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Consequence of different pruning time, pruning intensity and bagging on physical parameters of *Guava cv.* Sardar (L-49)

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Abstract
A field experiment was carried out at main experiment Station, Department of fruit Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, (U.P) during the year 2019 and 2020. The experiment was conducted in a Randomized block design (Factorial) with three replications. The treatment combination comprise of 3 factors *viz.* 3 pruning time, 2 pruning intensity and 2 bagging levels. The physical properties of Lucknow-49 **(**Sardar *Guava***)** variety of *Guava* fruits and its peduncle, stem and plant parameters were studied for the development of harvesting device for *Guava* fruit. Based on the experimental results it can be concluded that result obtained from the present investigation, among different pruning time, the 05th June pruning was found most effective in improving physical parameters of *Guava* fruit. The vegetative bud growth, fruit setting, fruit growth and ripening process delayed with 60 per cent pruning intensity results in higher production of quality fruits. The bagging 20 days after fruit set was effective for improving physical characters of *Guava* fruits. Pruning of *Guava* trees in the first week of June with 60 per cent pruning intensity of annual shoot growth and bagging 20 days after fruit set can be recommended to obtain higher yield with quality fruit and maximum return.

Keywords: Canopy, pruning, quality, shoots, bagging, season, fruit

Introduction
Guava (*Psidium guajava* L.), the "Apple of the tropics" or "Poor man's apple" is one of the most popular fruit crops of tropical and subtropical climate belonging to Myrtaceae family (Radha and Mathew, 2007) [23]. It is the third richest source of Vitamin C (299 mg/100 g) after Barbados cherry (1000-4000 mg/100 g pulp) and aonla (600 mg/100 g of pulp). According to Gupta (2014) [13], *Guava* contains 2 to 5 times more vitamin C than oranges and 10 times more than tomato. *Guava* is hardy, prolific bearer and highly remunerative fruit crop grown on a variety of soils under varied agro-climatic conditions. The physical properties of Lucknow-49 variety of *Guava* fruits and its peduncle, stem and plant parameters were studied for the development of harvesting device for *Guava* fruit**.** This variety was developed at Ganesh Khend garden, Pune by the selection from Allahabad Safeda variety**.** Its plant are semi-dwarf, vigorous, spreading type, profuse bearing and heavy branching type with flat crown. Leaves are elliptic-ovate to oblong in shape**.** Its fruits are large, round to ovate in shape, dark green to yellowish green skin colour, white flesh and seeds are in plenty and harder than that of Allahabad Safeda (Singh, 2013a) [27]. Keeping quality of fruits is good. TSS and Vitamin 'C' content also higher. The developed device was tested with Lucknow-49 cultivar.
Joseph and Priya (2011) [15] reported that *Guava* fruit is round to ovate or pear-shaped berry, white or yellow at maturity with yellow or dark pink flesh having numerous seeds. The fruits are usually ready to harvest after 4-5 month of flowering, when the fruit colour change from dark green to yellowish green. Harvesting should be done during the coolest part of the day, which is usually the early morning or late evening when physiological activities of the fruit are low. The fruit as well as its juice are freely consumed for their great taste and nutritional benefits**.** Singh (2013b) [27] reported that the period of maturity depends on the climate condition of the growing areas. The maturity of fruits is determined based on colour change, specific gravity, total soluble solids, acidity, etc.

At the time of harvest, the specific gravity of mature fruit becomes less than 1.0, i.e., mature fruits float in water**.** The fruits having specific gravity between 1.00 and 1.02 have better shelf life and are good for long distance transportation.

Materials and Methods

The experiment was carried out at Main Experiment Station, Department of Fruit Science, College of Horticulture and Forestry, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh during year 2019- 20 and 2020- 21. The experiment was laid out in factorial randomized block design with thirteen treatments and three replications with one plant in each replication. The plants were planted at spacing of 6 m x 6 m. Thirteen treatment combinations were formed from 3 pruning time, 2 pruning intensity, 2 bagging time and control.

1. Number of new shoots per pruned branch

Ten terminally pruned shoots were tagged randomly in all directions on the tree at the time of pruning and number of new shoots emergence per pruned branch was counted in the 1st week of November. The average was worked out and expressed as number of new shoots per pruned branch.

