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EFFECT OF TIME OF PRUNING ON GROWTH AND FLOWERING PRAMETERS OF SCENTED ROSE VARIETIES

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ABSTRACT

A field trial was conducted at the Horticulture Section, College of Agriculture, Nagpur during October, 2015 to March, 2016 to examine the effect of time of pruning on growth and flowering parameters of scented rose varieties. The experiment was laid out in a three replicated Factorial randomized block design consisting of seven scented rose varieties i.e. (V_1) Birendranath, (V_2) Bonnie Nuit, (V_3) Sugandha, (V_4) Chardony, (V_5) Tajmahal, (V_6) Dr. M. S. Randhawa and (V_7) Kumkum and three times of pruning i.e. (P_1) first week of October, (P_2) third week of October and (P_3) first week of November with twenty one treatment combinations. The results revealed that significantly maximum plant height was recorded with the variety Chardony (V_4) and maximum branches plant^{-1}, shoot length, and earliest sprouting was recorded with the variety Sugandha (V_3). Maximum leaves flowering^{-1} shoot in rose were counted with the variety Bonnie Nuit (V_2) and sprouts plant^{-1} were recorded maximum with the variety Kumkum (V_7). Amongst the different treatments of time of pruning, all characters of growth were found significant with pruning done at first week of November (P_3).

In respect to flowering parameters, earliest flower bud emergence, harvesting of flower from bud emergence, 50 per cent flowering and maximum flowering span in scented rose were noticed with the variety Sugandha (V_3). However, in regards to time of pruning all characters of flowering found superior when the plants were pruned at first week of November (P_3). Interaction effect of scented rose varieties and time of pruning on growth and flowering parameters found non-significant except days for sprouting, leaves flowering^{-1} shoot, shoot length and 50 per cent flowering.

(Key words: Pruning times, rose varieties, growth and flowering)

INTRODUCTION

Rose (*Rosa hybrida* L.) belongs to the family Rosaceae, it remains a major ornamental plant for cut and loose flower trade all over the world. It is considered to be an ancient flower and scientists assumed that, the evolution of rose started 60 million years ago and originated in Asia. In both Greek and Roman mythology the rose is usually associated with beauty and love. There is a tremendous diversity of growth habit, flower form and colour among roses. Rose is the most popular of all the flowers because of its beauty and fragrance and is called the "Queen of Flower. Roses are immensely important for landscaping and no garden is considered complete without roses (Gibson, 1984).

The flower production in rose can be increased by adopting special horticultural practice like pruning. Pruning in broad sense refers to scientifically removal of plant parts with an object to get higher yield and quality produce. Pruning is defined as the art of removing scientifically certain parts of plant with a view to divert the sap flow towards flowering area of the plant to bear more quality produce. Pruning encourages growth of new healthy shoots which bear more flowers than an old branch. It keeps the plants in shape and form. 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.The time of pruning has considerable effect on the yield and quality rose flower. Hence, it is necessary to identify the suitable pruning time for commercial cultivation of rose also time of pruning have big role to produce flowers according to market demand. The research work on this particular aspect in rose under Vidarbha condition is lacking. Hence, it is felt necessary to conduct experiment entitled "Effect of time of pruning on growth and flowering parameters of scented rose varieties" which was undertaken at Horticulture section, College of Agriculture, Nagpur.

MATERIALS AND METHODS

The experiment was conducted under open field condition at Horticulture Section, College of Agriculture, Nagpur to study the effect of time of pruning on growth and flowering parameters during the year 2015-2016. The experiment was laid out in a three replicated Factorial Randomized Block Design comparing two factors with

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twenty one treatment combinations. Factor A consist of scented rose varieties i.e. (V_1) Birendranath, (V_2) Bonnie Nuit, (V_3) Sugandha, (V_4) Chardony, (V_5) Tajmahal, (V_6) Dr. M. S. Randhawa and (V_7) Kumkum. Factor B consist of three times of pruning i.e. (P_1) first week of October, (P_2) third week of October and (P_3) first week of November. The rose varieties use for the experiment is of one year old already planted at Horticulture Section, Nagpur. Individual plot size was 1.20 m x 3 m size. Light digging operation was carried out prior to pruning so as to loosen the soil for better aeration.

