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## Growth and Yield Response of Phalsa (*Grewia asiatica* L.) to Various Pruning Intensities and Dates

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**Abstract:** The effect of different pruning intensities as factor-A and various pruning dates as factor-B on the production of phalsa was checked. Pruning levels significantly affected the days taken to sprouting, flowering, fruit setting, number of branches/plant, length of branches, number of fruit clusters/plant and weight of clusters. Among different pruning intensities, 100 cm gave maximum number of clusters/plant (1771) and also the highest yield/plant (18.41 kg). Various pruning dates significantly affected the days taken to sprouting, number of leaves/branch and number of branches/plant. Pruning at 22 Dec. produced maximum number of fruit clusters/plant (1660) and the highest yield/plant (18.17 kg).

**Key words:** Phalsa, *Grewia asiatica*, pruning intensities, pruning dates, sprouting, flowering, clusters

### Introduction

Phalsa is grown on a very limited scale, mostly in the vicinity of towns. However, it has considerable prospects for making Phalsa juice and syrup which are highly esteemed as a refreshing and cooling drink. Phalsa is also a good source of vitamin A and C. There are many factors responsible for its decline, such as pruning and inadequate levels of fertilizers etc.

Ahmad and Ghaffoor (1962) stated that pruning is considered to be the most suitable and cheapest practice in order to give the plant a regular frame work, yield and quality of the phalsa fruit. In pruned trees, the size and colour of the fruit is also improved due to more exposure to light. Annual pruning encourages new vigorous shoots and ensures regular and heavy fruiting. Ginai (1969) reported that pruning of phalsa at a height of 3.5 to 4 feet is considered the best which produces a greater number of shoots and a much higher yield than pruning at 1.5 to 2 feet or at just ground level. He also observed that the size of the fruit was inversely proportional to the yield, however, the smaller fruits yielded juice of a higher specific gravity. Pruning is one of the most important factor responsible for the decline in yield and quality of phalsa in D.I.Khan. To find out the optimum level of pruning and also the exact date of pruning for obtaining better yield of good quality fruit, a field experiment was conducted.

### Materials and Methods

About seven years old phalsa trees were selected for the study. The plants of similar size and vigour were included in each level of both the factors. The distance between two successive trees was 8 feet and the rows were spaced 10 feet. The levels of both the factors is given as under:

FACTOR-A ( <i>P. INTENSITIES</i> )	FACTOR-B ( <i>P. DATES</i> )
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P <sub>1</sub> 75 cm above ground level	D <sub>1</sub> 22 December 1997
P <sub>2</sub> 100 cm ---do---	D <sub>2</sub> 07 January 1998
P <sub>3</sub> 125 cm ---do---	D <sub>3</sub> 23 January 1998
P <sub>4</sub> 150 cm ---do---	D <sub>4</sub> 08 February 1998

Number of branches/plant, length of branches (cm), number of leaves/branch, days taken to bud sprouting, days taken to flowering, days taken to fruit setting, number of fruit clusters/plant, number of fruits/ cluster, weight of clusters (g) and yield of fruit plant (kg), were estimated.

2-Factorial experiment using Randomized Complete Block Design, was performed. The data were analyzed using the

Analysis of Variance Techniques (Steel and Torrie, 1980) and Duncan's Multiple Range Test (Duncan, 1955) was used to check the differences among the different treatment means. The analysis were performed with the help of computer using MSTATC software package.

### Results and Discussion

**Number of branches per plant:** The large number of branches resulted in higher production of the fruit. Table 1 expressed that 100 cm pruning intensity gave the maximum of 231 branches per plant closely followed and at par with the pruning intensity of 125 cm with 225.7 branches per plant. 23 Jan: pruning date gave the best results with 226.3 branches per plant and these results are in accordance with those the findings of Vasilenko (1991).