2. Length of new shoots (cm)

Ten terminal shoots were tagged randomly in all directions on the tree at the time of pruning. The length of shoots was measured from the point of emergence to its apex at the fruit set stage and the mean value was calculated and expressed as length of new shoots in centimeter.

3. Number of flower per branch

Ten terminal pruned shoots were tagged randomly in all directions on the tree at the time of pruning and count the number of flower per pruned branch. The average was workout and expressed as number of flower per branch.

4. Fruit set per branch

Ten branches from each tree were tagged randomly in all four directions and in the centre of canopy, then open flower just after full bloom stage were counted and the average was workout and expressed as fruit set (In respect to number of open flowers) recorded.

5. Number of fruit per tree

Fruits are born in the axil of leaves of the shoot and also those emerged newly on branches where fruit are available were recorded. The average number of fruits per plant was worked out.

6. Fruit weight (g)

The weight of harvested fruits was recorded with the help of electronic balance by taking five numbers of representing fruit sample from each treatment and their average weight were determined and expressed in g.

7. Volume of fruit (cm^3)

Volume of fruit was determined by using measuring cylinder, the volume of a liquid i.e. water which was actually displaced by fruit was measured as volume of fruit. It was calculated as per formula by Mazumdar and Majumder (2003) [19].

$V = b-a$

Where,
V = Volume of fruit (ml)
b = Final volume of water (ml)
a = Initial volume of water (ml)

8. Fruit length (cm)

Randomly selected five harvested fruits from each treatment per replication were taken to record fruit parameters. The length was measured vertically from the attached portion of pedicel up to an apex of fruit with the help of Vernier caliper and average was worked out according to Magness and Taylor (1925) [18].

9. Fruit width (cm)

Randomly selected five harvested fruits from each treatment per replication were taken to record fruit parameters. The width was measured horizontally from the widest point of fruit by the Vernier caliper and average was worked out.

10. Fruit firmness (kg/cm^2)

The firmness of the fruit was measured with the help of fruit Penetrometer (Model I: GY-3), Capacity: **1-** 12 kg/cm^2 and **2-** 24 kg/cm^2 and it was expressed in $Kg./cm^2$ (Deepthi *et al.*, 2016) [9].

Results and Discussions

1. Number of new shoot per pruned branch of *Guava*

The 5th June pruning and 60 per cent pruning intensity gave significantly higher number of shoot per pruned branch of *Guava*. Bagging was not effective for number of new shoots per pruned branch of *Guava*. Higher values were obtained with 5th June pruning and the 60 per cent pruning intensity showed significant effect during both the years. Overall the treatments were found effective against control during both the years. Lal (1983) [16] studied that number of new shoot and flower bud emergence were significantly increased in all the pruning treatments. Maximum number of new shoots was observed in winter season by full shoot pruning and ¾ shoot pruning in May. He further concluded that three forth shoot pruning in May was best for good crop during winter season. Singh *et al.* (2001) [29] studied the effect of pruning dates on fruit yield of *Guava* cv. Allahabad Safeda and Sardar. As compared to pruning in February and March, pruning from April through June, enhanced number of shoots and flowering percentage. The study indicated that half shoot (50%) pruning in April and July have positive effect towards vegetative growth, results in less rainy season yield and more number of emergence of new shoots per plant, flower buds per plant and increased fruit weight during winter season (Sah *et al.* 2017) [24].

2. Length of new shoots of *Guava* (cm)

The 05th June pruning and 60 per cent pruning intensity produced significant effect and maximum length of new shoots of *Guava*. Significantly, higher shoot length were obtained with 5th June pruning. The pruning intensity 60 per cent showed significant effect during both the years.

The treatments were found effective against control in the year 2020. Jadhav *et al.* (2002) [14] reported the effects of pruning date (25th April, 25th May and 25th June) and pruning intensity (30 and 60 cm) on the vegetative growth and fruit yield of 16-year-old *Guava* cv. Sardar.

