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Dr. RJ Makwana
Assistant Professor, Sheth D. M. Polytechnic in Horticulture Model Farm, AAU, Vadodara, Gujarat, India

VD Rathva
Assistant professor, Sheth D. M. Polytechnic in Horticulture Model Farm, AAU, Vadodara, Gujarat, India

BH Panchal
Associate Professor, Sheth D. M. Polytechnic in Horticulture Model Farm, AAU, Vadodara, Gujarat, India

Corresponding Author:
Dr. RJ Makwana
Assistant Professor, Sheth D. M. Polytechnic in Horticulture Model Farm, AAU, Vadodara, Gujarat, India

Flowering in Mogra (*Jasminum sambac*) var. local influenced by time and severity of pruning

Dr. RJ Makwana, VD Rathva and BH Panchal

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Abstract
An investing on flowering behaviour of *Jasminum sambac* L var. Local influenced by time and severity of pruning was conducted at Sheth D. M. polytechnic in Horticulture College, Anand Agricultural University, Model farm, Vadodara during 2018-2022. The treatments under study were analysed by randomized block design with factorial concept (FRBD). The treatments included three different pruning time *viz.*, 2nd week of November, 2nd week of December and 2nd week of January and severity of pruning in three levels *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). Two years old plants of *Jasminum sambac* (L) were selected for experiment. The result showed that pruning time and level of pruning significantly influence the flowering parameters in *Jasminum sambac* var. Local. Pruning on 2nd week of December had most promising result for enhancing flowering attributes *viz.*, flower diameter (3.69 cm), weight of 100 flowers (49.23 g), flower per plant (866.42 g) and estimated yield (6.02 t/ha) while significantly lower days to flower bud initiation (43.29 days), days to 50% flowering (54.53 days) and total numbers of flowering days (138.76 days) were found in *Jasminum sambac* var. Local pruned on 2nd week of January. Whereas, in case of severity of pruning, medium pruning (40 cm from the ground level) recorded significantly lower days to flower bud initiation (48.30 days), days to 50% flowering (55.69 days) and total number of flowering days (139.82 days) and significantly higher flower diameter (3.77 cm), flower per plant (840.06 g) and estimated flower 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: *Jasminum sambac*, severity of pruning, flowering parameters

Introduction
Floriculture is a growing market and quality flower production is an important aspect to meet the demand during the pick period. A systematic approach by adopting a modified atmosphere Packaging after harvest can reduce post-harvest loss in cut flowers like rose (Makwana *et al.* 2024) [9] and gerbera (Patel and singh 2009) [11]. In the case of loose flowers, a holistic approach to post-harvest techniques as well as cultural operations is a must to boost production and meet demand of market. A loose flower like Jasmine occupies a prominent place in the Indian commercial flower market not only due to attractiveness but also fragrance. Jasmine name is originally derived from a Arabic word Jessamine (Bailey, 1947) [3] and in Persian language it means fragrance. There are about 40 species of jasmine distributed in West Bengal, Sikkim, and Jaintia hills, tropical North West Himalayas, Assam, Khasia Kashmir, Deccan peninsula, from Travancore to Konkan, Western Ghat, Malabar Coast, Coonor, Niligiris, Palani hills and South Andaman (Bhattacharjee, 1980) [4]. Its always in high demand due to its various adaptive use *viz.*, worshiping gods, beautification, making garlands and hair adornment for women on special occasions, preparation of cosmetic products, perfumes and syrups etc. Several species of jasmine is commercially cultivated on large scale in different states as loose flowers. In Gujarat the crop cultivated area for jasmine had risen up to 949 ha in 2019-20 distributed mainly in the middle and south Gujarat region (Annonym 2020) [2]. *Jasminum sambac* var. Local produces flowers during the months from March up to august.
Cultural operations like punning help improve the aesthetic value of orchards as well as rejuvenate plants. Plant growth in crops like jasmine can be heavily regulated by pruning.

It eradicates the unwanted shoots and diverts that energy towards development of new shoot or flowering in plant. It promotes the emergence and growth of new shoots helps in better ease of intercultural operation and keeping good shape of the plants. Pruning is an important step because it increases the plant growth and its aesthetic value. (Gibson, 1984; Anderson, 1991) [6, 1]. In a study conducted in Madurai district of Tamil Nadu, it was observed that 75.83% farmers cultivating jasmine crops adopted pruning at right season but still remaining farmers did not want to prune in order to get continues harvest from the crop being unaware about the importance of pruning (Rajeshwaran *et al.*, 2022) [13]. Pal and Bose, (1981) [10] found that pruning at 40 cm height in January produced highest yield in *J. sambac* cv. Khoya. On the other hand, pruning at 75 cm height from ground level in mid-December resulted in the highest flower and concrete yield in *Jasminum* species (Singh and Moe, 1980) [15]. Khanchana K. and Jawaharlal M. (2019) [7] stated that pruning at 60 cm height from ground level in the month of august give higher yield. A study in south Gujarat region revealed that pruning at 50 cm height from ground level in December month increase the yield in *Jasminum sambac* var Barmasi (Pawar *et al.*, 2019) [12]. 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. Keeping this view, the present experiment was carried out to examine the effect of time and severity of pruning on flowering attributes in *Jasmine sambac* var, Local.