At the same time well decomposed farm yard manure at the rate of 10 kg (mixed with 100 g of Lindane powder) plot^{-1} was applied and mixed uniformly in the soil. Recommended dose of nutrients @ 200 kg N, 200 kg P_2O_5 and 100 kg K_2O hectare^{-1} was applied throughout the experimental period in the form of Urea, Single super phosphate and Muriate of potash. (MOP), respectively through splits doses. All inter cultural operations like weeding, watering, loosening of soil and plant protection measures were carried out as an when required. Pruning was done at 60 cm height in respect to all treatments of pruning time. A short slanting cut was given on the shoot with the help of secateurs, half centimetre above the bud facing outside. Leaves on the shoot were completely removed. To prevent fungal infection cut ends of the shoots were smeared with copper-oxy-chloride. Dead, small interlaced, diseased and insect damaged shoots were also pruned completely.

Observations on plant height and branches plant^{-1} were recorded at 90 days of plant growth. Days required for sprouting, sprouts plant^{-1}, leaves flowering^{-1} shoot, shoot length, days required for first flower bud emergence, 50 per cent flowering, harvesting of flower from bud emergence and flowering span were also recorded. The data was statistically analyzed as per method suggested by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

There were significant differences recorded amongst the different scented rose varieties and different treatments of pruning time. Data regarding plant height, days for sprouting, sprouts plant^{-1}, branches plant^{-1}, leaves flowering^{-1} shoot, shoot length, days for first flower bud emergence, 50 per cent flowering, harvesting of flower from bud emergence and flowering span are presented in table1.

Growth

Significantly maximum plant height at 90 days after pruning recorded with variety Chardony (117.72 cm) which was found statistically at par with the variety Bonnie Nuit (113.62 cm). However, significantly minimum plant height was recorded in the variety (V_7) Kumkum (95.39 cm). Significantly minimum number of days for sprouting was registered in the variety (V_3) Sugandha (5.30 days). However, significantly maximum number of days for sprouting was recorded in the variety (V_4) Chardony (9.46 days). Significantly maximum number of sprouts plant^{-1} was recorded in Kumkum (V_7) variety (39.13) and it was found to be at par with varieties (V_3) Sugandha (38.32) and (V_1) Birendranath (37.19). Whereas, minimum was found in variety (V_2) Bonnie Nuit (19.20). Branches plant^{-1} were recorded significantly maximum in (V_3) Sugandha variety (16.68). However, minimum number of branches plant^{-1} was counted in the variety (V_4) Chardony (11.38) at the stage of 90 days after pruning. Significantly maximum number of leaves flowering^{-1} shoot was recorded in the variety (V_2) Bonnie Nuit (34.47) and minimum with (V_6) Dr. M. S. Randhawa (21.75). Sugandha (V_3) variety recorded significantly maximum shoot length (78.04 cm) and minimum shoot length of plant was recorded with the variety (V_6) Dr. M. S. Randhawa (56.71 cm). This variation in growth characters of varieties due to differential genetic make up and varied growth rate amongst the scented rose varieties under study. These results are in close conformity with the findings of Wasnik (2015), who evaluated different scented rose varieties and noted maximum branches plant^{-1} and leaves plant^{-1} by variety Sugandha. Kulkarni and Reddy (2006) observed the differences in plant height and number of primary branches amongst the different China aster cultivars under north Karnataka conditions and noted the highest plant height with the cultivar Phule Ganesh White and primary branches with cultivar Phule Ganesh Violet. Atram *et al.* (2015) reported that, variety Chardony recorded maximum plant height at 90 days after pruning. Santoshini (2014) reported that, variety Gladiator recorded earliest sprouting, maximum sprouts shoot^{-1}, leaves flowering^{-1} shoot and shoot length amongst the three varieties under study.