Table 1: Effect of pruning time, pruning intensity and bagging on Number of new shoot per pruned branch

Treatments	Number of new shoot per pruned branch	
A. Pruning time	2019	2020
T_1 (Pruning on 20th May)	9.91	9.38
T_2 (Pruning on 5th June)	10.10	9.57
T_3 (Pruning on 20th June)	8.85	8.38
SE(m+)	0.209	0.196
CD (P=0.05%)	0.609	0.572
B. Pruning intensity		
P_1 (30% Pruning)	9.14	8.65
P_2 (60% Pruning)	10.10	9.57
SE(m+)	0.170	0.160
CD (P=0.05%)	0.497	0.467
C. Bagging		
D_1 (Bagging at 10 DAFS)	9.43	8.93
D_2 (Bagging at 20 DAFS)	9.81	9.29
SE(m+)	0.170	0.160
CD (P=0.05%)	NS	NS
D. Treatment vs Control		
Treatment (T)	9.62	9.11
Control (C)	6.60	7.62
SE(m+)	0.417	0.392
CD (P=0.05%)	1.218	1.144

The number of days before sprouting increased, whereas the average length of shoots, number of flowers and fruits per shoot, average weight of fruits per shoots and crop yield decreased with the delay in pruning. Singh and Chauhan (1998) [28] reported that the heavily pruned trees had significantly longer shoots than light pruning trees. The increase in growth was primarily a function of greater availability of photosynthates and nutrients in the heavily pruned trees. Dubey *et al.* (2001a) [11] studied the de-blossoming by pruning of summer season flower of *Guava* cv. Allahabad Safeda. The greatest length of shoots and number of shoots that emerged after pruning (lateral shoots) were obtained with 100 and 25% pruning intensities. The treatment, pruning at 45 cm shoot length in May gave the highest increase in new shoot length (1.83 cm) at 15 days after pruning (DAP) followed by the treatment 30 cm pruning in April and the lowest (0.31 cm) was recorded in the control (Meena *et al.* 2016) [20].

Table 2: Effect of pruning time, pruning intensity and bagging on length of new shoots (cm)

Treatments	Length of new shoots(cm)	
A. Pruning time	2019	2020
T_1 (Pruning on 20th May)	11.01	10.54
T_2 (Pruning on 5th June)	11.22	10.74
T_3 (Pruning on 20th June)	9.83	9.41
SE(m+)	0.244	0.235
CD (P=0.05%)	0.711	0.685
B. Pruning intensity		
P_1 (30% Pruning)	10.16	9.72
P_2 (60% Pruning)	11.22	10.74
SE(m+)	0.199	0.192
CD (P=0.05%)	0.580	0.560
C. Bagging		
D_1 (Bagging at 10 DAFS)	10.48	10.03
D_2 (Bagging at 20 DAFS)	10.90	10.43
SE(m+)	0.199	0.192
CD (P=0.05%)	NS	NS
D. Treatment vs Control		
Treatment (T)	10.69	10.23
Control (C)	11.76	12.81
SE(m+)	0.487	0.470
CD (P=0.05%)	NS	1.371

3. Number of flower per branch of *Guava*

Pruning during 5th June produced maximum number of flowers per branch. The pruning was also effective in year 2019 and 2020, with 60 per cent intensity. Jadhav *et al.* (2002) [14] reported that the number of days before sprouting increased, whereas the average length of shoots, number of flowers and fruits per shoot decreased with the delay in pruning. Singh and Varu (2017) [33] studied that early flowering during rainy season flush was observed with 10th May pruning. Minimum number of flowers and fruit set per shoot was recorded with 30th May pruning in summer season flush, subsequently increased number of flowers and fruits set per shoot with 30th May pruning during kharif season flush. Widyastuti *et al.* (2019) [35] reported that pruning treatment was able to accelerate the appearance of flowers and increase the number of generative shoots, the

number of flowers per tree, the amount of fruit harvested. Increased flowering response due to pruning is supported by the rate of stomatal conduction; the number of stomata is higher than without pruning. The pruning treatment can accelerate the time the flower appears 10 days faster than without trimming. The minimum number of flowers and fruits in the rainy season and minimum flowers and fruit per shoot in winter season were recorded at 60 cm pruning treatment. (Suleman *et al.* 2006) [34].

