

Original Research Article

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Pruning Effect on Yield and Fruit Quality in Guava at Eastern Uttar Pradesh Conditions

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ABSTRACT

This trial was carried out during 2017-2018 and 2018- 2019 on 12 years old seedy guava (*Psidium guajva*, L) trees planted at 5x5 meters at college farm, S.D.J.P.G. college-Chandeshwer, Azamgarh, U.P. This investigation aimed to study the effect of some pruning treatments: 1- Control (unpruned trees). 2- Apical ten cm of new shoots were pruned. 3- Apical twenty cm of new shoots were pruned, in three dates: May, June and July on yield and fruit quality of guava trees. The obtained results showed that, number of fruits per tree, yield per tree and fruit weight was better with apical 10 cm of pruning shoots with May, while fruit set percentage and total sugars were better with apical 10 cm of pruning shoots at May and June. In the other side, fruit weight and fruit volume gave the highest values with apical 20 cm of new pruned shoots at May and June, while TSS gave the highest values with apical 10 and twenty cm of new pruned shoots at May and June, but fruit dry weight percentage gave insignificant differences among treatments in first season, but gave highest results in second season with apical 10 cm of new pruned shoots at June, whereas maximum Vitamin C was found in control guava fruits at May We can be recommended by apical 10 cm of pruning shoots at May to get the best results of yield, fruit growth and fruit quality.

Keywords

Pruning, Guava,
Fruit quality, Yield

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Introduction

Guava is considered as a remunerative fruit; grows well under different range of soil and agro climatic conditions. Its fruit is rich in vitamin C (200-300 mg/100g of pulp). And also have vitamin A, riboflavin, thiamine and minerals like calcium, phosphorus and iron. Furthermore, guava is processed commercially into jam, jellies and other products. In spite of being a popular fruit, meager information is available on suitable planting density for guava. The pruning may

be helpful in reducing the tree size and improving the fruit quality as well Haropinder and Bal (2006). Lal (1983) indicated that the yield of guava cv. Sadar was improved by pruning. Pruning and hydrogen Cyanamid were found to modify the production curve of guava Quijada *et al.*, (1999). Also, Salah (2005) produced the highest bud emergence of guava by using severe and moderate pruning. Haropinder and Bal (2006) stated that pruning with (10 and 20 cm) and growth regulators (paclobutrazol and ethephon at 500 and 1000 ppm) treatments on guava cv.

Allahabad Safeda trees during rainy season planted with four different spacing's (6 x 2 m, 6 x 3 m, 6 x 4 m and 6 x 5 m). Maximum fruit size, palatability rating, TSS and vitamin C were noted in wider spacing (6 x 5 m). They found that maximum Vitamin C was found in control in guava fruits. Physical characters like fruit weight was improved at 20 cm level of pruning. Whereas, fruit quality (chemical characters) were noted better at 10 cm level of pruning. The time and intensity of pruning affected guava cv. Paluma tree sprout and yield (Serrano *et al.*, 2008a). Moreover, (Serrano *et al.* 2008b) reported that the light pruning increased the number of productive branches and number of fruits per branch of guava cv. Paluma. The present study was, carried out to find the effect of some pruning treatments at different time on fruit set, yield and fruit physical and chemical properties in guava.

Materials and Methods

The trial was conducted during 2017-2018 and 2018-2019 on 12 years old seedy guava (*Psidium guajava*, L) trees planted at 5x5 meters at college farm, S.D.J.P.G. college- Chandeshwer, Azamgarh, U.P. Fifty four trees, uniform in growth and in good physical condition were selected and grouped under three treatments.

Trees under investigation were subjected to the following treatments

1-Control (unpruned trees). 2-Apical ten cm of new shoots were pruned. 3- Apical twenty cm of new shoots were pruned. Pruning treatments were carried out at 15th of May, June and July for both seasons.

The experiment was design in split plot design where pruning in main plot and dates of pruning in sub plot (3 pruning treatments x 3 pruning date = 9 treatments) in a factorial

experiment. Each treatment had three replicates and two trees for each. Data was statistically analyzed according to Snedecor and Cochran (1980). The following measurements were recorded: Fruit and Yield Indices: a) Fruit set percentage: Four branches for each tree of three treatments were selected at random, then tagged and their flowers were counted during the full bloom. Fruitlets were also counted and recorded at the right time of fruit setting in mid-July. Fruit set was calculated as a percentage of the initial number of flowers as follows:

No. of set fruits

$$\text{Fruit set \%} = \frac{\text{No. of set fruits}}{\text{Total number of opened flowers}} \times 100$$

Yield (Kg), at harvest time, mature fruits were picked, tree yield in Kg was estimated by multiplying number of fruits per tree x average of fruit weight.

Fruit quality: Fifteen fruits of the same age were labeled at fruit maturity for each tree to study fruit physical and chemical properties at harvest date.

Fruit physical properties: The following physical properties were determined and recorded i.e., fruit weight (g), fruit volume (cm³) and fruit dry weight percentage.