**Length of branches:** The results pertaining to length of branches are presented in Table 1. Significant differences were observed with pruning at different levels. 75 cm and 7 Jan: pruning produced the longest branches (145.8 cm) followed by 100 cm pruning level with the branch length of 136.5 cm. Non-significant behaviour observed in case of pruning dates, however, 7 Jan; date gave the longest branches. Similar results were obtained by Vasilenko (1991) that pruning and highest N rates gave the best results with regard to shoot length.

**Number of leaves per branch:** Table 1 indicated that the different levels of pruning intensity had no significant effect on number of leaves per branch. However, pruning at different dates gave significant results. The maximum number of leaves (21.48) were obtained at 7 Jan: which was at par with 23 Jan: indicating these dates suitable for increased leaf initiation, while 75 cm pruning intensity also increased the number of leaves (21.10).

**Days taken to sprouting:** The data regarding the number of days taken to sprouting are presented in Table 1. 150 cm pruning intensity and 22 Dec: pruning date took the lowest number of days (36.50 and 36.75) which show that the said pruning level and date are the most effective.

**Days taken to flowering:** The data regarding the number of days taken to flowering are presented in Table 2. The shortest time taken to flower (26.17 days) is with 125 cm pruning intensity while pruning date of 8 Feb: gave the least days (26.58) to flowering. Pruning gave more shoot growth,

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Table 1: Effect of different pruning intensities and various dates on the growth and yield of phalsa

Pruning Inten:	Pruning Dates					Means
	22 Dec:	07 Jan:	23 Jan:	08 Feb:		
Number of branches per plants						
075 cm	208.3 de	215.0 cd	202.7 de	225.0 bc	212.8 b	
100 cm	245.0 a	235.0 ab	229.0 b	215.0 cd	231.0 a	
125 cm	211.7 d	237.7 ab	245.0 a	208.3 de	225.7 a	
150 cm	204.7 de	197.7 e	228.3 b	234.3 ab	216.3 b	
Means	217.4 b	221.3 ab	226.3 a	220.7 ab		
Length of branches (cm)						
075 cm	125.1 cd	161.0 a	159.4 a	137.7 b	145.8 a	
100 cm	139.3 b	137.9 b	130.9 bc	137.9 b	136.5 b	
125 cm	139.9 b	128.4 bcd	120.8 cd	124.2 cd	128.3 c	
150 cm	119.1 cd	115.9 d	116.7 d	124.6 cd	119.1 d	
Means	130.8 N.S	135.8	131.9	131.1		
Number of leaves per branch						
075 cm	19.97 bcde	23.50 a	22.76 ab	18.16 e	21.10 N.S	
100 cm	19.39 de	20.62 bcde	20.18 bcde	21.66 abcd	20.46	
125 cm	22.44 abc	20.33 bcde	21.96 abcd	19.58 cde	21.08	
150 cm	21.39 abcd	21.47 abcd	19.11 de	19.83 cde	20.45	
Means	20.80 ab	21.48 a	21.00 ab	19.81 b		
Days taken to sprouting						
075 cm	37.00 abc	39.00 ab	39.33 ab	40.33 a	38.92 a	
100 cm	37.33 abc	38.00 abc	38.67 ab	37.67 abc	37.92 ab	
125 cm	38.00 abc	39.67 ab	39.00 ab	37.00 abc	38.42 a	
150 cm	34.67 c	36.00 bc	37.33 abc	38.00 abc	36.50 b	
Means	36.75 b	38.17 ab	38.58 a	38.25 ab		

Any two means not sharing a common letter are significant at 5% level of probability.