Table 3: Effect of pruning time, pruning intensity and bagging on number of flower per branch

Treatments	Number of flower per branch	
A. Pruning time	2019	2020
T_1 (Pruning on 20th May)	19.04	20.79
T_2 (Pruning on 5th June)	19.41	21.19
T_3 (Pruning on 20th June)	17.01	18.57
SE(m±)	0.328	0.456
CD (P=0.05%)	0.957	1.330
B. Pruning intensity		
P_1 (30% Pruning)	17.57	19.17
P_2 (60% Pruning)	19.41	21.19
SE(m±)	0.268	0.372
CD (P=0.05%)	0.781	1.086
C. Bagging		
D_1 (Bagging at 10 DAFS)	18.12	19.78
D_2 (Bagging at 20 DAFS)	18.86	20.58
SE(m±)	0.268	0.372
CD (P=0.05%)	NS	NS
D. Treatment vs Control		
Treatment (T)	18.49	20.18
Control (C)	20.00	20.33
SE(m±)	0.656	0.911
CD (P=0.05%)	NS	NS

4. Number of Fruit set/branch

Higher number of fruit set/branch with 05th June pruning and 60 per cent pruning intensity during both the years. The bagging treatment was found non-significant during both the years. However the treatments were found effective against control in the year 2020. Singh and Varu (2017) [33] reported, minimum number of flowers and fruit set per shoot was recorded with 30th May pruning in summer season flush, subsequently increased number of flowers and fruits set per shoot with 30th May pruning during kharif season flush. To regulate the *Guava* crop, it is essential to reduce the fruit set during the rainy season and subsequently increase the fruit set during winter season (Boora *et al.* 2016) [6].

Table 4: Effect of pruning time, pruning intensity and bagging on number of Fruit set/branch

Treatments	Number of Fruit set/branch	
A. Pruning time	2019	2020
T_1 (Pruning on 20th May)	14.39	16.01
T_2 (Pruning on 5th June)	14.67	16.32
T_3 (Pruning on 20th June)	12.85	14.30
SE(m±)	0.393	0.342
CD (P=0.05%)	1.148	0.998
B. Pruning intensity		
P_1 (30% Pruning)	13.27	14.76
P_2 (60% Pruning)	14.67	16.32
SE(m±)	0.321	0.279
CD (P=0.05%)	0.937	0.815
C. Bagging		
D_1 (Bagging at 10 DAFS)	13.69	15.23
D_2 (Bagging at 20 DAFS)	14.25	15.85
SE(m±)	0.321	0.279
CD (P=0.05%)	NS	NS
D. Treatment vs Control		
Treatment (T)	13.97	15.54
Control (C)	12.08	13.33
SE(m±)	0.786	0.684
CD (P=0.05%)	NS	1.996

5. Number of fruit/ Tree of *Guava*

Pruning time 5th June and pruning with 60 per cent intensity yielded highest number of *Guava* fruit per tree. Highest number of fruit per tree was obtained with 05th June pruning time and pruning with 60 per cent intensity during both the years. The treatments were also found effective against control in both the years. Singh and Varu (2017) In winter season crop, maximum number of fruits per tree and fruit

yield per plant and per hectare was recorded with 30th May pruning. Dhaliwal *et al.* (2000) [10] reported that the maximum number of fruit was recorded with 50% pruning intensity, while the minimum number of fruits was obtained with 100% pruning intensity. The study revealed that heading back at the level of 200 cm and two pinching were found most effective in increasing the growth characters of the plant, i.e. number of sprouts per shoot, flowering intensity, fruit setting, number of fruits/plant and yield as compared to control and other treatments (Saini *et al.* 2016) [25]. In case of yield and fruit attributes the highest fruit set was registered, highest numbers of fruits per tree, maximum fruit yield was obtained in 30 cm of pruning (Choudhary and Dhakare 2018) [8]. The results of the study revealed that among the various pruning treatments the pruning of 30 cm of apical shoots on 15th May proved to be the best in increasing the yield and yield attributes in terms of number of fruits per tree (Singh *et al.* 2020) [30].