Fruit chemical properties: The following chemical properties were determined: Total soluble solids (T.S.S) were determined with the help of Bausch and Lomb Refractometer in terms of degree Brix. The values of TSS were corrected at 20°C. Ascorbic acid (Vitamin C) was determined using 2,6-dichlorophenol indophenol solutions and oxalic acid as a substrate. Vitamin C content was calculated as mg / 100 ml juice and total sugars content were determined calorimetrically according to A.O.A.C, (1980). The total sugar contents were

determined colorimetrically by using picric acid Thomas and Ditcher (1924) and expressed as g/100g fresh weight.

Results and Discussion

Data in table (1) Effect of pruning treatments, date and their interaction on fruit set%, number of fruits /tree and yield (Kg) in guava trees during (2010/2011) seasons. Fruit set%: concerning to pruning treatments, pruning at 10 cm gave highest significant value in both seasons. Regarding to date, May and June gave higher significant values than July in both seasons. The interaction between two studies factors, pruning at 20 cm with May and June gave highest significant values in first and second seasons. No. of fruits /tree: concerning to pruning treatments, pruning at 10 cm gave highest significant value in both seasons. Regarding to date, pruning at May gave highest significant value in both seasons. The interaction between two studies factors, pruning at 10 cm with May pruning gave highest significant values in first and second seasons.

Yield (Kg) /tree: concerning to pruning treatments, pruning at 10 cm gave highest significant value in both seasons. Regarding to date, pruning at May gave highest significant value in both seasons. The interaction between two studies factors, pruning at 10 cm with May pruning gave highest significant value in first and second seasons. These results agreement with Shaban and Haseeb (2009) they found that moderate pruning and treatments at 15th February on 25 years guava trees hybrid I apronounced and significant increase in initial fruit set, also pruning treatments with spraying chemicals substances improved tree yield. Data in table (2) Effect of pruning treatments, date and their interaction on fruit weight (g), fruit volume (cm³) and fruit dry weight percentage of guava trees during (2010/2011) seasons.

Fruit weight (g): concerning to pruning treatments, pruning at 20 cm gave highest significant value. Regarding to date, pruning at May gave highest significant value. The interaction between two studies factors, pruning at 10 cm with May and pruning at 20 cm with May and June gave highest significant values in first season. In second season, concerning to pruning treatments, pruning at 20 cm gave highest significant fruit weight. Regarding date of pruning both May and June pruning gave higher significant values than July. The interaction between two studies factors, pruning at 20 cm at May and June had highest significant values.

Fruit volume (cm³): concerning to pruning treatments, pruning at 20 cm gave highest significant value in both seasons. Regarding to date, pruning at May gave highest significant values in both seasons. The interaction between two studies factors, pruning at 20 cm with May and June pruning gave highest significant values in first season, while pruning at 20 cm with May pruning gave highest significant value in second season. Fruit dry weight (g): concerning to pruning treatments, there were insignificant differences among all treatments. Regarding to date, pruning at June gave highest significant value. The interaction between two studies factors, there are insignificant differences among treatments in first season, except pruning 10 cm with June showed higher significant value than pruning 10 cm with May. In the second season, concerning to pruning treatments, pruning at 20 cm gave highest significant value. Regarding to date, pruning at June gave highest significant value. The interaction between two studies factors, pruning at 10 cm with June gave highest significant value. These results agreement with Haropinder and Bal (2006) they found that physical characters like fruit weight was improved at 20 cm level of pruning in guava fruits.

Table.1 Effect of pruning treatments, date and their interaction on fruit set percentage, number of fruits /tree and yield of guava trees during (2018-2019) seasons

Treatments	Fruit set %				No. of fruits/tree				Yield (Kg) /tree			
	First season											
	May	June	July	Mean	May	June	July	Mean	May	June	July	Mean
Control	0.52b	0.51b	0.42b	0.50B [']	242.6d	281.0e	96.0i	206.41B [']	24.21d	24.58c	7.89j	19.34B [']
Pruning 10cm	0.71a	0.61a	0.42b	0.60A [']	307.0a	274.0c	172.0i	251.0A [']	31.45a	27.21b	16.42a	25.21A [']
Pruning 20cm	0.45b	0.42b	0.41b	0.44C [']	166.0f	139.0h	150.0j	152.0C [']	17.25a	14.36f	14.67f	15.11C [']
Mean	0.56A	0.52A	0.42B		239.3 A	230.23 B	142.66C		24.67A	22.57B	12.89C	
Second season												
	May	June	July	Mean	May	June	July	Mean	May	June	July	Mean
Control	0.51b	0.56b	0.41b	0.51B [']	281.7c	182.2a	98.0i	187.5B [']	26.1c	19.29e	7.21j	17.43C [']
Pruning 10cm	0.72a	0.62a	0.41b	0.60A [']	311.6a	276.4b	155.0j	251.6A [']	33.9a	28.5b	16.21e	25.21A
Pruning 20cm	0.44b	0.41b	0.44b	0.41B [']	224.1d	149.h	177.2f	180.7C [']	24.74d	15.3j	14.93f	19.0B [']
Mean	0.58 A	0.52A	0.42B		271.6 A	201.B	141.1C		28.89A	21.33B	12.67C	

Means having the same letter (s) in each row, column or interaction are insignificantly different at 5% level.

