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Effect of pruning time and intensity on physical attributes of guava (*Psidium guajava* L.) CV. Shweta

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Abstract
An experiment was carried out to study the effect of pruning time and intensity on the Physical attributes of guava (*Psidium guajava* L.) Cv. Shweta in the year 2018-2019. The experiment was conducted in Randomized Block Design in a factorial arrangement having two factors time of pruning and pruning intensity. The experiment comprises twelve treatment combinations with three pruning times and four pruning intensities. The pruning was done at monthly intervals starting from 1st May (M_1), 1st June (M_2) and 1st July (M_3) with four pruning intensities was done at 0% pruning (P_0), 25% pruning (P_{25}), 50% pruning (P_{50}) and 75% pruning (P_{75}).
The maximum fruit weight (g), fruit volume (cm^3), fruit length (cm), fruit width(cm), fruit yield (kg per tree) was recorded with 50% pruning (P_{50}) and The pruning time also influenced weight (g), fruit volume (cm^3), fruit length (cm), fruit width(cm), and fruit yield (kg per tree) was recorded maximum with pruning in May (M_1). The 50% pruning of shoot in the month of May resulted in Maximum fruit weight (g), fruit volume (cm^3), fruit length (cm), fruit width(cm), and fruit yield (kg per tree) of guava fruit among the treatments.

Keywords: Pruning, intensity, physical, attributes, Shweta

Introduction
Guava (*Psidium guajava* L.) is also known as the "Apple of Tropics" and it is a popular fruit tree in tropical and subtropical climates of India. Guava belongs to the family Myrtaceae, the diploid chromosome number is 2n=22 and it is native of Peru (Tropical America). Guava is cultivated on varied types of soils like heavy clay, light sand, gravel bars or limestone ranging from pH of 4.5-9.4. It is grown all over the tropical and subtropical region up to 1500 m above mean sea level. It is grown in both humid and dry climates. The optimum temperature for its cultivation ranges from 23 ºC to 28 ºC. It grows best with annual rainfall ranging from 1000 to 2000 mm mainly between June to September. It requires a dry atmosphere at the time of flowering and fruiting. The high temperature at the time of fruit development causes fruit drop. The rain during the harvesting period deteriorates the quality of fruits.
In view of area and production of guava in India are 2,70,000 ha and 4,107,000 MT (Anon. 2018-19) and productivity is 14 MT/ha (Anon. 2016-17). The best quality guavas are produced in Uttar Pradesh. The district Allahabad has a reputation of growing the best guava in the country.
Guava is considered to be one of the exquisite, nutritionally valuable and remunerative fruit crops. Guava fruits are used for making juice, jam, jellies, toffee and candy. It excels among most other fruit crops in productivity, hardiness, adaptability and nutritive value. Guava is a rich source of vitamin C 200-300 mg/100g, 0.33 per cent acidity, 4.46 per cent reducing sugar, 7.87 per cent total sugar, 1.11 per cent starch, 1.15 per cent Pectin, 13.29 per cent total soluble solid, besides this, guava fruit is also a good source of minerals like phosphorous 22.5-40mg, calcium 10-30mg and iron 0.60-1.39mg. The quality of winter season fruit is considered to be superior to rainy season fruit.
Pruning is one of the oldest cultural practices which are practised in temperate and subtropical fruit crops to bring a balance between vegetative and reproductive growth of the plant. In guava, the flowers and fruits are borne on current season growth, therefore it responds well to pruning. The terminal portion of the shoots up to 20 or 30 cm long should be pruned between spring and early summer. Pruning the current season's growth of spring flush is advocated to avoid the rainy season crop.

The pruning of 25-50% shoots in April and May was found to escape flowering of rainy season crop and encouraged winter season flowering of Sardar guava (Dhaliwal *et al.,* 2000) [10]. Pruning of guava is one of the most important practices that influence the vigour, productivity and quality of the fruits (Gadgil and Gadgil, 1933) [11], pruning in summer also reduce the rainy season crop which is of poor quality and enhance the winter crop with quality fruit.