Table 5: Effect of pruning time, pruning intensity and bagging on number of fruit/ Tree

Treatments	Number of fruit/ Tree	
A. Pruning time	2019	2020
T_1 (Pruning on 20th May)	184.11	198.87
T_2 (Pruning on 5th June)	187.69	202.73
T_3 (Pruning on 20th June)	164.45	177.63
SE(m±)	3.085	3.753
CD (P=0.05%)	9.005	10.954
B. Pruning intensity		
P_1 (30% Pruning)	169.81	183.43
P_2 (60% Pruning)	187.69	202.73
SE(m±)	2.519	3.064
CD (P=0.05%)	7.353	8.944
C. Bagging		
D_1 (Bagging at 10 DAFS)	175.18	189.22
D_2 (Bagging at 20 DAFS)	182.33	196.94
SE(m±)	2.519	3.064
CD (P=0.05%)	NS	NS
D. Treatment vs Control		
Treatment (T)	178.75	193.08
Control (C)	111.00	138.87
SE(m±)	6.171	7.506
CD (P=0.05%)	18.010	21.907

6. Length and width of *Guava* fruit (cm)

The 5th June Pruning significantly, increased fruit length and minimum fruit length was measured in 20th June pruning during both the years. The pruning was effective in the year 2019 and 2020, with 60 per cent intensity. The bagging at 20 days after fruit set was found effective for fruit length of *Guava* in year 2020, however the treatments were found effective against control in year 2020. Maximum fruit width was seen with 5th June pruning and pruning intensity 60 per cent during both the years. The minimum fruit width was measured in 20th June pruning time and pruning intensity 30 per cent during both the years. Adhikari and Kandel (2015) [3] reported that the increased level of pruning and delayed pruning increased the fruit size and fruit weight in both seasons (Rainy and winter). El-Souda (2005) [12] reported that the *Guava* fruit weight and size increased by increasing severity of pruning. The size of fruit were maximum in a tree pruned at the 45 cm level followed by 15 cm level and minimum in unpruned trees (Brar *et al.* 2007) [7]. Maximum fruit weight, fruit length and fruit breadth in winter season were recorded with pruning of total flower/ fruit bearing portion of current season shoot treatment (Singh *et al.* 2007b) [32]. There is an increasing trend during growth and development in shoot length, leaf area index, and fruit growth parameters like fruit length, fruit diameter and average fruit weight. At the time of harvest recorded maximum shoot length, fruit length, fruit diameter and average fruit weight result (Patil *et al.* 2017) [22].

Table 6a): Effect of pruning time, pruning intensity and bagging on fruit length (cm)

Treatments	Fruit length (cm)	
A. Pruning time	**2019**	**2020**
T_1 (Pruning on 20th May)	6.60	6.82
T_2 (Pruning on 5th June)	6.73	6.95
T_3 (Pruning on 20th June)	5.90	6.09
SE(m±)	0.137	0.110
CD (P=0.05%)	0.399	0.321
B. Pruning intensity		
P_1 (30% Pruning)	6.09	6.29
P_2 (60% Pruning)	6.73	6.95
SE(m±)	0.112	0.090
CD (P=0.05%)	0.326	0.262
C. Bagging		
D_1 (Bagging at 10 DAFS)	6.28	6.49
D_2 (Bagging at 20 DAFS)	6.54	6.76
SE(m±)	0.112	0.090
CD (P=0.05%)	NS	0.262
D. Treatment vs Control		
Treatment (T)	6.41	6.62
Control (C)	5.86	5.93
SE(m±)	0.274	0.220
CD (P=0.05%)	NS	0.642

Table 6 (b): Effect of pruning time, pruning intensity and bagging on Fruit width (cm)

Treatments	Fruit width (cm)	
A. Pruning time	**2019**	**2020**
T_1 (Pruning on 20th May)	6.18	6.34
T_2 (Pruning on 5th June)	6.30	6.47
T_3 (Pruning on 20th June)	5.52	5.67
SE(m±)	0.134	0.140
CD (P=0.05%)	0.391	0.410
B. Pruning intensity		
P_1 (30% Pruning)	5.70	5.85
P_2 (60% Pruning)	6.30	6.47
SE(m±)	0.109	0.115
CD (P=0.05%)	0.319	0.335
C. Bagging		
D_1 (Bagging at 10 DAFS)	5.88	6.04
D_2 (Bagging at 20 DAFS)	6.12	6.28
SE(m±)	0.109	0.115
CD (P=0.05%)	NS	NS
D. Treatment vs Control		
Treatment (T)	6.00	6.16
Control (C)	5.27	5.46
SE(m±)	0.268	0.281
CD (P=0.05%)	NS	NS