In respect to different treatments of pruning time pruning at first week of November ranked first and gave significantly maximum plant height (107.95 cm), sprouts plant^{-1} (34.63), branches plant^{-1}(13.88), leaves flowering^{-1} shoot (29.13) and shoot length (71.75 cm) and significantly minimum days for sprouting (6.84 days). Whereas, pruning at third week of October ranked second in respect to plant height (105.63 cm), days for sprouting (7.32 days), sprouts plant^{-1}(32.32), branches plant^{-1}(13.17), leaves flowering^{-1} shoot (27.78) and shoot length (70.01 cm). However, pruning at first week of October showed minimum plant height (103.74 cm), days for sprouting (7.81 days), sprouts plant^{-1} (29.87), branches plant^{-1} (12.69), leaves flowering^{-1} shoot (24.76) and shoot length (67.81cm). Notani *et al.* (2014) studied on rose and recorded maximum plant height and number of branches plant^{-1} on 15th November pruning and 1st November pruning ranked second. Lokhande *et al.* (2015) recorded earliest sprouting due to pruning on 2nd week of January and 4th week of December and recorded maximum sprouts plant^{-1} and leaves primary^{-1} shoot in *Jasminum sambac* (L.)

Flowering

The data presented in table 1 in respect of days for first flower bud emergence in different scented rose varieties revealed that, significantly earliest flower bud emergence ,

Table 1. Effect of time of pruning on growth and flowering parameters of scented rose varieties

Treatments	Plant height (cm)	Days for sprouting (days)	Sprouts plant^{-1}	Branches plant^{-1}	Leaves flowering^{-1} shoot	Shoot length (cm)	Days for first flower bud emergence (days)	Days for 50 % flowering (days)	Days for harvesting of flower from bud emergence (days)	Flowering span (days)
Factor A. Varieties (V)										
V_1- Birendranath	102.21	6.03	37.19	13.60	26.20	66.57	13.62	38.17	25.63	142.62
V_2 - Bonnie Nuit	113.62	6.94	19.20	11.96	34.47	74.20	14.67	43.85	26.05	135.39
V_3 – Sugandha	100.20	5.30	38.32	16.68	31.90	78.04	12.35	33.90	23.87	170.98
V_4 – Chardony	117.72	9.46	36.59	11.38	23.35	74.09	20.25	49.65	32.92	123.53
V_5 – Tajmahal	103.00	8.33	34.04	14.00	26.28	64.70	17.43	38.08	28.64	162.61
V_6 - Dr. M. S. Randhawa	108.26	8.81	21.45	12.26	21.75	56.71	20.37	43.78	31.29	135.80
V_7 – Kumkum	95.39	6.39	39.13	12.84	26.65	74.68	14.36	36.24	24.05	160.86
SE(m) ±	1.50	0.13	0.85	0.21	0.28	0.28	0.16	0.31	0.20	1.27
CD at 5%	4.20	0.37	2.44	0.62	0.82	0.82	0.46	0.90	0.58	3.65
Factor B. Time of pruning (P)										
P_1 – IST week of October	103.74	7.81	29.87	12.69	24.76	67.81	17.26	42.43	29.59	144.71
P_2 – IIIrd week of October	105.63	7.32	32.32	13.17	27.78	70.01	15.89	40.07	27.33	147.52
P_3 – IST week of November	107.95	6.84	34.63	13.88	29.13	71.75	15.30	39.07	25.55	149.96
SE(m) ±	0.98	0.08	0.55	0.14	0.18	0.18	0.10	0.20	0.13	0.83
CD at 5%	2.80	0.24	1.59	0.41	0.54	0.53	0.30	0.60	0.38	2.39
Interaction (V X P)										
SE(m) ±	3.18	0.27	1.81	0.46	0.61	0.60	0.34	0.66	0.43	2.71
CD at 5%	-	0.78	-	-	1.75	1.73	-	1.91	-	-

