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Study of Pruning Technique with Different Level of Fertilizers in Guava (*Psidium guajava* L.) cv. Sardar

P. S. Bagul[1]*, G. M. Waghmare[2] and L.A. Girase[3]

[1 & 3]Department of Horticulture, College of Agriculture, Badnapur, Dist. Jalna, India
[2]Department of Horticulture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, M.S., India

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ABSTRACT

The field experiment was laid out at fruit research station, Aurangabad, Maharashtra (India) in Randomized Block Design (RBD) replicated thrice with pruning was done at 30cm, 60cm, 90cm and control of no pruning along with soil application of N: P_2O_5: K_2O at different levels will be given as nine treatments. The pruning was done in 1st week of April, 2019 observations were made on morphological Parameters. The results of the investigation revealed that the growth characters were significantly influenced by different pruning levels and fertilizer treatments. Among the different treatments, T_9 (Pruning of shoot at 90 cm with soil application of N: P_2O_5: K_2O @ 1000: 400: 400g/plant) increased the tree height, tree spread, fresh weight of pruned branches and number of new shoots emerged from pruned branches and shoot length.

Key word : *Fertilizer level, Guava, Pruning, Sardar*

Introduction

Guava (*Psidium guajava* L.) popularly known as the "Apple of the tropics" has gained considerable prominence because of its high nutritive value, pleasant aroma, good flavour and availability at moderate prices. It is one of the commonest fruit liked by the rich and poor alike. It is rich source of vitamin C and pectin, moderately good source of calcium and a fair source of phosphorus. Ripe guava fruits emit a characteristics sweet aroma and have a pleasant sour sweet taste. Fully matured or ripe juicy fruits are eaten fresh. Apart from being relished as fresh fruit when fully mature or ripe, it is extensively used for making jelly and to certain extent for juice, fruit jam and canning in sugar syrup. It is also made in to fruit butter. In some countries the leaves are used for treating diarrhoea and also for drying and tanning. The crop is quite hardy, prolific bearer and highly remunerative even without much care. A common farmer can afford to plant this crop because it is being drought resistant and is highly profitable even under adverse conditions of soil and water. The development of a prolific bearing guava variety viz., Sardar (Lucknow-49) at NARP, Pune (1927) revolutionized the guava cultivation in Maharashtra and became the leading variety of the state.

Pruning is one of the oldest cultural practice, which is practiced in sub-tropical and temperate fruit crops to bring a balance between vegetative and reproductive growth in the plant. In guava the flowers and fruits are born on current season growth. A light annual pruning considered necessary to encourage new shoots after the harvest. Better light distribution within canopy increases the number of well illuminated leaves. It also promotes the rate of photosynthesis that leads to high yield

([1 & 3] PG Student, [2] Head)

per unit area. A better understanding of the effect of pruning is the need of an hour. The pruning of guava has not received much attention when we observed its economic importance.

Hence for improving the growth pruning provides exact and correct removal of plant parts in term of length (distance) instead of percentage. In order to generate the research based information on this aspect the present investigation **"**Study of pruning technique with different level of fertilizers in guava *(Psidium guajava* L.*)* cv. Sardar**"** was planned with following objective to study the effect pruning techniques and fertilizer on yield and quality of guava.

Materials and Methods

The present investigation "Study of pruning technique with different level of fertilizers in guava *(Psidium guajava* L.*)* Cv. Sardar" was conducted at Fruit Research Station, Aurangabad (M.S.) during 2019-2020. Guava orchard of four years old plant, planted at 5 m x 5 m had been pruned in the month of April 2019. Experiment was conducted with ten treatments where pruning was done at 30 cm, 60 cm, 90 cm and control of no pruning along with soil application of N: P_2O_5: K_2O at different level will be given as nine treatments.

Observations were recorded on different aspects to growth parameters *viz.,* Plant height (cm), Percent increase in plant height at time of harvest, Number of branches- primary, secondary, tertiary, Number of leaves per branch, Spread of tree (N-S, E-W), Percent reduction of spread, Volume of tree (m^3), Percent volume decrease after pruning, Percent increase in volume at harvest, Number of new shoots per plant, Length of new shoot.

Results and Discussion

Plant height

Plant height had been measured before, after pruning and at the time of harvesting and presented in Table 1. The data revealed that plant height was found to differ non-significant after pruning however at the time of harvest it differed significantly. Amongst the different treatments indicated that the highest plant height at time of harvesting was recorded in T_9 (369.67cm) trees with maximum 89.01 per cent increase in height, which received with pruning of shoot at 90 cm with soil application of 1000N: 400P: 400K g/plant in rainy seasons. Among the various pruning levels 90 cm pruning had increased plant height. This may be due to the reserved food materials, which were made available to replace the loss made. This reserved food materials had been utilized for the production of new shoots, which would have resulted in increased height of plants. This is in accordance with the findings of Suleman *et al.* (2006) in guava, Pradeepha (2004) and Sathiya (2005) in sapota.

