



RESPONSE OF *JASMINUM SAMBAC* (L.) TO TIME AND SEVERITY OF PRUNING

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Abstract

An experiment entitled “Response of *Jasminum sambac* (L.) to time and severity of pruning” was carried out at Satpuda Botanic Garden, College of Agriculture, Nagpur from December, 2013 to August, 2014 with sixteen treatment combinations in Factorial Randomised Block Design. The treatments comprised of four different time of pruning viz., 2nd week of December, 4th week of December, 2nd week of January and 4th week of January and four levels of severity of pruning viz., light pruning (45 cm above ground level), medium pruning (30 cm above ground level), heavy pruning (15 cm above ground level) and no pruning (control). The treatments were imposed on two year old plants of *Jasminum sambac* (L.). The results revealed that significantly maximum length of primary shoot, leaf area, flower buds plant⁻¹ and flower yield ha⁻¹ were recorded when the jasmine plants pruned during 4th week of December, whereas, minimum days for sprouting and maximum secondary laterals primary shoot⁻¹ were found when the plants pruned during 2th week of January. Significantly minimum days for emergence of first flower were required due to pruning at 4th week of January. Whereas, longevity of intact flower, diameter of flower bud, flower bud index and shelf life of flower were non-significantly influenced by time of pruning. In respect of severity of pruning, length of primary shoot, secondary laterals primary shoot⁻¹, leaf area, longevity of intact flower, flower buds plant⁻¹, flower yield ha⁻¹, diameter of flower bud and shelf life of flower were found significantly maximum, whereas, days for sprouting, days for emergence of first flower and flower bud index were found significantly minimum when the plants pruned at 30 cm above ground level. Interaction effect of time and severity of pruning on all the characters of jasmine under study was found non-significant.

Key words : Jasmine, time, severity, flower yield, flower quality.

Introduction

Jasmine (*Jasminum sambac* L.) is a very important group of plants, which is cultivated extensively in tropical and sub-tropical areas of southeast Asia and other parts of world for garden decoration and commercial purposes. It is the national flower of Philippines, which was adopted in 1937. It is offered to the God and used for worshipping and hence, these plants are preferably planted in Hindu temple gardens and Mughal gardens. Several species and varieties of jasmine are grown on a large scale in different states for loose flower production. The genus *Jasminum* belongs to family oleaceae and comprises of about 200 species which are mainly shrubs and climbers. *Jasminum sambac* find a very important place in the perfume industry. The concrete of *Jasminum grandiflorum* has worldwide acceptance and there is an increasing demand in the international market for essential oil extracted from *Jasminum auriculatum* and *Jasminum sambac*. Jasmine oils are used extensively in the manufacture of cosmetics,

soaps, confectionary perfumes, perfumed tobacco, syrups, aerated water, ointments, disinfectants and detergents. Flowers are used for making garlands, hair adornment of women and various religious and social functions.

Pruning greatly helps in rejuvenation of old plants. Growth habit of a plant can be manipulated by careful pruning. It helps in utilization of energy by elimination of unwanted shoots. For the maximization of yield and quality of any flower crop, selection of suitable variety, cultural and management practices like optimum dose of manures and fertilizers, spacing, irrigation, staking, pruning, plant protection etc. are required to be properly followed. The flower production in jasmine can be increased by adopting special horticultural practice like pruning. Pruning encourages growth of new healthy shoots which bear more flowers than an old branch. It keeps the plants in shape and form. In order to meet the ever increasing demand for fresh flowers, efforts are being made to increase the area under jasmine, to develop high yielding

varieties and improved agro-techniques and to standardise cultivation aspects such as pruning, nutrients management and plant density. Practices have been standardized under south Indian conditions, but no such work has been undertaken for environmental conditions of Vidarbha (M.S., India) even though the area under this crop is increasing day by day in this region. Hence, the present investigation was undertaken to study the effect of time and severity of pruning on jasmine.

Materials and Methods

The present investigation was carried out at Satpuda Botanic Garden, College of Agriculture, Nagpur from December, 2013 to August, 2014 to study the effect of time and severity of pruning on growth, flower yield and quality of *Jasminum sambac* L. with sixteen treatment combinations in Factorial Randomised Block Design with three replications. The treatments comprised of four different time of pruning *viz.*, 2nd week of December, 4th week of December, 2nd week of January and 4th week of January and four levels of severity of pruning *viz.*, light pruning (45 cm above ground level), medium pruning (30 cm above ground level), heavy pruning (15 cm above ground level) and no pruning (control).

