

Effect of Pruning and Thinning on Growth, Yield and Quality of Pomegranate

S K Pawar, U T Desai and S M Choudhari

Department of Horticulture, Mahatma Phule Krishi Vidyapeeth, Rahuri-413 722 India

Abstract Shoot length and number of leaves per shoot increased with the pruning intensity. Pruning also delayed the bud sprouting, flower appearance and harvesting. Although, the highest yield was obtained from unpruned trees, the 40 cm pruning of main stems was comparable with it. The number and percentage of better grade fruits were more in higher severity of pruning. The fruit size, juice content and TSS were better with increasing severity of pruning. The rind and aril colour, aril content and seed hardness were not appreciably influenced by pruning treatments.

Key words Pomegranate, Pruning

Pomegranate (*Punica granatum* L.) is grown in selected locations in almost all the states of India. However, maximum area under this crop is in Maharashtra. Pruning is one of the important special horticultural practices in many fruit crops, which influences both yield and quality of fruit. Pomegranate fruits are borne on short branches known as spurs that arise from mature shoots. These spurs have capacity to bear fruits for a period of 3 to 4 year and with advance of age, they decline in production (Patil & Karale 1985). Therefore, there is a need to encourage growth of new spurs. Besides, it also bears on current season's growth. Pruning is useful for this in other fruits. On their personal experiences, growers from Maharashtra do prune the pomegranates. However, no scientific report is available regarding the effect of pruning on pomegranate production. It was thought desirable to study effect of pruning on growth, yield and fruit quality of pomegranate.

Materials and Methods

An experiment was carried out during *ambia bahar* (Spring flush) on 13-year-old trees of uniform size and vigour, with eight pruning treatments, four replications and three plants per treatment unit in a simple randomized block design. The pruning treatments were given before first irrigation of *ambia bahar*. The treatments were: T₁ = Control, T₂ = Round-Top- Pruning, T₃ = 20 cm pruning of main stems with no thinning, T₄ = 20 cm pruning of main stems with thinning, T₅ = 40 cm pruning of main stems with no thinning, T₆ = 40

cm pruning of main stems with thinning, T₇ = 60 cm pruning of main stems with no thinning, and T₈ = 60 cm pruning of main stems with thinning. In round-top- pruning, a round shape was given to tree top with least possible pruning as is followed by some growers. In thinning treatments, the tertiaries (on main and secondary branches) were removed. If the two tertiaries at each node, one was removed, alternatively. Besides, the secondary branches on main stems with more than 30 cm length were cut back by 30 cm. The data on growth, yield and fruit quality parameters were recorded.

Results and Discussion

The length of new shoot and number of leaves per shoot (Table 1) increased with an increase in severity of pruning as reported by other workers in different fruit crops. (Awasthi & Misra 1969, Bajpai *et al.* 1973, Dhaliwal & Sandhu 1982). While, correspondingly the bud sprouting was delayed (Patil 1987). The number of water sprouts and the period required for appearance of first ground sucker, in general, increased with increase in pruning intensity. But there was no effect on the number and length of ground suckers.

The days required for appearance of first flower and for harvesting were delayed as the intensity of pruning increased (Table 1). The juvenility is considered to be more at the base of a tree or branch and gets gradually reduced in acropetal manner towards the distal end (Leopold & Kriedmann 1982). Thus, buds remained on lower portion of a tree or branch require more period for dif-

Table 1 Effect of pruning and thinning on the growth characters

Pruning treatments	Weight of pruned material tree ⁻¹ (kg)	Period required for sprouting of buds (days)	Length of new shoot (cm)	No. of leaves shoot ⁻¹	Day for appearance of first flower	Total number of flowers tree ⁻¹	Days for total harvest
T ₁	0.00	6.50	30.29	67.02	52.67	714.49	183.26
T ₂	1.33	6.75	32.74	74.30	54.67	336.73	183.09
T ₃	1.43	8.58	40.08	88.15	54.50	381.60	186.42
T ₄	1.89	10.42	41.67	92.70	56.75	282.01	193.67
T ₅	1.59	11.33	42.31	96.50	58.25	364.22	195.42
T ₆	1.97	11.50	42.48	100.75	61.66	288.19	206.67
T ₇	2.49	14.75	46.24	101.68	63.17	252.55	214.34
T ₈	2.67	16.92	47.82	106.26	64.67	218.34	224.25
SE	0.21	0.34	2.48	6.67	0.61	13.35	2.60
CD at 5%	0.62	0.98	7.31	19.61	1.78	39.25	7.65

ferentiation in a pruned tree. The total number of flowers per tree were the highest in control and got reduced as the pruning intensity increased (Bajpai *et al.* 1973, Dhaliwal & Sandhu 1982).