Table 2: Effect of different pruning intensities and various dates on the growth and yield of phalsa

Pruning Inten	Pruning Dates					Means
	22 Dec:	07 Jan:	23 Jan:	08 Feb:		
Days taken to flowering						
075 cm	29.00 a	28.00 abc	24.33 d	26.00 cd	26.83 ab	
100 cm	27.00 abc	26.00 cd	28.00 abc	27.00 abc	27.00 ab	
125 cm	26.67 abcd	25.67 cd	26.00 cd	26.33 bcd	26.17 b	
150 cm	26.33 bcd	27.33 abc	28.67 ab	27.00 abc	27.33 a	
Means	27.25 NS	26.75	26.75	26.58		
Days taken to fruit setting						
075 cm	8.333 d	9.667 bcd	10.33 abcd	10.00 abcd	9.583 b	
100 cm	11.00 abc	9.000 cd	10.33 abcd	10.00 abcd	10.08 ab	
125 cm	10.67 abc	11.33 ab	9.667 bcd	11.00 abc	10.67 a	
150 cm	12.00 a	11.67 ab	10.33 abcd	10.00 abcd	11.00 a	
Means	10.50 NS	10.42	10.17	10.25		
Number of fruit clusters per plant						
075 cm	1623 b	1676 b	1250 c	1526 bc	1519 b	
100 cm	2057 a	1740 b	1649 b	1637 b	1771 a	
125 cm	1527 bc	1663 b	1619 b	1708 b	1629 ab	
150 cm	1432 bc	1541 bc	1647 b	1687 b	1577 b	
Means	1660 NS	1655	1541	1639		
Number of fruits per cluster						
075 cm	16.45 abc	18.47 ab	16.10 abc	12.94 bc	15.99 N.S	
100 cm	15.69 abc	16.37 abc	15.00 abc	11.61 c	14.67	
125 cm	17.39 abc	16.26 abc	19.28 a	12.76 bc	16.42	
150 cm	13.00 bc	12.90 bc	12.36 c	19.25 a	14.38	
Means	15.63 NS	16.00	15.68	14.14		

Any two means not sharing a common letter are significant at 5% level of probability, NS: Non significant

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Table 3: Effect of different pruning intensities and various dates on the growth and yield of phalsa

Pruning Inten:	Pruning Dates				Means
	22 Dec:	07 Jan:	23 Jan:	08 Feb:	
	Weight of clusters (g)				
075 cm	11.56 ab	11.13 abcd	12.02 ab	9.80 bcd	11.13 ab
100 cm	10.24 abcd	11.32 abc	11.14 abcd	8.86 d	10.39 ab
125 cm	12.33 a	11.57 ab	11.62 ab	9.72 bcd	11.31 a
150 cm	9.77 bcd	8.98 cd	9.92 abcd	11.85 ab	10.13 b
Means	10.98 NS	10.75	11.18	10.06	
	Yield of fruit plant (kg)				
075 cm	18.73 abc	18.68 abc	15.10 bc	15.29 bc	16.95 NS
100 cm	21.06 a	19.78 ab	18.31 abc	14.49 bc	18.41
125 cm	18.86 abc	19.36 abc	18.75 abc	16.59 abc	18.39
150 cm	14.02 c	13.75 c	16.96 abc	19.92 ab	16.16
Means	18.17 NS	17.90	17.28	16.57	

Any two means not sharing a common letter are significant at 5% level of probability

number of flowers and fruits than control (Goldschmidt-Reischel, 1973).

**Days taken to fruit setting:** Table 2 revealed significant results in case of various pruning intensities. The minimum number of days (9.58) by 75 cm pruning indicates its significance for Phalsa production. The results demonstrated that different pruning dates had no significant effect on fruit setting. Greene and Lord (1983) also reported that fruit set was not effected by summer pruning.

**Number of fruit clusters per plant:** Different pruning levels significantly effected the number of clusters per plant (Table 2) with maximum fruit clusters (1771) recorded in 100 cm pruning which showed its significance over other pruning levels while 22 Dec: gave the best response (1660) in the same aspect. Similar results were obtained by Myers and Ferree (1983).

**Number of fruits per clusters:** There was no significant effect of pruning levels and pruning dates (Table 2). Maximum number of fruits were counted as 16.42 per cluster at 25 cm pruning level whereas 7 Jan: pruning date gave the maximum number of fruits (16.00) per cluster. These results are in contrast with the findings of Myers and Ferree (1983) who obtained significant results in case of number of fruits.