The two years old bushes of local variety of jasmine were pruned according to the treatment schedule to a level of 15 cm, 30 cm and 45 cm above ground level and no pruning. Immediately after pruning, the FYM and chemical fertilizers were applied 15 cm deep in rings and 20 cm away from the main stem. The urea, single super phosphate and muriate of potash were used as the sources of nutrient elements. All the cultural operations *viz.*, weeding, irrigation, pest control etc. were carried out as and when required. Observations on various vegetative characters *viz.*, days for sprouting, length of primary shoot, secondary laterals primary shoot⁻¹ and leaf area, flowering characters *viz.*, days for emergence of first flower after pruning and longevity of intact flower, yield parameters like flower buds plant⁻¹ and flower yield ha⁻¹ and quality parameters *viz.*, diameter of flower bud, flower bud index and shelf life of flower were recorded and the data were analysed statistically as per the method suggested by Panse and Sukhatme (1967).

Results and Discussion

The data presented in table 1 revealed that different treatments of time of pruning in jasmine had significant effect on all growth, flowering, yield and quality parameters except longevity of intact flower, diameter of flower bud, flower bud index and shelf life of flower. However, the pruning intensities had significant effect

on all the parameters under study.

Growth

Significantly earliest sprouting (10.29 days) and maximum secondary laterals primary shoot⁻¹ (8.49) were noted, when the jasmine plants pruned during second week of January, whereas, pruning at second week of December exhibited late sprouting (12.94 days) and produced significantly minimum secondary laterals primary shoot⁻¹ (7.99). However, pruning at 4th week of December recorded significantly maximum length of primary shoot (60.76 cm) and leaf area (25.86 cm²), which were statistically at par with the pruning at second week of January and second week of December in respect of length of primary shoot (60.10 and 57.06 cm, respectively) and second week of December in respect of leaf area (24.03 cm²). This increase in vegetative growth due to pruning at 4th week of December and second week of January might 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. However, Ratikanth (2005) reported that among the different dates of pruning, pruning on early mid December encountered better vegetative growth in respect of secondary laterals primary shoot⁻¹, length of primary shoot, days for sprouting and leaf area than the other dates of pruning in *Jasminum sambac* (L.) under Karnataka conditions.

Significantly the earliest sprouting (10.07 days) and maximum length of primary shoot (60.93 cm), secondary laterals primary shoot⁻¹ (8.30) and leaf area (25.95 cm²) were noted with the plants pruned at 30 cm above ground level, whereas, the treatment of no pruning recorded significantly late (14.99 days) sprouting and minimum length of primary shoot (56.36 cm), secondary laterals primary shoot⁻¹ (8.30) and leaf area (25.95 cm²). Due to availability of sufficient light intensity to the plant as a result of adequate level of pruning might have caused synthesis of more food. Also, pruning reduces apical dominance and enhances lateral growth of plant. This might have been the reason for increasing length of primary shoot, leaf area and number of secondary laterals primary shoot⁻¹ in jasmine. Similar results were obtained by Santhoshini (2014) in rose under Nagpur (M.S.) conditions.

Flowering

Significantly minimum number of days for emergence of first flower was recorded with the pruning during 4th week of January (56.67 days), whereas, pruning at 2nd week of December recorded significantly late emergence of first flower (92.00 days). This might be the treatment

Table 1 : Effect of time and severity of pruning on growth, flowering, yield and quality of jasmine.