Table.2 Effect of pruning treatments, date and their interaction on: fruit weight (g), fruit volume (cm³) and fruit dry weight % in guava trees during (2018-2019) seasons

Treatments	Fruit weight (g)				Fruits volume (cm ³)				Dry fruit weight (%)			
	First season											
	May	June	July	Mean	May	June	July	Mean	May	June	July	Mean
Control	99.21b	93.22b	86.22	92.22C'	100 b	97.34b	80.01c	92.45C'	5.11ab	6.01ab	5.99ab	5.88A'
Pruning 10cm	107.24a	102.34	101.23	102.09B'	101.2b	97.01b	98.09b	98.76B'	5.14b	7.21a	6.01ab	5.99A'
Pruning 20cm	108.64	108.61	98.68	104.21A'	113.67a	112a	97.23b	107.21A'	6.02 B	6.21 ab	5.34ab	6.22A'
Mean	106.09A	101.07	95.06		105.1A	102.21B	92.02C		5.04 B	6.24A	5.11B	
Second season												
	May	June	July	Mean	May	June	July	Mean	May	June	July	Mean
Control	95.36j	107.68c	89.67h	98.21C'	108.d	97.06h	94.2i	100C'	5.11 d	6.12b	5.21c	5.21B'
Pruning 10cm	110.86b	102.80e	104.8d	105.87B'	112.7c	106e	99.67j	105.43B'	4.98d	6.97a	5.06d	5.21B'
Pruning 20cm	112.43a	112.78a	100.9f	108.7A'	115.34a	114.3b	101.85f	110.4A'	6.02b	6.11b	5.28c	6.02A'
Mean	107.87A	107.97A	98.75B		112.76A'	105.9B	98.5C		5.02B	6.18A	5.07B	

Means having the same letter (s) in each row, column or interaction are insignificantly different at 5% level.

Table.3 Effect of pruning treatments, date and their interaction on TSS%, total sugars% and vitamin C mg/100ml in guava trees during (2018-2019) seasons

Treatments	TSS (%)				Total sugar (%)				Vitamin C mg/100ml			
	First season											
	May	June	July	Mean	May	June	July	Mean	May	June	July	Mean
Control	6.87b	7.01b	7.11b	7.02C'	4.87c	5.01c	4.21c	5.02C'	88.32a	84.89b	80.07c	84.11A'
Pruning 10cm	10.01a	9.20a	7.08b	9.05B'	7.01a	6.80a	4.26a	6.07A'	71.76d	69.08e	59.78h	66.31B'
Pruning 20cm	8.87a	8.23a	5.45c	7.21B'	5.67b	5.79b	4.19b	5.26B'	65.21f	62.28j	65.77f	64.76C'
Mean	8.01A	7.89A	6.57B		6.02A	6.05A	4.27B		75.09A	72.46B	67.03C	
Second season												
	May	June	July	Mean	May	June	July	Mean	May	June	July	Mean
Control	8.12a	7.21b	7.99b	7.87B'	5.04c	5.01c	4.28d	5.09C'	88.47a	84.96b	84.27b	86.11A
Pruning 10cm	10.41a	9.02a	6.89b	8.78A'	6.38a	7.06a	4.11d	5.88A'	74.32c	68.87e	70.88d	70.28B'
Pruning 20cm	9.54a	7.76b	7.54b	8.42B'	5.78b	5.76b	4.90d	5.34B'	57.67j	55.98h	60.81f	58.23C'
Mean	9.41A	8.01B	7.05B			5.83A	5.92A	4.24B	73.82A	69.02C	72.95B	

Means having the same letter (s) in each row, column or interaction are insignificantly different at 5% level.

TSS%: concerning to pruning treatments, pruning at 10 cm gave highest significant value. Regarding to date, pruning at May and June recorded highest significant values. The interaction between two studies factors, pruning at 10 cm and 20 cm with May and June showed highest significant values in first season. In second season, concerning to pruning treatments, pruning at 10 cm recorded highest significant value. Regarding to date, pruning at May showed highest significant TSS value. The interaction between two studied factors, all pruning treatments with May and pruning 10 cm with June had highest significant values. Total sugars%: concerning to pruning treatments, pruning at 10 cm gave highest significant value in both seasons. Regarding to date, pruning at May and June gave highest significant values in both seasons. The interaction between two studies factors, pruning at 10 cm with May and June pruning gave highest significant values in both seasons. Vitamin C: concerning to pruning treatments, control gave highest significant value in both seasons. Regarding to date, pruning at May gave highest significant value in both seasons. The interaction between two studies factors, control with May recorded highest significant values in both seasons. These results agreement with Haropinder and Bal (2006) they found that guava fruits which pruning at 10 and 20 cm and growth regulators (paclobutrazol and ethephon at 500 and 1000 ppm), maximum Vitamin C was found in control and fruit quality (chemical characters) were noted better at 10 cm level of pruning.

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