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Performance of Different Varieties of Jasmine (*Jasminum sambac*) Under Prayagraj Agro-Climatic Conditions

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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). 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). So, this variety can be used for better quality, flower yield and benefit cost ratio. Hence the variety V5 (Gundumalli) can be recommended for commercial cultivation under Prayagraj agro-climatic conditions.

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

INTRODUCTION

Jasmine is a genus of shrubs and vines in the olive family (Oleaceae). 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. The basic chromosome number of jasmines is 13, while 2n ranges from 26 to 39, though most of them are diploid. The name Jasmine is of Persian origin and means "gift from God." It is derived from the Persian word "yasmin" which is used for the flower.

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. 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.

The Jasmine species *Jasminum sambac* Ait. is distributed mainly in Karnataka, Andhra Pradesh, TamilNadu and also to some extent in West Bengal states of India (Bhattacharjee *et al.* 1983). Hence, the great extent of variability is available in *J.sambac* Ait. from this region. Essential oil is extracted from the flowers to make perfumes. The different parts of *J.sambac* such as the leaf, stem, bark and roots are important as source of chemicals that are useful in the pharmaceutical industries.

The number of species in the genus *Jasminum* varies from about 200. environment / season is the important limiting factor for growth and flowering of jasmine. The variations among jasmine varieties are largely in response to theenvironment particularly temperature and the interaction between temperature and variety. Hence, there is a need to evaluate promising genotypes, so that elite genotypes could be recommended for specific locations.

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 study comprised of 7 varieties and 3 replications. Single Mogra, Arka Aradhana, Double Mogra, U.P Local, Gundumalli, Iruvachi and Erkil Jasmine these are the varieties. The experiment was laid out in RBD.

Table .1: Meteorological data recorded during experimental period (August, 2021 to October, 2022)

Month	Week	Temperature (ºC)		Relative humidity (%)		Rainfall (mm)
		Max.	Min.	Max.	Min.	
August, 2021	1st	33.0	25.2	89.2	66.4	17.9
	2nd	31.9	24.97	91.2	69.7	19.0
	3rd	33.1	25.5	89.1	64.1	13.7
	4th	33.6	25.6	88.64	61.9	14
September, 2021	1st	35.6	26.1	88.7	55.7	10.7
	2nd	34.7	26.3	86.5	56.8	5.7
	3rd	33.7	25.8	89.0	61.5	14.4
	4th	34.1	34.3	89.2	59.7	13.4
October, 2021	1st	34.2	25.5	87.5	57.7	1.5
	2nd	34.8	25.8	85	55.4	0.7
	3rd	35.0	25.8	85.	55	1
	4th	35.1	25.7	85.8	54.8	1.1
November, 2021	1st	30.7	18.1	91.1	58.8	0
	2nd	30.3	16.8	91	57.1	0
	3rd	29.8	15.9	91.4	57.2	0
	4th	29.6	15.2	91.6	57.8	0
December, 2021	1st	28.4	13.8	93.2	59.7	0
	2nd	27.6	12.8	93.7	60.4	0
	3rd	26.64	12.	94.1	62	0
	4th	25.4	11.4	94.5	66.4	0
January, 2022	1st	19.8	9.1	96.8	81.8	2.7
	2nd	19.51	10.8	96.8	81.1	3.6

	3rd	19.9	9.5	96.5	78.6	2.4
	4th	20.3	9.3	96.1	77.1	2
February, 2022	1st	26	11.8	93.4	56	0
	2nd	27.8	10	95	62	0.00
	3rd	28.8	12.4	91	53	0
	4th	32	14	89	41	0
March, 2022	1st	33.2	15.1	87	46	0
	2nd	33.6	16.2	88	46	0
	3rd	39.2	18	73	37	0
	4th	41.1	22	68	35	0
April, 2022	1st	40.1	22.4	79.8	38.7	0
	2nd	41.3	23.7	77.7	38.5	0
	3rd	42.4	23.5	82.2	39.5	0
	4th	43.8	24.6	75.7	38.4	0
May, 2022	1st	43.2	24.5	82	41	0
	2nd	42.7	24.8	75	40	0
	3rd	42.1	26.2	76	37	0
	4th	42.5	25.6	74	35	0
June, 2022	1st	44.7	28.08	82.71	27	0
	2nd	44.61	28.94	78.71	24.85	0
	3rd	39.98	28	78.28	36	0
	4th	39.24	26.24	81.57	40.28	0
July, 2022	1st	34.82	28.04	79.57	40.71	0
	2nd	38.14	28.52	78.85	40.14	0
	3rd	38.54	27.94	71.57	37.28	0
	4th	36.71	25.25	91.71	56.71	15.6
August, 2022	1st	36.09	25.41	93	50.28	0.95
	2nd	35.05	24.51	92.85	57.57	0.48
	3rd	34.12	24.3	92.57	55.57	15.21
	4th	35	24.32	90.57	54.71	13.82
September, 2022	1st	35.48	26.22	88.85	53.85	1.07
	2nd	34.57	26.45	90	57	5.27
	3rd	32.14	24.71	91.28	66.57	12.91
	4th	31.74	25.54	90.57	67.42	11.34
October, 2022	1st	33.34	25.77	90.42	67	4.34
	2nd	32.01	24.97	94	69.57	7.08
	3rd	32.08	21.2	92.42	59.42	0
	4th	32.02	18.4	92.85	56.28	0

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) to 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 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 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 Quality Characters

There were significant differences among the varieties concerning quality parameters (Table 3). 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 varietyV3 (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 (Table3). 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	115.5	50.58	22.25
ARKA ARADHANA	54.53	99.5	42.7	16.5
DOUBLE MOGRA	65.49	105.25	43.68	20.5
U.P. LOCAL	95.57	118.5	60.45	24.5
GUNDUMALLI	90.54	116.5	58.46	23.42
IRUVATCHI	76.75	108	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	0.6
C.V.	0.29	0.31	0.48	1.64

Table. 3 Performance of Jasmine cultivars for quality parameters yield parameters and benefit: cost ratio under Prayagraj agro-climatic conditions.

Variety	Flower Bud Diameter (Mm)	Average Flower Bud Weight(G)	Shelf Life Of Loose Flower (Days)	Flower Yield/Ha (Q)	Benefit Cost Ratio
Single Mogra	8.17	0.33	3.08	48.4	3.44
Arka Aradhana	2.25	0.16	2.42	14.4	1.05
Double Mogra	13.75	0.41	4.17	22.4	1.59
U.P. Local	17.08	0.37	2.42	43.2	3.07
Gundumalli	24.83	0.75	5.58	58.4	4.15
Iruvatchi	17.08	0.27	3.33	23.2	1.64
Erkil Jasmine	3	0.25	2.25	16	1.13
F - test	**S**	**S**	**S**	S	
S.Ed (±)	0.34	0.01	0.12	0.13	
C.D. (0.05)	0.74	0.02	0.26	0.29	
C.V.	3.39	3.35	4.35	0.5	

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. So, it can be used for better quality, flower yield and benefit cost ratio. Hence the variety V5 (Gundumalli) can be recommended for commercial cultivation under Prayagraj agro-climatic condition.

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