Observations recorded on number of branches for primary, secondary and tertiary branches presented in Table 1 revealed that significantly maximum number of primary branches observed in T_5 (5.16) Pruning of shoot at 60 cm with Soil application of 800N: 200P: 200K g/plant. Whereas, minimum number of primary branches was recorded in control and T_1 (3.16 each) and maximum number of secondary branches observed in T_8 (21.67), whereas tertiary branches found non-significant result. Additional availability of nutrients increased the uptake, which helped in fast multiplication of cells and cellular elongation resulting in better growth of roots

Sr. No.	Treatment No	Treatment Detail
1	T_0	No pruning with soil application of N: P_2O_5: K_2O @ 900: 300: 300g/plant.
2	T_1	Pruning of shoot at 30 cm with soil application of N: P_2O_5: K_2O @ 900: 300: 300g/plant.
3	T_2	Pruning of shoot at 30 cm with soil application of N: P_2O_5: K_2O @ 800: 200: 200g/plant.
4	T_3	Pruning of shoot at 30 cm with soil application of N: P_2O_5: K_2O @ 1000: 400: 400g/plant.
5	T_4	Pruning of shoot at 60 cm with soil application of N: P_2O_5: K_2O @ 900: 300: 300g/plant.
6	T_5	Pruning of shoot at 60 cm with soil application of N: P_2O_5: K_2O @ 800: 200: 200g/plant.
7	T_6	Pruning of shoot at 60 cm with soil application of N: P_2O_5: K_2O @ 1000: 400: 400g/plant.
8	T_7	Pruning of shoot at 90 cm with soil application of N: P_2O_5: K_2O @ 900: 300: 300g/plant.
9	T_8	Pruning of shoot at 90 cm with soil application of N: P_2O_5: K_2O @ 800: 200: 200g/plant.
10	T_9	Pruning of shoot at 90 cm with soil application of N: P_2O_5: K_2O @ 1000: 400: 400g/plant.

and shoots, which helped better vegetative growth including number of primary and secondary branches. These results are in conformity with the finding of Meena, 2005; Joy *et al*., 2005.

From the data presented in Table 1 found that the number of leaves per branch was found to be non-significant whereas maximum (229) in the treatment T_9 (Pruning of shoot at 90 cm with soil application of @ 1000N: 400P: 400K g/plant).

The effect of different pruning and fertilizer levels on spread of tree (N-S, E-W) (cm) was found non-significant however the per cent reduction in spread was differed significantly. From the data presented in Table 1. It is revealed that, significantly maximum per cent reduction of spread (N-S) was found in the treatment T_9 (69.53) (Pruning of shoot at 90 cm with Soil application of 1000N: 400P: 400K g/plant). Further, as regards the (E-W) spread, it was notice that the spread after pruning was recorded non-significant whereas, percent reduction was found to differed significantly from the data maximum per cent spread (77.56) was recorded in treatment T_7.

The effect of different pruning and fertilizer levels on volume of tree (m^3) presented in Table 2 was found significant after pruning and at the time of harvesting whereas it was found non-significant for before pruning. From the data it was found that, maximum (4.78 m^3) volume of tree after pruning was recorded in treatment T_0 i.e. control.

Observations recorded on per cent volume decrease after pruning in Table 2 revealed that maximum volume decrease after pruning observed in T_9(76.84) (Pruning of shoot at 90 cm with soil application of 1000N: 400P: 400Kg/plant).

From the Table 2 found that maximum 81.85 per cent increase in volume at harvest found in T_9 (Pruning of shoot at 90 cm with Soil application of @1000N: 400P: 400K g/plant). An appraisal of data indicate that among all treatments T_9 shows significant increase in volume, this might due to pruning accumulates more carbohydrates as availability of nutrients are in sufficient quantities of plant to come out their metabolic and physiological process. These findings are in accordance with result reported by Pawar *et al.* (1994) in pomegranate, Suleman *et al*. (2006) in guava, Ghum (2011) in custard apple, Patil (2018) in acid lime.

Observations recorded on number of new shoots emerged from pruned branches presented in Table 2 revealed that significantly maximum number of

Table 1. Effect of different levels of pruning and fertilizer on following growth observation's