Material and Method

The present investigation was undertaken at Main Experimental Station, Horticulture, A.N.D.U.A. &T., Kumarganj, (Faizabad) Ayodhya U.P. India during the summer season of 2018- 19. Geographically, it is situated in the typical saline-alkali belt of Indo-Gangetic plains of eastern U.P. at 26.47˚N latitude, 88.12˚E longitudes and at an altitude of 113 meters from mean sea level. The region enjoys a sub-humid and subtropical climate receiving a mean annual rainfall of about 1215 mm out of which about 85% is concentrated from mid-June to the end of September with an average annual rainfall of 764.01mm and relative humidity of 66.76 per cent.

The winter months prevail from November to March with mild to severe cool temperatures ranging from 17.9 ˚C to 33.1 ˚C. A severe cold temperature of 17.9 ˚C was recorded in the month of January and occasionally winter rains and frost were also noticed. The summer months occur from April to June with an average temperature of 39.2 ˚C to 41.4 ℃. The dry and hot wind waves were also noticed in the months of mid-May and June.

The experiment was laid out in Factorial Randomized Block Design with three replications in the month of May 2018. One plant was taken as a unit and the total number of plants selected is 36. The pruning was done at different times and intensities. In according to the time of pruning is 1st May (M_1), 1st June (M_2) and 1st July (M_3) are done and pruning intensity is done at 0% pruning(P_0), 25% pruning(P_{25}), 50% pruning (P_{50}) and 75% pruning (P_{75}) are done at a time. The observations were recorded on Fruit weight (g), Fruit volume (cm3), Fruit length (cm), Fruit width (cm), and Fruit yield (kg per tree). Statistical analysis of the data obtained in the different sets of experiments was calculated, as suggested by Panse and Sukhatma (1989).

Result

The statistical analysis of data (Table-1) revealed that pruning level was found significant with fruit weight. Maximum fruit weight (219.42g) was noted with 50% pruning which was found at par with P_{25} and minimum fruit weight (205.63 g) was noted with a pruning intensity of 75%. Pruning time also significantly influenced the fruit weight. The maximum fruit weight (254.11g) was measured with the pruning in June whereas the minimum fruit weight (189.69 g) was recorded with pruning in May (M_1). The interaction between pruning levels and pruning time was also found significant. Maximum fruit weight (254.11g) was recorded with (M_2P_{50}) 50% pruning in June and minimum (189.68 g) was measured with (M_2P_0) no pruning in June.

Data on fruit volume was significantly influenced by pruning levels and have been presented in Table-1 revealed that maximum fruit volume (210.39 cm^3) was recorded with a pruning intensity of 50% which was found at par with (P_{75}) whereas, minimum fruit volume (166.95 cm^3) was recorded with no pruning. Pruning time also significantly influenced the fruit volume. Maximum fruit volume (213.33 cm^3) was recorded with pruning in July which was found at par with pruning in June while minimum fruit volume (160.79 cm^3) was recorded with pruning in May. The interaction effect of pruning levels and pruning time on fruit volume was found non-significant. The maximum fruit volume (238.33cm^3) was recorded with a pruning intensity of 50% in June (M_2P_{50}) whereas the minimum fruit volume (132.50 cm^3) was recorded with no pruning in May (M_1P_0).

It is clear from the data presented in Table-1 and showed that the pruning level was found significant with respect to fruit length. Maximum fruit length (7.94 cm) was recorded with 75% pruning (P_{75}) and minimum (7.07 cm) with no pruning (P_0). The pruning time was non significantly affect fruit length however maximum fruit length (7.57cm) was recorded with pruning in June (M_2) and minimum (7.53 cm) with pruning in July (M_3). The interaction between pruning levels and pruning time on fruit length was found significant. The maximum fruit length (8.20 cm) was recorded with 50% pruning intensity in May (M_1P_{50}) whereas the minimum fruit length (6.80 cm) was recorded with no pruning in May (M_1P_0).

