANA | 54.53 | 99.50 | 42.70 | 16.50 |
| DOUBLE MOGRA | 65.49 | 105.25 | 43.68 | 20.50 |
| U.P. LOCAL | 95.57 | 118.50 | 60.45 | 24.50 |
| GUNDUMALLI | 90.54 | 116.50 | 58.46 | 23.42 |
| IRUVATCHI | 76.75 | 108.00 | 48.46 | 18.33 |
| ERKIL JASMINE | 56.58 | 102.25 | 42.83 | 17.33 |
| F - test | S | S | S | S |
| S.Ed (±) | 0.18 | 0.28 | 0.19 | 0.27 |
| C.D.(0.05) | 0.38 | 0.61 | 0.42 | 0.60 |
| C.V. | 0.29 | 0.31 | 0.48 | 1.64 |

Table.3 Performance of Jasmine cultivars for floral parameters under Prayagraj agro-climatic conditions.

| VARIETY | Days to first flower bud initiation | Numbers of flower buds | Days to 50% flowering | Duration of flowering (days) |
|-------------------|--|-------------------------------|------------------------------|-------------------------------------|
| SINGLE MOGRA | 93.42 | 3675.25 | 102.75 | 204.42 |
| ARKA ARADHANA | 121.50 | 1996.08 | 86.33 | 170.75 |
| DOUBLE MOGRA | 130.50 | 1335.17 | 82.25 | 162.58 |
| U.P. LOCAL | 103.50 | 2998.67 | 97.33 | 192.42 |
| GUNDUMALLI | 111.58 | 2749.25 | 92.42 | 183.25 |
| IRUVATCHI | 114.25 | 2235.83 | 89.33 | 177.50 |
| ERKIL JASMINE | 118.25 | 1634.00 | 88.17 | 175.58 |
| F - test | S | S | S | S |
| S.Ed (±) | 0.17 | 2.37 | 0.25 | 0.30 |
| C.D.(0.05) | 0.38 | 5.15 | 0.54 | 0.66 |
| C.V. | 0.19 | 0.12 | 0.33 | 0.21 |

Table.4 Performance of Jasmine cultivars for quality parameters under Prayagraj agro-climatic conditions.

| VARIETY | Flower bud length(cm) | Flower bud Diameter (mm) | Average flower bud weight(g) | Shelf life of loose flower(days) |
|-------------------|------------------------------|---------------------------------|-------------------------------------|---|
| SINGLE MOGRA | 1.37 | 8.17 | 0.33 | 3.08 |
| ARKA ARADHANA | 1.69 | 2.25 | 0.16 | 2.42 |
| DOUBLE MOGRA | 1.85 | 13.75 | 0.41 | 4.17 |
| U.P. LOCAL | 2.12 | 17.08 | 0.37 | 2.42 |
| GUNDUMALLI | 2.26 | 24.83 | 0.75 | 5.58 |
| IRUVATCHI | 1.99 | 17.08 | 0.27 | 3.33 |
| ERKIL JASMINE | 2.59 | 3.00 | 0.25 | 2.25 |
| F - test | S | S | S | S |
| S.Ed (±) | 0.08 | 0.34 | 0.01 | 0.12 |
| C.D.(0.05) | 0.17 | 0.74 | 0.02 | 0.26 |
| C.V. | 4.88 | 3.39 | 3.35 | 4.35 |

Table.5 Performance of Jasmine cultivars for yield parameters and benefit: cost ratio under Prayagraj agro-climatic conditions.

| VARIETY | Flower yield/plant(kg) | Flower yield/ha(q) | Benefit cost ratio |
|-------------------|-------------------------------|---------------------------|---------------------------|
| SINGLE MOGRA | 1.21 | 48.4 | 3.44 |
| ARKA ARADHANA | 0.37 | 14.4 | 1.05 |
| DOUBLE MOGRA | 0.56 | 22.4 | 1.59 |
| U.P. LOCAL | 1.08 | 43.2 | 3.07 |
| GUNDUMALLI | 1.46 | 58.4 | 4.15 |
| IRUVATCHI | 0.58 | 23.2 | 1.64 |
| ERKIL JASMINE | 0.40 | 16.0 | 1.13 |
| F - test | S | S | |
| S.Ed (±) | 0.01 | 0.13 | |
| C.D.(0.05) | 0.03 | 0.29 | |
| C.V. | 1.88 | 0.50 | |

CONCLUSION

From the present investigation entitled “Performance of different varieties of jasmine (*Jasminum sambac*) under Prayagraj agro-climatic conditions”, it is concluded that the variety V4 (U.P. Local) performed significantly better for all the growth parameters like plant height, number of leaves, plant spread, and number of branches, while in terms of flowering parameters, variety V1 (Single Mogra) was found superior in terms of days to first flower bud initiation, number of flower bud, 50% flowering and duration of flowering, and the variety V5 (Gundumalli) was found superior in terms of bud diameter, shelf life, average flower bud weight, flower yield per plant, flower yield per hectare, gross return, net profit, and benefit cost ratio. Hence for capturing early market variety V1 (Single Mogra) can be used while for better quality, flower yield and benefit cost ratio variety V5 (Gundumalli) can be recommended for commercial cultivation under Prayagraj agro-climatic condition.