Treatment no.	Plant height (cm)				Number of branches			Spread of tree (N-S) (cm).			
	Before pruning (cm)	After pruning (cm)	At time of harvest (cm)	Percent increase at harvest (%)	Primary branches	Secondary branches	Tertiary branches	Number of leaves per branch	Spread of tree (N-S) before pruning	Spread of tree (N-S) after pruning	Percent reduction of spread
T_0	176.33	176.33	206.66	17.36 (24.60)	3.16	7.16	60.33	106.00	210	210	0(0)
T_1	245.16	205.66	326.83	61.54 (51.80)	3.16	10.83	88	205.5	249.5	181.66	36.04 (36.58)
T_2	224.17	202.00	319.33	58.99 (50.26)	4.17	15.67	104.17	132.67	229.33	170.50	36.57 (36.98)
T_3	214.67	200.67	328.67	67.50 (55.75)	4.33	16.17	127.50	128.33	246.67	187.00	31.14 (33.34)
T_4	245.50	189.83	332.67	74.93 (61.79)	4.00	18.33	119.17	160.50	266.17	192.00	39.79 (38.59)
T_5	251.66	220.66	329.83	63.56 (53.48)	5.16	21.5	178.66	160.00	272.5	175.33	56.38 (48.74)
T_6	265.83	204.83	343.83	69.21 (56.48)	4.33	14.5	136.33	132.00	272.5	189.5	43.39 (40.75)
T_7	285.00	218.67	358.7	69.14 (56.27)	4.00	21.00	127.17	129.00	280.83	180.17	55.05 (48.99)
T_8	263.67	189.00	352.33	81.44 (65.16)	4.67	21.67	162.33	131.67	242.67	175.17	36.46 (36.42)
T_9	280	200.16	369.67	89.01 (70.70)	4.00	18.00	125.16	229.00	296	173.33	69.53 (457.09)
SE(m)±	19.14	22.60	23.69	4.04	0.37	2.33	28.30	22.31	19.71	12.78	6.38
CD at 5%	56.88	NS	70.39	12.00	1.09	6.91	NS	NS	NS	NS	19.11

Table 2. Effect of different levels of pruning and fertilizer on following growth observation's

Treatment no	Spread of tree (E-W): Spread of tree (E-W) before pruning (cm)	Spread of tree (E-W): Spread of tree (E-W) after pruning (cm)	Spread of tree (E-W): Percent reduction of spread	Volume of tree (m^3): Volume of tree before pruning (m^3)	Volume of tree (m^3): Volume of tree after pruning (m^3)	Volume of tree (m^3): Volume of tree at time of harvesting (m^3)	Percent volume decrease after pruning	Percent increase in volume at harvest	Number of new shoots per branch	Length of new shoot (cm)
T_0	219	219	0(0.00)	4.78	4.78	5.65	0(0.00)	15.06 (22.80)	3.00	34.00
T_1	261.5	211.17	23.36 (28.76)	9.08	4.57	12.24	49.15 (44.51)	61.41 (51.61)	6.67	124.16
T_2	245.17	201.00	23.47 (28.59)	7.00	4.21	10.08	45.20 (42.12)	60.95 (51.37)	6.50	117.33
T_3	265.00	200.17	31.96 (34.14)	7.94	4.15	12.37	43.88 (41.41)	65.42 (54.01)	6.97	128.00
T_4	291.17	191.33	52.14 (46.21)	10.86	3.87	14.41	63.16 (52.65)	72.91 (58.64)	7.17	137.00
T_5	288.33	190.17	50.01 (44.95)	11.63	4.19	15.94	61.59 (51.73)	73.89 (59.27)	7.00	131.66
T_6	291.66	179.66	62.66 (52.35)	11.63	3.71	15.08	66.55 (54.70)	74.36 (59.60)	7.83	143.5
T_7	320.33	180.50	77.56 (62.17)	14.66	4.00	18.98	71.47 (57.84)	77.49 (61.76)	8.50	151.00
T_8	264.67	169.50	55.48 (48.36)	9.29	3.29	12.42	64.74 (53.60)	72.91 (58.69)	8.17	143.67
T_9	345	194.33	76.04 (61.23)	16.86	4.06	22.02	76.84 (61.24)	81.85 (64.79)	9.17	158.33
SE(m)±	19.44	94.41	3.91	2.39	0.73	3.07	2.52	1.57	0.62	3.25
CD at 5%	57.77	NS	11.69	NS	2.15	9.12	7.50	4.66	1.85	9.65

new shoots emerged from pruned branches was recorded in T_9 (9.7) trees which received with pruning of shoot at 90 cm with soil application of 1000N: 400P: 400K g/plant. As a known fact that application of higher dose of nitrogen, which is an important constituent of nucleon protein, amino acids and amino sugars in guava (Bhobia *et al*., 2005).

Data recorded on shoot length presented in table 2 revealed that various pruning and fertilizer treatments had produced a significant effect on shoot length. The treatments indicated that the highest shoot length recorded in T_9 (158.33 cm) trees, which received pruning of shoot at 90 cm with soil application of @ 1000N: 400P: 400K g/plant. Among the various pruning levels, 90 cm pruning had increased number of shoot length. This may be due to the quick response of supply of food materials absorbed by the roots and transmission of the same to the site of growth.

Conclusion

The result and the discussion of the present study showed that, the different treatments have significant influence on growth parameters. From the critical evaluation of results of the present investigation, the following conclusion can be drawn. The shoot pruning at 90 cm from tip with Soil application of N: P_2O_5: K_2O @ 1000: 400: 400g/plant. Produce significant superior effect on most of the growth parameters of guava. The performance of some other treatments like T_7 (Pruning of shoot at 90 cm with Soil application of N: P_2O_5: K_2O @ 900: 300: 300g/plant) and T_8 (Pruning of shoot at 90 cm with Soil application of N: P_2O_5: K_2O @ 800: 200: 200g/plant.) in most of parameters were found at par with potential treatments showing their importance in improving the level of these parameters' of the study.

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