was recorded in the variety (V_3) Sugandha (12.35 days) and significantly maximum days for flower bud emergence with variety (V_6) Dr. M. S. Randhawa (20.37 days).Variety (V_3) Sugandha recorded minimum days for 50 per cent flowering (33.90 days).However the variety (V_4) Chardony reported maximum days for 50 per cent flowering (49.65 days). Significantly minimum days were required for harvesting from flower bud emergence in the variety (V_3) Sugandha (23.87days) which was statistically at par with variety (V_7) Kumkum (24.05) and significantly maximum days was required for harvesting of flower from bud emergence in the variety (V_4) Chardony (32.92 days). Variety (V_3) Sugandha had recorded maximum duration of flowering (170.98 days) and the variety (V_4) Chardony recorded minimum duration of flowering (123.53 days). The variation in flowering character in varieties might be due to the inherent genetic factor and production of plant growth hormones like auxins, cytokinins, gibberllins and ethylene which helps for early bud emergence, ultimately minimum days were required for 50% flowering and days for harvesting. The above results are similar with the investigation of Santoshini (2014), who reported variety Gladiator took minimum time for bud appearance, harvesting of flower from bud emergence and maximum flowering span.

In respect to different treatments of pruning time significantly minimum days for first flower bud emergence (15.30 days), 50 per cent flowering (39.07 days) and days for harvesting of flower from bud emergence (25.55 days) recorded with (P_3) pruning at first week of November. Next to this treatment, treatment (P_2) i.e. pruning at third week of October required 15.89 days for first flower bud emergence, 40.07 days for 50 per cent flowering and 27.33 days for harvesting of flower from bud emergence. Whereas, maximum days for first flower bud emergence (17.26 days), 50 per cent flowering (42.43 days) and harvesting of flower from bud emergence (29.59 days) was recorded in (P_1) pruning at first week of October. Maximum flowering span recorded in (P_3) pruning at first week of November (149.96 days) and it was at par with (P_2) pruning carried out at third week of October (147.52 days). However, minimum flowering span was recorded in (P_1) pruning conducted at first week of October (144.71 days). Rose plants pruned at first week of November ranked first in respect to flowering characters. These findings could also be correlated with Younis *et al.* (2013) in *Rosa centifolia*, who reported that rose plants pruned at the end of December took minimum days for first flower bud emergence. Lokhande *et al.* (2015) noted that, jasmine bushes pruned during 4th week of January took minimum days for emergence of first flower and 50 per cent flowering. Saffari *et al.*(2004) in *Rosa damascene* Mill noted, longest flowering period associated with pruning time.

The interaction effect due to scented rose varieties and time of pruning found to be non-significant in respect to all growth and flowering parameters except days for sprouting, number of leaves flowering^{-1} shoot, shoot length and 50 per cent flowering.

The interaction effect due to the scented rose varieties and time of pruning on days for sprouting, number of leaves flowering^{-1} shoot, shoot length and 50 per cent flowering was found to be significant. Significantly the earliest sprouting was noticed with the treatment combination of V_3P_3 i.e. Sugandha variety pruned during first week of November (4.79 days). The maximum number of leaves flowering^{-1} shoot was observed in treatment combination of V_2P_3 i.e. Bonnie Nuit variety pruned at first week of November (36.07). The shoot length was found to be significantly highest with the treatment combination of V_3P_3 i.e. variety Sugandha pruned at first week of November (80.78 cm). Significantly minimum days to 50 per cent flowering was observed in treatment combination V_3P_3 i.e. variety Sugandha pruned during first week of November (31.11 days).

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