Effect on yield : The total weight (yield) of marketable fruits tree⁻¹ was the highest in control and amongst the pruning treatments, it was highest in 40 cm pruning of main stems with thinning (Table 2). The number of fruits tree⁻¹ decreased with increased pruning intensity (Bajpai *et al.* 1973, Patil, 1987). The higher number and percentage of better grade fruits were harvested in pruning treatments (Table 2).

Effect on fruit quality : The external fruit colour was not appreciably influenced by the pruning. However, the average fruit size increased with an increase in pruning intensity. Pruning also improved juice percentage and TSS. However, the rind percentage, aril percentage, acidity and seed hardness had no significant effect due to pruning (Table 3). Thus, pruning has no detrimental effect on fruit quality in pomegranate. On the contrary, it helped to improve fruit size, which is the most dominating parameter in commercial marketing of pomegranate fruits. Such evidences, that pruning enhances fruit quality have also been observed in other fruit crops (Awasthi & Misra 1969, Bajpai *et*

Table 2 Effect of pruning and thinning on the yield characters

Pruning treatments	Total number of marketable fruits tree ⁻¹	Total weight of marketable fruits tree ⁻¹ (kg)	Total grade wise weight tree-1 of marketable fruits (kg)				
			'A' grade (351-400g)	'B' grade (301-350g)	'C' grade (251-300g)	'D' grade (201-250g)	'E' grade (151-200g)
T ₁	127.92	22.90	0.29	0.39	0.94	5.85	15.13
T ₂	58.00	12.63	1.08	0.66	0.64	6.32	3.93
T ₃	71.83	15.73	1.32	0.86	2.16	7.30	4.09
T ₄	63.76	14.28	1.66	1.05	3.85	5.23	2.49
T ₅	65.41	17.16	2.23	2.96	3.94	5.37	2.66
T ₆	62.33	16.22	2.15	1.58	8.97	2.49	1.03
T ₇	44.59	13.55	2.70	5.69	2.03	2.98	0.15
T ₈	39.43	13.18	5.65	4.58	1.79	0.98	0.18
SE ±	3.33						
CD at 5%	9.78						

Table 3 Effect of pruning and thinning on fruit quality

Pruning treatments	Average fruit weight (g)	Juice (%)	T.S.S. (%)	Rind (%)	Aril (%)	Acidity (%)	Seed hardness cm ⁻¹ (kg)
T ₁	178.96	62.50	14.51	28.68	71.33	0.43	2.35
T ₂	217.26	64.00	15.16	29.53	70.48	0.39	2.08
T ₃	219.17	66.00	15.48	30.65	69.38	0.40	2.48
T ₄	223.79	65.75	15.63	32.72	67.29	0.41	2.33
T ₅	264.94	67.75	15.74	28.21	71.80	0.39	2.23
T ₆	260.06	67.00	15.94	30.77	69.24	0.39	2.15
T ₇	303.86	68.75	16.82	29.92	70.08	0.37	2.33
T ₈	334.56	70.25	16.86	31.18	68.82	0.39	2.16
SE ±	5.84	1.27	0.42	1.78	1.18	0.01	0.16
CD at 5%	17.16	3.74	1.23	NS	NS	NS	NS

al. 1973, Patil 1987). However, no earlier studies on pomegranate pruning have been reported.

Thus, pruning has influence on fruit grade, fruit size, juice content and marketable and total yield of pomegranate. Considering all these aspects together, 40 cm pruning of main stem was better to give optimum number of fruits tree⁻¹, better yield of higher grade fruits and improve fruit quality than control.

References

- Awasthi AN & Misra RS 1969 Effect of pruning on subsequent vegetative growth, fruit set, fruit drop and quality of ber (*Ziziphus mauritiana* Lam.). *Punjab Horticulture Journal* 9 54-60
- Bajpai PN, Shukla HS & Chaturvedi AM 1973 Effect of pruning on growth, yield and quality of guava (*Psidium guava* L.)
- Var. Allahabad Safeda. *Progressive Horticulture* 5(1) 73-79
- Dhaliwal GS & Sandhu JPS 1982 Effect of pruning on vegetative growth, flowering and fruit set in ber. *Haryana Journal of Horticultural Science* 11(3/4) 208-212
- Leopold AC & Kriendmann EF 1982 Flowering In : *Plant Growth and Development*. The Mc Graw Hill Publishing Company Ltd. Bombay, New Delhi
- Patil AV & Karale AR 1985 Pomegranate : *Fruits of India : Tropical and Sub-tropical* Ed. TK Bose, Naya Prakash Private Ltd., Calcutta, PP. 538-548
- Patil UM 1987 *Effect of Pruning Intensities on Growth, Yield and Quality of ber (Ziziphus mauritiana L.) Cv. Unran. M.Sc. (Agri.) thesis, Mahtama Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India*

(Received November 1993

Accepted February 1994)