**Weight of clusters (g):** The data concerning the weight of cluster is given in Table 3. Different pruning intensities significantly effected the weight of clusters. Weight of cluster (11.31 gm) produced by 125 cm pruning level was the best, whereas 23<sup>rd</sup> Jan: pruning date gave highest (1118 gm) weight. This may be due to the vigourosity of fruit. Stino and Barkat (1979) and Kolev *et al.* (1980), found same results.

**Yield of fruit plant (kg):** The results regarding the yield of fruit plant (Table 3) revealed the non-significant results in both the factors. However, 100 cm pruning gave the highest yield i.e 18.41 kg which was at par with 125 cm pruning level (18.39 kg). 22 Dec: pruning date gave the maximum yield (18.17 kg). Shankar (1985), Ghafoor and Rahman (1987) and Rao and Reddy (1989) reported that the highest fruit yield were obtained by pruning the Phalsa trees upto 125 cm height.

The following recommendations can be made to the growers of Phalsa.

The pruning intensity of 100 cm (above the ground level) is considered to be the best as it produced maximum number of branches per plant, maximum number of fruit clusters per plant and mainly the highest yield among the other pruning intensities.

Pruning date of 22<sup>nd</sup> Dec: is recommended for the best results because growers get maximum production on this date of pruning, although the days to flowering and fruit setting are maximum for this date.

**References**

Ahmad, S. and A. Ghafoor, 1962. Phalsa Cultivation in West Pakistan. West Pakistan Co-operative Fruit Development Board, Lyallpur, pp: 4-6.

Duncan, D.B., 1955. Multiple range and multiple F tests. *Biometrics*, 11: 1-42.

Ghafoor, A. and S. Rahman, 1987. Effect of pruning intensities on the yield and quality of phalsa. *Proceedings of the Third National Conference of Plant Scientists*, November 7-11, 1987, Peshawar, pp: 11-21.

Ginai, M.A., 1969. A Treatise on Horticulture. Bureau of Agriculture Information, Government of West Pakistan, Lahore, pp: 233-236.

Goldschmidt-Reischel, E., 1973. Influence of nitrogen, pruning and temperature on young apple trees. *Swedish J. Agric. Res.*, 2: 175-180.

Greene, D.W. and W.J. Lord, 1983. Effects of dormant pruning, scoring and growth regulators on growth, yield and fruit quality of delicious and cortland apple trees. *J. Am. Soc. Hortic. Sci.*, 108: 590-595.

Kolev, R.K. P. Manolow and A. Pet, 1980. Effect of summer contour pruning on the light regime, photosynthesis and productivity of peach. *J. Hortic. Sci.*, 52: 622-622.

Myers, S.C. and D.C. Ferree, 1983. Influence of time of summer pruning and limb orientation on yield, fruit size and quality of vigorous delicious apple-trees. *J. Am. Soc. Hortic. Sci.*, 108: 630-633.

Rao, L.J. and M.G.R. Reddy, 1989. Effect of time and severity of pruning on yield of phalsa (*Grewia asiatica* L.). *South Indian Hortic.*, 37: 115-117.

Shankar, G., 1985. Phalsa. In: *Fruits of India: Tropical and SubTropical*, Bose, T.K. (Ed.). Naya Prakash Publisher, Calcutta, pp: 559-565.

Steel, R.G.D. and J.H. Torrie, 1980. *Principals and Procedures of Statistics*. McGraw Hill Book Company, New York.

Stino, G.R. and M.R. Barkat, 1979. Effect of severity and time of pruning on fruit quality of Meet-Ghamr peach cultivar. *Ann. Agric. Sci. Moshtohor*, 11: 135-147.

Vasilenko, A.A., 1991. Apple tree development in relation to nitrogen nutrition and pruning methods. *Sadovodstvo-i-Vinogradarstvo*, 9: 21-22.