Materials and Methods

The experiment was conducted at Sheth D. M. Polytechnic in Horticulture College Research Farm, Anand Agricultural University, Model farm, Vadodara to study the effect of pruning time and intensity in *Jasminum sambac* var Local with ten treatment combination in randomized block design with factorial concept and three replications. The treatments comprised of three levels for severity of pruning *viz.*, heavy pruning (L_1), medium pruning (L_2) and light pruning (L_3) (20 cm, 40cm and 60 cm from ground level respectively and three different time of pruning *viz*., 2nd week of November (T_1), 2nd week of December (T_2) and 2nd week of January (T_3). 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*., 20 cm, 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 and flowering parameters *viz.*, numbers of secondary shoot at 90 days after pruning (cm), days for flower bud initiation, days to 50% flowering, total numbers of flowering days, flower diameter (cm), weight of 100 flowers (g), flowers per plant (g) and estimated flower yield per ha (t) in five randomly selected and tagged plants per replication in each treatment. Three year data were collected and statistical analysis was done following the method of Panse and Sukhatme (1978).

Result and Discussion

Time of pruning: Result from the Table 1 clearly showed significant influence of time and severity of pruning on various parameters *viz.*, numbers of secondary shoot per plant at 90 days after pruning, days to flower bud initiation, days to 50% flowering, total numbers of flowering days, flower diameter, weight of 100 flowers, flower per plant and yield in *Jasminum sambac* var. Local. Pruning in 2nd week of January, recorded significantly lower days to flower bud initiation (43.29 days), days to 50% flowering (54.53 days), total numbers of flowering days (138.76 days) in *Jasminum sambac* var. Local. This might be due to treatment effect. The juvenile phase in the late pruning was less as compared with early pruning. The results are close conformity with the findings of Lokhande *et al.* (2015) [8] and Pawar *et al.*, (2019) [12] in Jasmine. While, 2nd week of December pruned plant recorded significantly higher numbers of secondary shoot per plant at 90 days after pruning (29.32), flower diameter (3.69 cm), weight of 100 flowers (49.23 g), flower per plant (866.42) and yield (6.02 t/ha). Increase in the numbers of secondary shot per plant may be due to increased light intensity and aeration, diversion of sap flow towards lateral buds caused by pruning and availability of favourable climate for vegetative growth of plant after pruning. Increase in flowering parameters might be due to favourable climate conditions and increase in the numbers of secondary shoot that leads to more numbers of flowering branches ultimately increase the flower production in flowers pruned on 2nd week of December. The results confirms the finding of Lokhande *et al.* (2015) [8], Pawar *et al*., (2019) [12] and Khanchana K. and Jawaharlal M. (2019) [7] in Jasmine.

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

Treatments	Numbers of secondary shoot	Days for flower bud initiation	Days require for 50% flowering	Total numbers of flowering days	Flower diameter	Weight of 100 flowers	Flowers per plant (g)	Flower yield (t/ha)
Factor A time of pruning								
T_1	22.00	59.90	68.18	156.19	3.32	43.55	643.52	4.47
T_2	29.32	54.09	61.13	145.13	3.69	49.23	866.42	6.02
T_3	26.41	43.29	54.53	138.76	3.57	45.92	733.95	5.10
SE (m) ±	0.58	0.90	1.10	2.03	0.06	0.677	10.43	0.07
CD at 5%	1.64	2.55	3.13	5.77	0.16	1.93	29.70	0.21
Factor B Level of pruning								
L_1	26.69	53.55	63.31	145.86	3.29	47.61	777.83	5.40
L_2	28.58	48.30	55.69	139.82	3.77	47.54	840.06	5.83
L_3	22.46	55.44	64.84	154.39	3.52	43.55	626.00	4.35
SE (m) ±	0.58	0.90	1.10	2.03	0.06	0.677	10.43	0.07
CD at 5%	1.64	2.55	3.13	5.77	0.16	1.93	29.70	0.21
Interaction T x L	Sig	NS	NS	NS	NS	NS	Sig	Sig

Severity of pruning: Pruning at medium height, *i.e.*, treatment L_2 (40 cm above ground level) recorded significantly higher numbers of secondary shoot at 90 days after pruning (28.58), flower diameter (3.77 cm), flowers per plant (840.06 g), and significantly lower days for flower bud initiation (48.30 days), days required for 50% flowering (55.69 days) and total numbers of flowering days (138.82 days) in *Jasminum sambac* var. Local. Weight of 100 flower war recorded significantly higher in plants pruned at 20 cm height above ground level which was at par with treatment L_2 (pruning at 40 cm above ground). This might be due to acceleration in mobility of photosynthesis from the source to the sink as influenced by growth hormone released or synthesized due to higher plant growth, diverting its energy for production of new shoots and due to increase in nodes resulted from cell elongation and cell division. Earliness in emergence of flowering could be due to fact that pruning helps to broaden C/N ratio, thus stimulating flowering and increase in plant vigor at adequate level. The results are in close agreement with findings of Zekavati (2013) [16] in rose, Ratikanth (2005) [14], Lokhande *et al.* (2015) [8], Pawar *et al.*, (2019) [12], Chopde *et al.* (2017) [5] in Jasmine.

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 in increasing flower quality and yield based on the current findings from experiment.

Future scope

Jasmine flowers strongly response to the time and severity of pruning. It also regulated the offseason flowers and more research can be conducted to evaluate oil content or flower quality aspect 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.

B. H. Panchal: Paper writing.

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