REFERENCES

- Barik, D. and Mohanty,C.R. (2015).** Evaluation of Asiatic hybrid lily varieties under Bhubneshwar condition. *Asian J. Hort*, **10** (2):194-200.
- Desai, N. and Mamatha, B. (2016).** Effect of spacing on yield of tuberose at farmers field in Karnataka. *Journal of Krishi Vigyan*, **5** (1): 54-56.
- Fatmi, U. and Singh, D. (2020).** Flower quality, yield and bulb production of different varieties of tuberose as affected by different planting time and geometry under Prayagraj agroclimatic conditions. *Journal of Pharmacognosy and Phytochemist*,**9** (2): 74-77.
- Gowdhami, T., Rajalakshmi, A.K., Sugumar, N. and Valliappan, R. (2015).** Evaluation of antimicrobial activity of different solvent extracts of aromatic plant: *jasminum sambac*. *Journal of Chemical and Pharmaceutical Research*, **7** (11):136-143.
- Henny, T., Palai, S.K., Beura, S., Chongloi, L., Devi, O.B. and Mishra, S. (2021).** Evaluation and selection of spray chrysanthemum (*Chrysanthemum morifolium* Ramat) genotypes suitable for commercial cultivation under coastal plain zone of Odisha. *The Pharma Innovation Journal*,**10** (4): 124-126.
- Jeebit, Singh. L., Khangjarakpam, G., Shadukan, r., andDhua, R. S. (2019)** Quality characterization of new chrysanthemum genotypes. *Journal of Pharmacognosy and Phytochemistry*, **8** (4): 1611-1617.
- Jayamma, N., Jagadeesh, K.S., Patil, V.S. (2009).** Growth and flower yield of jasmine (*Jasminum auriculatum*) as influenced by biofertilizers and graded doses of chemical fertilizers. *Journal of ornamental horticulture*, **11**(4) 275-280.
- Joshi, M., Verma, L.R. and Masu, M.M. (2010).** Performance of different varieties of chrysanthemum in respect of growth, flowering and flower yield under north Gujarat condition. *The Asian Journal of Horticulture*, **4** (2): 292-294.

Kumar, R., Prasad, V.M., and Singh, D. (2021). Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* L.) under Prayagraj agro-climatic conditions. *The Pharma Innovation Journal*, **10** (12): 245-248.

Kartheka, T., Rajamani, k., Ganga, M., and ManikandaBoopathi. (2021). Morphological characterization of certain *Jasminum sambac* genotypes using principal component analysis. *The Pharma Innovation Journal*, **10** (12): 118-123.

Keerthishankar, K., Balaji, S., Kulkarni., Yathindra, H.A., Sudarshan, G.K., and Mutthuraju, G.P. (2020). Yield and cost economics of *Jasminum sambac* Cv. Mysuru Mallige as influenced by fertigation along with a foliar spray of micronutrients. *Journal of Pharmacognosy and Phytochemistry*, **9** (6): 1499-1501.

Kalaiyarasi, A., Dhananjaya, M.V., Sujatha, A.N., Rajive, K., Yogeasha, H.S., Munikrishnappa, P.M., Devappa, V., and Pavithra, S. (2018). Studies on floral morphology in different genotypes of *Jasminum sambac*. *Indian Journal of Agricultural Sciences*, **88** (11) : 1789–93.

Kumar, K.K., Ganga, M., Rajamani, K., and Geethanjali, S. (2021). Evaluation of *Jasminum sambac* accessions for flower bud yield and floral quality parameters to identify a promising genotype for loose flower cultivation. *The Pharma Innovation Journal*, **10** (10): 1642-1645.

Karthikeyan, S., and Jawaharlal, M. (2013). Optimization of planting density in carnation. *HortFlora Research Spectrum*, **2**(2): 121-125.

Kumar, A., Kumar, R., Singh, J., Singh, P. and Singh, V. (2020). On-farm evaluation of different cultivars of chrysanthemum under the climatic conditions of Western Uttar Pradesh. *International Journal of Current Microbiology and Applied Sciences*, special issue-11: 1937-1943.

Patil, S., Mishra, A., Nagar, K.K. and Kumar, C. (2017). Evaluation of chrysanthemum (*Chrysanthemum morifolium* Ramat.) varieties for flowering traits under ecological 106

conditions of sub-humid zone of Rajasthan. *Chemical Science Review and Letters*, **6** (22), 1338-1342.

Roopa, S., Chandrashekar, S.Y., Shivaprasad, M., Hanumantharaya, L. and Kumar, H. (2018). Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes for floral and quality traits under hill zone of Karnataka. *International Journal of Current Microbiology and Applied Sciences*, **7** (8): 1874-1879.

Srilatha, V., Kumar, K.S. and Kiran, Y.D. (2015). Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties in southern zone of Andhra Pradesh. *Agricultural Research Communication Centre*, **35** (2): 155-157.

Siddiqua, A., Lakshmi, K.S., Nagaraju, R. and Reddy, D.S. (2018). Performance of spray chrysanthemum cultivars (*Dendranthema grandiflora* Tzvelev.) in polyhouse conditions. *Journal of Pharmacognosy and Phytochemistry*, **7** (6): 1572-1575.

Singh, D.D., Tyagi, S., Singh, S. and Kumar, P. (2017). Studies on the performances and flower characterization of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes under Uttar Pradesh conditions. *Advances in Research*, **9** (1): 1-7.

Thiripurasundari, S., Velmurugan, M., Geethanjali, S. and Thamaraiselvi, S.P. (2021). Evaluation of cut chrysanthemum (*Dendranthema grandiflora* Tzvelev.) under open field and polyhouse conditions in Coimbatore conditions. *Journal of Pharmacognosy and Phytochemistry*, **10** (1): 2161-2165.

Vedavathi, R.S., Manjunatha, B., Mamatha, N.P., Hemlanaik, B. and Priyanka, H.L. (2014). Influence of spacing and nitrogen on flower quality and vase life of Asiatic lily cv. Gironde. *HortFlora Research Spectrum*, **4** (1): 70-72.