7. Fruit weight of *Guava* (g)

Pruning time 05th June gave highest fruit weight of *Guava* during 2019. The lowest fruit weight was estimated in treatment, pruning on 20th June during both the years. The pruning intensity 60 per cent gave significant and maximum fruit weight during 2020. The bagging treatment showed significant effect at 20 days after fruit set in year 2019, however the effect of treatment on control was also found

significant during both the years. Adhikari and Kandel (2015) [3] studied the increased level of pruning and delayed pruning increased the fruit size and fruit weight in both seasons (rainy and winter). The study indicated that half shoot (50%) pruning in April and July have positive effect towards vegetative growth, results in less rainy season yield and more number of emergence of new shoots per plant, flower buds per plant and increased fruit weight during winter season (Sah *et al.* 2017) [24]. The maximum return per tree was obtained from 30 cm pruned tree and minimum in 100 cm pruned tree. They also observed more volume and fruit weight under severe pruning than control (Bajpai *et al.* 1973) [5]. The *Guava* plant subjected to heavy pruning have lower rates of fruit set fewer fruit per plant and consequently, lower production. However, these fruits produce higher average weight compared to plants subjected to light pruning (Luiz *et al.* 2008) [17]. Maximum fruit weight (305.21 g) and maximum pulp content (54.34%) was found due to 90 cm of pruning intensity (Choudhary and Dhakare 2018) [8]. The results of the study revealed that among the various pruning treatments the pruning of 30 cm of apical shoots on 15th May proved to be the best in increasing the yield and yield attributes in terms of number of fruits per tree and also fruit size, weight and yield **(**Singh *et al.* 2020) [30].

Table 7: Effect of pruning time, pruning intensity and bagging on Fruit weight (g)

Treatments	Fruit weight (g)	
A. Pruning time	**2019**	**2020**
T_1 (Pruning on 20th May)	212.10	236.63
T_2 (Pruning on 5th June)	216.22	241.23
T_3 (Pruning on 20th June)	189.45	211.36
SE(m+)	4.435	4.928
CD (P=0.05%)	12.943	14.382
B. Pruning intensity		
P_1 (30% Pruning)	201.80	218.25
P_2 (60% Pruning)	210.04	241.23
SE(m+)	3.621	4.023
CD (P=0.05%)	NS	11.743
C. Bagging		
D_1 (Bagging at 10 DAFS)	197.68	225.15
D_2 (Bagging at 20 DAFS)	214.16	234.33
SE(m+)	3.621	4.023
CD (P=0.05%)	10.568	NS
D. Treatment vs Control		
Treatment (T)	205.92	229.74
Control (C)	146.67	148.33
SE(m+)	8.869	9.855
CD (P=0.05%)	25.887	28.765

8. Fruit Firmness (kg/cm^2)

In the 5th June pruning, 60 per cent pruning intensity and bagging at 20 days after fruit set recorded highest fruit firmness (kg/cm^2) of *Guava*. However, the effect of treatment verses control was also found significant during both the years. The lowest fruit firmness was observed in pruning on 20th June, the 30 per cent pruning and bagging at 10 days after fruit set during both the years (Nehad *et al.* 2017) [2] reported that, the bagging fruits with news paper bag increased fruit firmness and total acidity percentage. Abbasi *et al.* (2014) [1] reported the newspaper bagged fruit exhibited the lowest weight loss, maximum fruit firmness and highest pH during storage. Un-bagged fruits had the highest value for weight loss, while least value for fruit firmness. The pre harvest fruit bagging in Royal Delicious apple helps in improving skin colour, reducing blemishes, reducing diseases, insect pest damage, sun burn, fruit cracking, agro-chemical residue and bird damage. Light yellow coloured bags improved fruit firmness (Sharma *et al.* 2014) [26].

