Original Research Article

EFFECT OF TIME AND NUMBER OF PRUNING ON GROWTH, FLOWERING AND FRUITNG BEHAVIOUR OF PHALSA (*Grewia asiatica* L.) cv. LOCAL

ABSTRACT

Phalsa fruit (*Grewia asiatica* L.) berries are one of the most effective source of bioactive food ingredients with multiple health benefits when consumed regularly. Phalsa fruit, seed and pulp contain numerous functional phytochemicals that can be used to treat various diseases, and have be found to be highly effective in improving respiratory and cardiac functioning. Pruning is essential for fruit bearing. Plants pruned in different months in a year for two times stimulate growth, flowering and fruiting. A field experiment carried out in the year 2019 and was laid out in Completely Randomized Design (Factorial) with 10 treatment combinations with 4 replications. Treatment P_1N_2 found significant with the length of shoot (125.12 cm), days taken to flowering (38.25), days taken to fruit set (67.87) and days taken to first picking (98.25). Treatment P_2N_1 (pruning in September i.e. 1st pruning) recorded higher shoot length i.e. 116.00 cm, while, P_3N_1 (pruning in October i.e. 1st pruning) and P_3N_2 (pruning in March after the completion of October crop i.e. 2nd pruning) found superior with number of picking during both the pruning i.e. 5.00 and 5.25 respectively. Treatment P_4N_1 (pruning in November i.e. 1st pruning) had higher number of sprouted shoot per cane i.e. 9.37. however, treatment P_5N_1 (pruning in December i.e. 1st pruning) was significant in days taken to flowering (44.25), days taken to fruit set (73.25) and days taken to first picking (102.12), while, P_5N_2 (pruning in May after the completion of December crop i.e. 2nd pruning) had more number of sprouted shoot per cane i.e. 10.18.

KEYWORDS: Phalsa, pruning, pruning numbers, quality.

INTRODUCTION

Phalsa (*Grewia asiatica* L.) is a minor under-exploited fruit crop with, an ability to grow fast and withstand drought. Once established, it requires only few supplementary irrigations for fruit production. Pruning is an essential cultural operation since flowers are borne as axillary cyme on new growth, which is induced by pruning. The presence of mature leaves inhibit axillary bud sprouting in unpruned shoots. The flowering and fruiting is confined to 15-20 nodes from the base depending on vigor. In general under north Indian condition, it is pruned when it sheds off leaves during middle of winter (Singh, 1979). Hayes (1957) suggested late December or early January as the best time of phalsa pruning. Nowadays, phalsa cultivation is gaining popularity in arid regions due to high returns, on the other side the exact time and intensity of pruning has not been well standardized. Therefore studies were carried out to see the effect of time and intensity of pruning on vegetative' growth, fruit yield and quality of phalsa.

When unripe, it has been reported to alleviate inflammation and was administered in respiratory, cardiac and blood disorders, as well as in fever. Root and bark has been prescribed for rheumatism and its infusion used as a demulcent. The leaves were applied on skin eruptions. (Jyoti Sinha e*t.al*, 2015) and phalsa has the nutritional value like, Protein (g) 1.57, Fibre (g) 5.53, Vitamin C (mg) 4.385, Vitamin A (g) 16.11 (Values/100 g g) (Muhammad Zia-Ul-Haq *et.al*, 2013).

Two crops in year from one plant is possible and need to take research with different months combination for identify suitable period and time for double crops with their effect on growth, flowering and fruiting parameters of phalsa crops.

MATERIALS AND METHODS:

The experiment was carried out on seven years old phalsa plants of variety ‘Local’ (locally planted material) planted at Horticultural Research Farm, Anand Agricultural University, Anand. All the plants selected were uniform in growth and planted at the distance of 3 ×3 meters. The climate of Anand region is semi-arid and sub-tropical type. Winter is mild cool and dry, while summer is hot and dry. Number of tree per treatment is one and number of repetition is four.

The experiment was laid out in a Completely Randomized Design (Factorial) with 10 treatment combinations of two factor. 1) Pruning time (Aug & Jan, Sept & Feb, Oct. & March, Nov. & April, Dec & May) 2) No. of pruning (N_1= 1st pruning in Aug, Sept, Oct, Nov, and Dec and N_2= 2nd pruning on the same plant in Jan, Feb, March, April, May after completion of 1st crop)

Pruning in January at 1m height with recommended dose of fertilizer in single split (RDF) as control treatment and pruning carried out at first week of particular month at 1m height from ground level.