It is clear from the data presented in Table-1 and showed that the pruning level was found significant with respect to fruit width. The maximum fruit width (7.37 cm) was recorded with a 75% pruning level which was found at par with P_{50} (7.22cm) and minimum (6.96 cm) with no pruning (P_0). The pruning time significantly influenced the width of guava fruit. Maximum fruit width (7.36 cm) was recorded with pruning in June which was found at par with M_3 and Minimum (6.88 cm) fruit width was measured with pruning in May (M_1). The interaction between pruning levels and pruning time on fruit length was found non-significant. The maximum fruit width (7.53 cm) was recorded with 75% pruning intensity in July (M_3P_{75}) whereas; the minimum fruit width (6.62 cm) was recorded with no pruning in May (M_1 P_0).

It is clear from the data presented in Table 1 showed that pruning intensity significantly influenced the fruit yield per tree. Maximum fruit yield per tree (47.60kg) was recorded with a pruning intensity of 50% followed by a pruning intensity of 25% with yield per tree (30.84 kg) and minimum fruit yield per tree (14.36 kg) was recorded with no pruning (P_0). Pruning time significantly influenced the fruit yield per tree. The maximum fruit yield (34.67 kg) was recorded with pruning in May followed by pruning in June and the minimum fruit yield per tree (27.87 kg) was noted with pruning in July. The interaction between pruning levels and pruning time on fruit yield per plant was found significant. The maximum yield (61.40 kg) was recorded with a pruning intensity of 50% in May (M_1P_{50}) and a minimum (12.08 kg) was noted with no pruning in July.

Table 1: Effect of pruning time and intensity on physical attributes and yield of guava (*Psidium guajava* L.) cv. Shweta

Treatment	Fruit weight (g)	Fruit volume (cm3)	Fruit length (cm)	Fruit width (cm)	Fruit yield (kg per tree)
P0%	213.85	166.95	7.33	6.96	14.36
P25%	218.44	186.61	7.50	7.11	30.84
P50%	219.42	210.39	7.76	7.22	47.60
P75%	205.63	209.39	7.61	7.37	30.52
S.Em±	3.880	6.568	0.080	0.084	1.094
C.D.(P=0.05)	11.38	19.26	0.24	0.25	3.21
M1	189.69	160.79	7.26	6.88	34.67
M2	254.11	205.88	7.76	7.36	29.94
M3	214.45	213.33	7.64	7.24	27.87
S.Em±	3.360	5.688	0.070	0.072	0.947
C.D.(P=0.05)	9.86	16.68	0.20	0.22	2.78
P0 M1	240.67	132.50	6.97	6.62	15.66
P0 M2	189.68	170.01	7.59	7.20	15.34
P0 M3	211.20	198.33	7.44	7.06	12.08
P25 M1	208.21	140.00	7.15	6.78	32.92
P25 M2	227.38	209.33	7.76	7.37	39.23
P25 M3	219.73	210.50	7.57	7.18	20.37
P50 M1	189.69	164.50	7.48	7.03	61.40
P50 M2	254.11	238.33	7.87	7.42	39.99
P50 M3	214.45	228.33	7.94	7.20	41.40
P75 M1	199.65	206.17	7.41	7.10	28.70
P75 M2	212.80	205.83	7.82	7.47	25.21
P75 M3	204.43	216.17	7.59	7.53	37.65
S.Em±	6.719	11.377	0.139	0.145	1.895
C.D.(P=0.05)	19.71	33.37	NS	NS	5.56

Conclusion

It may be concluded from the results obtained in the present investigation that 50% pruning intensity in May month was found to be most effective to improve fruit yield kg per tree whereas Physical parameters like fruit weight (g), fruit volume (cm^3), fruit length (cm), fruit width (cm) was recorded best with 50% pruning in June Therefore, 50% pruning of shoot in the month of May can be recommended to obtain higher yield and quality production of guava fruit in the Indo-Gangetic plains of eastern Uttar Pradesh.

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