Table 8: Effect of pruning time, pruning intensity and bagging on fruit Firmness (kg/cm^2)

Treatments	Fruit Firmness (kg/cm^2)	
A. Pruning time	**2019**	**2020**
T_1 (Pruning on 20th May)	7.81	7.86
T_2 (Pruning on 5th June)	7.96	8.01
T_3 (Pruning on 20th June)	6.97	7.02
SE(m+)	0.150	0.164
CD (P=0.05%)	0.438	0.479
B. Pruning intensity		
P_1 (30% Pruning)	7.43	7.25
P_2 (60% Pruning)	7.73	8.01
SE(m+)	0.122	0.134
CD (P=0.05%)	NS	0.391
C. Bagging		
D_1 (Bagging at 10 DAFS)	7.28	7.32
D_2 (Bagging at 20 DAFS)	7.88	7.94
SE(m+)	0.122	0.134
CD (P=0.05%)	0.357	0.391
D. Treatment vs Control		
Treatment (T)	7.58	7.63
Control (C)	6.07	6.20
SE(m+)	0.300	0.328
CD (P=0.05%)	0.875	0.957

9. Volume of fruit (cm^3) of *Guava*

An increase in volume of fruit was observed with 5th June pruning gave highest volume of fruit. The lowest volume of fruit was recorded in treatment, pruning on 20th June during both the years. Pruning with 60 per cent intensity gave significant, highest volume of fruit during 2020. The bagging treatment, 20 days after fruit set showed significant effect. The effect of treatments on control was also found significant during both the years. Bajpai *et al.* (1973) [5] observed that maximum number of fruits was retained on the 30 cm pruned trees and minimum on 100 cm pruned trees in Allahabad safeda. The maximum return per tree was obtained from 30 cm pruned tree and minimum in 100 cm pruned tree. They also observed more volume and fruit weight under severe pruning than control. Ali and Abdel-Hameed (2014) [4] reported that the fruit weight and fruit volume gave the highest values with apical 20 cm of new pruned shoots at May and June. The maximum fruit weight and volume of fruit was found in the T_1 - Lucknow-49 variety according to Mehta *et al.* (2018) [21].

Table 9: Effect of pruning time, pruning intensity and bagging on volume of fruit (cm^3)

Treatments	Volume of fruit (cm^3)	
A. Pruning time	**2019**	**2020**
T_1 (Pruning on 20th May)	196.62	223.17
T_2 (Pruning on 5th June)	200.43	227.50
T_3 (Pruning on 20th June)	175.62	199.34
SE(m+)	3.682	4.726
CD (P=0.05%)	10.748	13.794
B. Pruning intensity		
P_1 (30% Pruning)	187.07	205.84
P_2 (60% Pruning)	194.71	227.50
SE(m+)	3.007	3.859
CD (P=0.05%)	NS	11.263
C. Bagging		
D_1 (Bagging at 10 DAFS)	183.25	208.00
D_2 (Bagging at 20 DAFS)	198.53	225.34
SE(m+)	3.007	3.859
CD (P=0.05%)	8.776	11.263
D. Treatment vs Control		
Treatment (T)	190.89	216.67
Control (C)	122.33	133.33
SE(m+)	7.365	9.452
CD (P=0.05%)	21.496	27.589

Conclusion

The maximum number of new shoots per pruned branch and length of new shoots were seen only with 5th June pruning time and 60 per cent pruning intensity during both the years. The maximum number of flower per branch was seen with 5th June pruning time and 60 per cent pruning intensity during both the years. The number of fruit set per branch and number of fruit per tree of *Guava* were recorded maximum with 5th June pruning time and 60 per cent pruning intensity during both the years. The maximum length and width of *Guava* fruits were recorded with 5th June pruning time and 60 per cent pruning intensity during both the years. The bagging was effective with 20 days after fruit set only for fruit length during 2020. The maximum weight of *Guava* fruit was recorded with 5th June pruning time during both the years and 60 per cent pruning intensity during 2020. The bagging was effective with 20 days after fruit set only in 2019. The maximum fruit firmness of *Guava* were observed with 5th June pruning time during both the years and pruning intensity 60 per cent was found effective only in 2020. The bagging was effective with 20 days after fruit set during both the years. The maximum fruit volume of *Guava* was measured with 5th June pruning time during both the years and 60 per cent pruning intensity during 2020. The bagging was effective with 20 days after fruit set during both the years.

The bagging 20 days after fruit set was effective for improving physical characters of *Guava* fruits. Pruning of *Guava* trees in the first week of June with 60 per cent pruning intensity of annual shoot growth and bagging 20 days after fruit set can be recommended to obtain quality fruit and maximum return for *Guava* growers.

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