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## Effect of different level and time of pruning on growth and flowering in Mogra (*Jasminum sambac*) var. Local

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### Abstract

An experiment was conducted at Sheth D. M. polytechnic in Horticulture College, Anand Agricultural University, Model farm, Vadodara during 2018-2022 to study the effect of different level and time of pruning in Mogra (*Jasminum sambac*) var. Local. The study was conducted using randomized block design with factorial concept (FRBD). The treatments comprising of three different time of pruning viz., 2<sup>nd</sup> week of November, 2<sup>nd</sup> week of December and 2<sup>nd</sup> week of January and three level of severity of pruning viz., light pruning (60 cm from the ground level), medium pruning (40 cm from ground level) and heavy pruning (20 cm from the ground level) and compared with control (no pruning). The treatments were applied to two years old plants of *Jasminum sambac* (L). The result showed that pruning time and level of pruning significantly influence the growth and flowering yield in *Jasminum sambac* var. Local. Among different pruning time, pruning on 2<sup>nd</sup> week of December had most promising result for enhancing vegetative attributes like higher plant height (77.2 and 100.3 at 90 and 180 days after pruning), length of secondary shoot (32.36 cm), number of leaves per secondary shoot (20.61), plant spread N-S (51.44 cm), plant spread E-W (54.72 cm), number of secondary shoot per plant (29.32) and yield (6.02 t/ha) in *Jasminum sambac* var. Local. While, in case of severity of pruning, medium pruning (40 cm from the ground level) recorded significantly higher plant height (107.2 cm at 180 days after pruning), length of secondary shoot (34.91 cm), number of leaves per secondary (20.79) shoot and number of secondary shoot per plant (28.58) and yield (5.83 t/ha). Pruning of *Jasminum sambac* var. Local at 40 cm above ground level during second week of December is beneficial for better growth and flowering yield.

**Keywords:** Jasmine, pruning, flowering, canopy management, cultural operations

### Introduction

Jasmine occupies prominent space in the Indian commercial flower markets due to not only its attractiveness but also its fragrance. It is also used in worshipping gods and planted around the religious places. It's also used in beautification, making garlands and hair adornment for women on special occasions, cosmetic products, perfumes and syrups etc. Several species of jasmine is commercially cultivated on large scale in different states as loose flowers. *Jasminum sambac* produces flowers during the months from March up to august. Pruning helps in rejuvenation of plants. Growth of the plant can be regulated by pruning. It eliminates the unwanted shoots and utilizes that energy to growth of the plant. In flower crops the growth and production can be increase by adopting a proper cultivation practices like adequate fertilizers, proper cultural practices, irrigation, spacing etc. The flower production in the jasmine can be efficiently increased by adopting special horticultural practice like pruning. It promotes the emergence and growth of new shoots on which bears more flowers as compared to the old ones and it also helps in keeping good shape of the plants. It also helps in ease of intercultural operations. Pruning is an important step because it increases the growth and its aesthetic value. (Gibson, 1984; Anderson, 1991) <sup>[4, 1]</sup>. Around 75.83% farmers cultivating jasmine crops in Madurai district from Tamil Nadu adopted pruning at right season but still other farmers were unaware about the importance of pruning and did not want to prune in order to get continues harvest from the crop (Rajeshwaran *et al.*, 2022) <sup>[11]</sup>. Pal and Bose, (1981) <sup>[9]</sup> observed that plants of *J. sambac* cv. Khoya pruned at 40 cm height in January produced the highest yield. Singh and Moe (1980) <sup>[14]</sup>, on the other hand reported that, pruning to 75 cm height in mid-December resulted in the highest

flower and concrete yield. Pruning at 50 cm height from ground level in December month increase the yield in *Jasminum sambac* var Barmasi (Pawar *et al.*, 2019) <sup>[10]</sup>. While according to Khanchana K. and Jawaharlal M. (2019) <sup>[6]</sup>, pruning at 60 cm height from ground level in the month of august give higher yield. Pruning in jasmine crop performed at right time and in specific severity boost up flowering by sufficient ventilation leading to least susceptibility of plant to diseases. Hence, present experiment was carried out to study the effect of time and severity of pruning on growth and flowering quality in Jasmine.