The data recorded during the course of investigation were subjected to the statistical analysis. The design of analysis used was Completely Randomized Design with Factorial concept as described by Panse and Sukhatme (1967). The significance of treatment differences was tested by 'F' test on the basis of null hypothesis. The appropriate standard error (S.Em±) was computed in each case. Coefficient of variance per cent was also worked out for all the characters.

RESULTS AND DISCUSSION:

Data presented in table-1 for the different pruning time and number of pruning on growth, flowering and fruiting of phalsa crop found the significant result with different parameters. With growth parameters like number of sprouted shoot per cane found the significant result in treatment P_4N_1 (Pruning in November) and P_5N_2 (Pruning in the month of May after the completion of December crop i.e 2nd pruning) i.e. 9.37 and 10.18, respectively. It shows that 2nd pruning had the maximum numbers of sprouted shoot per cane. Another growth parameters like length of shoot was found significant in treatment P_2N_1 (116.00cm) (Pruning in September i.e. 1st pruning) and P_1N_2 (125.12cm) (Pruning in the month of January after the completion of August crop i.e. 2nd pruning). Data indicate that pruning during summer season had higher number of sprouted shoot per cane compare to winter season pruning it might be due to ideal condition of environment i.e. temperature, humidity and light for the plant and this research supported with Ghosh *et.al* (2019), Kumar and Saravanan (2017) and Reddy (1982) in phalsa crop.

Minimum days taken to flowering was found significant in treatment P_5N_1 (Pruning in December i.e. 1st pruning) i.e. 44.25 and P_1N_2 (Pruning in January after the completion of August crop i.e. 2nd pruning) i.e. 38.25. With reference to data it can be concluded

that pruning during December and January recorded minimum days taken to flowering than other months, while, pruning during November and December recorded higher days take to flowering. This finding is accordance with the results reported by Aziz *et al.* (2018) in phalsa and Pawan *et al.* (2017) in mulberry crop.

In fruiting parameters, treatment P_5N_1 (Pruning in December i.e.1st pruning) was found significant with days taken to fruit set and days taken to first picking i.e. 73.25 and 102.12, respectively. Similarly, for the same parameters, treatment P_1N_2 (Pruning in January after the completion of August crop i.e. 2nd pruning) was found significant i.e. 73.25 and 67.87, respectively. This finding is accordance with Singh and Sharma (1961) and Jadav (1993) in phalsa.

Total number of pickings of phalsa fruits was found significant with double pruning in a year i.e. P_3N_1 (Pruning in October i.e. 1st pruning) (5.00) and P_3N_2 (Pruning in March after the completion of October crop i.e. 2nd pruning) (5.25). Environment particularly temperature plays an important role for growth and development of the fruits, during the winter season i.e. October to March fruits maturity required more days resulting in increasing the number of picking during the this season. This finding supported with Chundawat *et al.* (1976) in phalsa.

CONCLUSION:

From the present findings it can be concluded that, second pruning in a year *i.e.* January pruning after the completion of August pruning on the same plant recorded higher length of shoot (cm) and also minimum days taken to flowering and days taken to fruit set. Similarly, at the second pruning *i.e.* pruning in May after the completion of December crop on the same plant, recorded higher number of sprouted shoot per cane.

For the phalsa picking, 1st and 2nd pruning *i.e.* pruning in March after the completion of October crop on the same plant, recorded higher number of pickings during both the pruning.

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Table 1. Effect of different pruning time and number of pruning on growth, flowering and fruiting of phalsa crop.

Treatment	Number of sprouted shoot per cane		Length of shoot (cm)		Days taken to flowering		Days taken to fruit set		Days taken to first picking		Total number of pickings	
	N_1	N_2	N_1	N_2	N_1	N_2	N_1	N_2	N_1	N_2	N_1	N_2
P_1 (Aug & Jan)	8.25	9.43	115.62	125.12	45.75	38.25	75.75	67.87	104.75	98.25	4.25	3.50
P_2 (Sept & Feb)	8.68	9.68	116.00	122.62	46.12	43.00	75.25	73.50	104.75	102.25	4.75	3.75
P_3 (Oct & March)	9.06	9.43	75.50	81.12	46.62	44.75	76.50	76.50	106.37	107.00	5.00	5.25
P_4 (Nov & April)	9.37	9.81	53.87	119.50	47.12	47.25	80.00	78.37	109.37	108.25	4.37	4.75
P_5 (Dec & May)	9.18	10.18	61.62	118.75	44.25	48.62	73.25	78.37	102.12	110.25	3.62	4.50
S.Em±	0.45		3.30		0.28		0.61		0.39		0.17	
$Lsd_{0.05}$	1.27		6.61		0.79		1.74		1.11		0.48	

C.V%	19.57	9.39	1.77	2.28	1.47	11.13