Treatments	Days for sprouting (days)	Length of primary shoot (cm)	Secondary laterals primary shoot ⁻¹	Leaf area (cm ²)	Days for emergence of first flower (days)	Longevity of intact flower (days)	Flower buds plant ⁻¹	Flower yield ha ⁻¹ (q)	Diameter of flower bud (mm)	Flower bud index	Shelf life of flower (days)
Factor A- Time of pruning											
T ₁ - 2 nd week of Dec.	12.94	57.06	7.99	24.03	92.00	1.67	475.48	13.65	9.03	1.00	1.58
T ₂ - 4 th week of Dec.	11.77	60.76	8.24	25.86	75.75	1.62	573.52	16.26	9.40	0.96	1.74
T ₃ - 2 nd week of Jan.	10.29	60.10	8.49	22.83	64.30	1.69	515.70	15.32	9.33	0.97	1.77
T ₄ - 4 th week of Jan.	11.88	56.12	8.13	21.35	56.67	1.61	465.61	13.63	9.87	0.93	1.86
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	N.S.	Sig.	Sig.	N.S.	N.S.	N.S.
SE(m)±	0.36	1.31	0.11	0.85	1.52	0.04	15.36	0.51	0.25	0.02	0.06
CD at 5%	1.05	3.79	0.34	2.47	4.39	-	44.31	1.47	-	-	-
Factor B-Severity of pruning											
S ₁ - 15 cm above G.L.	10.48	56.76	8.25	23.84	69.00	1.78	532.09	14.95	9.37	0.97	1.66
S ₂ - 30 cm above G.L.	10.07	60.93	8.30	25.95	64.00	1.80	593.30	17.34	10.25	0.87	1.91
S ₃ - 45 cm above G.L.	11.15	59.96	8.20	22.42	69.66	1.70	492.98	13.74	9.20	0.98	1.75
S ₄ - No pruning	14.99	56.36	7.09	21.85	86.00	1.30	411.91	12.78	8.80	1.03	1.61
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	0.36	1.31	0.11	0.85	1.52	0.04	15.36	0.51	0.25	0.02	0.06
CD at 5%	1.05	3.79	0.33	2.47	4.39	0.12	44.31	1.47	0.74	0.07	0.19
Interaction effect (TXS)											
'F' test	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
SE(m)±	0.72	2.62	0.23	1.71	3.05	0.08	30.72	1.02	0.51	0.05	0.13
CD at 5%	-	-	-	-	-	-	-	-	-	-	-

*DAP- Days After Pruning, *G.L. – Ground Level, N.S. – Non-significant.

effect. The juvenile phase in the late pruning was less as compared to other treatments. The results are in close conformity with the findings of Gowda *et al.* (1986) in *Jasminum auriculatum* under Bangalore (Karnataka) conditions.

In respect of severity of pruning, medium pruning (30 cm above ground level) took significantly minimum days (64.00 days) for emergence of first flower and recorded maximum longevity of intact flower (1.80 days) and it was found statistically at par with light (45 cm above ground level) and heavy (15 cm above ground level) pruning (1.78 and 1.70 days, respectively), whereas, significantly late emergence of first flower (86.00 days) and minimum longevity of intact flower (1.30 days) were noted with no pruning treatment. It could be due to the fact that, pruning helps to broaden the C/N ratio, thus stimulating flowering and increasing vigour of plant as a result of adequate level of pruning. These results are in line with the findings of Jadhav *et al.* (2003) and Ghulam *et al.* (2004) in rose.

Yield

Jasmine plants pruned at 4th week of December and pruning at 30 cm above ground level recorded significantly maximum flower buds plant⁻¹ (573.52 and 593.30, respectively) and flower yield ha⁻¹ (16.26 and 17.34 g, respectively), whereas, significantly minimum number of flower buds plant⁻¹ (465.61 and 411.91, respectively) and flower yield ha⁻¹ (13.63 and 12.78 g, respectively) were noted with the treatment of 4th week of January and no pruning. An increase in flower yield due to pruning of jasmine bushes at 30 cm above ground level during 4th week of December might be due to more vigorous growth of plant and maximum number of productive shoots plant⁻¹ due to the production and accumulation of more photosynthates which would have diverted to the sink resulting into more flower yield ha⁻¹ in jasmine. The results confirm the findings of Porwal *et al.* (2002) in 8 year-old-damask rose (*Rosa damascena*) and Adnan *et al.* (2013) in *Rosa centifolia*.

Quality

The data from table 1 revealed that the quality parameters *viz.*, diameter of flower bud, flower bud index and shelf life of flower were influenced non-significantly due to time of pruning in jasmine. However, in respect of

severity of pruning, significantly maximum diameter of flower bud and shelf life of flower and minimum flower bud index were noted with medium pruning treatment (30 cm above ground level), whereas, maximum flower bud index and minimum diameter of flower bud and shelf life of flower were recorded with the treatment of no pruning. This might be due to increased availability of photosynthates due to enhanced vegetative growth of plant which might have been utilised for the production of better quality flowers of jasmine. The results obtained are in close agreement with the findings of Ghulam *et al.* (2004) in rose.

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