### Material and Methods

The present investigation was carried out at Sheth D. M. Polytechnic in Horticulture college research farm, Anand Agricultural University, Model farm, Vadodara to study the canopy management in *Jasminum sambac* var Local with ten treatment combination in randomized block design with factorial concept and three replications. The treatments comprised of three different time of pruning *viz.*, 2<sup>nd</sup> week of November (T<sub>1</sub>), 2<sup>nd</sup> week of December (T<sub>2</sub>) and 2<sup>nd</sup> week of January (T<sub>3</sub>) and three levels for severity of pruning *viz.*, heavy pruning at 20 cm above ground level (L<sub>1</sub>), medium pruning at 40 cm above ground level (L<sub>2</sub>) and light pruning at 60 cm above ground level (L<sub>3</sub>) were compared with control (without pruning). The two year old Jasmine plants planted at 1.2 x 1.2 m spacing were pruned according to the scheduled time and levels for severity of pruning *viz.*, 20cm, 40cm, and 60 cm above the ground level. The fertilizers were immediately applied 20 t/ha FYM as basal dose and 75 g nitrogen with 30 g phosphorus per plant in three equal splits at 15, 45 and 90 days interval after pruning. All the cultural operations *viz.*, weeding, irrigation, pest control etc. were carried out. Observations made on the important plant growth parameters *viz.*, plant height (cm), length of secondary shoot (cm), numbers of leaves per secondary shoot, plant spread (N-S) and (E-W) (cm), number of secondary shoot per plant and yield parameters *viz.*, days for flower bud initiation, flowers per plant (g) and estimated flower yield per ha (t) in five randomly selected and tagged plants per replication in each treatment. The statistical analysis was done following the method of Panse and Sukhatme (1978) <sup>[17]</sup>.

### Result

Pruning time and level significantly influence the growth parameters *viz.*, plant height, length of secondary shoot, number of leaves per secondary shoot, plant spread and number of secondary shoot per plant in *Jasminum sambac* var. Local. Pruning in 2<sup>nd</sup> week of December i.e. treatment T<sub>2</sub> recorded significantly higher plant height (77.2 and 100.3 at 90 and 180 days after pruning), length of secondary shoot (32.36 cm), number of leaves per secondary shoot (20.61), plant spread N-S (51.44 cm), plant spread E-W (54.72 cm) and number of secondary shoot per plant (29.32) in *Jasminum sambac* var. Local. While, in case of level of pruning medium pruning i.e., treatment L<sub>2</sub> recorded significantly higher plant height (107.2 cm at 180 days after pruning), length of secondary shoot (34.91 cm), number of leaves per secondary (20.79) shoot and number of secondary shoot per plant (28.58) in *Jasminum sambac* var. Local. Whereas, treatment L<sub>3</sub> recorded significantly higher plant height (82.6 cm) and plant spread N-S (54.82 cm) and plant spread E-W (55.98 cm) which was at par with treatment L<sub>2</sub>. In case of all the parameters *viz.*, plant height, length of secondary shoot, number of leaves per secondary shoot and plant spread, control recorded significantly higher value as compared to all the treatments while number of secondary shoot at 90 DAP recorded significantly higher.

Data presented in Table 2 showed significant influence of level and time of pruning on days to flower bud initiation and yield in *Jasminum sambac* var. Local. Treatment T<sub>3</sub>, recorded significantly lower days for flower bud initiation (43.29 days) while in case of severity of pruning, pruning at 40 cm from ground level treatment L<sub>2</sub>, recorded significantly lower days for flower bud initiation (48.30 days). *Jasminum sambac* var. Local pruned on 2<sup>nd</sup> week of December recorded significantly higher flower per plant (866.42 g) and estimated flower yield (6.02 t/ha) whereas medium pruning at 40 cm from ground level recorded significantly higher flowers per plant (840.06 g) and flower yield (5.83 t/ha). All the treated plants recorded significantly lower days for flower bud initiation and higher yield as compared to control.

### Discussion

Various factors responsible for plant growth and quality of flower in a plant are reliable on climatic conditions, soil and cultural operations and their interactions. Pruning time and pruning level play a vital role in promoting the growth and quality of plant flowers in the jasmine plant. Vegetative growth characteristics were resulted due to an availability of favourable climatic condition for canopy development. Plant spread in N-S and E-W direction was increased due to increase in light intensity as well as aeration, diversion of sap flow towards lateral buds after pruning. The results are also substantiated the findings of Ratikanth (2005) <sup>[12]</sup> in *Jasminum sambac* under Karnataka conditions, lokhande *et al.* (2015) <sup>[8]</sup> and Pawar *et al.*, (2019) <sup>[10]</sup> in Jasmine. Previous studies on time of pruning also suggest that plants pruned in December month contents more total polysaccharide, which resulted high number of leaves in *Jasminum sambac* (Sumangala *et al.*, 2003) <sup>[15]</sup> Pruning in second week of January (T<sub>3</sub>) in *J. sambac* bushes may have triggered early flower bud initiation. It might be due to the juvenile phase in late pruning was less compared to other treatments. Low temperature and shorter sun shine hours during November month might have promoted late flowers in jasmine bushes pruned in November month. Similar trend was also observed by Gowda *et al.* (1986) <sup>[5]</sup> in *Jasminum auriculatum*, Sumangala *et al.* (2003) <sup>[15]</sup>, lokhande *et al.* (2015) <sup>[8]</sup> and Pawar *et al.*, (2019) <sup>[10]</sup> in *J. sambac*. The higher numbers of flower per plant and yield was obtained due to better vegetative growth, favourable climatic condition and production of large quantity of reserve food as compared to November month pruning. The results obtained are in close agreement with the findings of Khattak *et al.* (2011) <sup>[7]</sup> in Rose. Similarly, finding of yield were also agreement of the findings of Sumangala *et al.* (2003) <sup>[15]</sup> Pawar *et al.*, (2019) <sup>[10]</sup> in *Jasminum sambac*.

Higher plant height at 90 DAP and plant spread (N-S) and (E-W) in treatment L<sub>3</sub> might be due to higher initial height and high polysaccharide content in plants. Similar trend was found by Zekavati (2013) <sup>[16]</sup> in rose and Pawar *et al.*, (2019) <sup>[10]</sup> in *Jasminum sambac*. Pruning promotes shoot growth but minimum pruning discourage shoot length (Sharma and Singh, 1991) <sup>[13]</sup>. Pruning depress the apical dominance and promotes lateral growth. Better aeration and light penetration might have helped in growth of new leaves. The results also agreement of findings Zekavati (2013) <sup>[16]</sup> in rose and Chopde *et al.* (2017) <sup>[2]</sup> and Pawar *et al.*, (2019) <sup>[10]</sup>. An adequate pruning might have helped in broaden C/N ratio and stimulating vegetative growth might have helped in early more numbers of secondary shoot and lower days to flower bud initiation which ultimately have produced higher yield in jasmine plants. Similar findings are in line with Ghulam *et al.*, (2004) <sup>[3]</sup> in rose and lokhande *et al.*, (2015) <sup>[8]</sup> and Pawar *et al.*, (2019) <sup>[10]</sup> in jasmine.

**Table 1:** Effect of time and level of pruning on growth parameters of *Jasminum sambac* var. Local

Treatments	Plant height (cm)		Length of secondary shoot at 90 DAP (cm)	Numbers of leaves per secondary shoot at 90 DAP	Plant spread at 90 DAP (cm)		Number of secondary shoot at 90 DAP
	90 DAP	180 DAP			N-S	E-W	
<b>Factor A time of pruning</b>							
T <sub>1</sub>	71.0	95.4	27.63	17.57	47.81	48.49	22.00
T <sub>2</sub>	77.2	100.3	32.36	20.61	51.44	54.72	29.32
T <sub>3</sub>	66.7	93.4	23.95	15.03	45.54	44.90	26.41
SE (m) ±	2.52	1.53	1.32	0.54	0.80	1.56	1.07
CD at 5%	6.03	4.36	2.27	1.53	3.19	2.76	2.26
<b>Factor B Level of pruning</b>							
L <sub>1</sub>	51.9	80.6	27.53	14.36	38.41	38.28	26.69
L <sub>2</sub>	80.3	107.2	34.91	20.79	51.56	53.85	28.58
L <sub>3</sub>	82.6	101.3	21.50	18.07	54.82	55.98	22.46
SE (m) ±	2.52	1.53	0.58	0.54	0.80	1.56	0.58
CD at 5%	6.03	4.36	1.65	1.53	3.19	2.76	1.64
Interaction T x L	NS	NS	NS	NS	NS	NS	NS
<b>Control vs rest</b>							
Treatment	71.61	96.34	27.98	17.74	48.26	49.37	25.91
Control	97.69	104.16	49.64	31.82	63.22	62.16	12.31
SE (m) ±	1.94	2.01	0.76	0.70	1.04	0.95	0.72
CD at 5%	5.50	5.71	2.15	1.98	2.95	2.68	2.04

**Table 2:** Effect of time and level of pruning on flowering parameters of *Jasminum sambac* var. Local

Treatments	Days for flower bud initiation	Flowers per plant (g)	Flower yield (t/ha)
<b>Factor A time of pruning</b>			
T <sub>1</sub>	59.90	643.52	4.47
T <sub>2</sub>	54.09	866.42	6.02
T <sub>3</sub>	43.29	733.95	5.10
SE (m) ±	0.90	10.43	0.07
CD at 5%	2.55	29.70	0.21
<b>Factor B Level of pruning</b>			
L <sub>1</sub>	53.55	777.83	5.40
L <sub>2</sub>	48.30	840.06	5.83
L <sub>3</sub>	55.44	626.00	4.35
SE (m) ±	0.90	10.43	0.07
CD at 5%	2.55	29.70	0.21
Interaction T x L	NS	Sig	Sig
<b>Control vs rest</b>			
Treatment	52.43	747.96	5.19
Control	78.13	430.70	2.99
SE (m) ±	0.76	13.36	0.09
CD at 5%	2.15	37.88	0.26

### Conclusion

It was concluded that the *Jasminum sambac* var. Local pruned at 40 cm height from the ground level during second week of December is beneficial for the growth and flower yield based on the current results from investigation.

### Future scope

Jasmine flowers strongly respond to the time and severity of pruning. It also regulated the off-season flowers and more research can be conducted to evaluate oil content or flower quality aspects that are affected by pruning time and level.

### Author contributions

**R. J. Makwana:** Conceived and designed the analysis; Collected the data; Contributed data or analysis tools; Performed the analysis; Wrote the paper

**V. D. Rathva:** Paper writing and observations

**S. V. Mahida:** Paper writing

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