

Effect of Bending, Shoot, Pruning and Girdling for Crop Regulation in Guava cv Kazi under Foot Hill in Nagaland

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Abstract A field experiment was conducted during 2014-15 on 6 years old guava plant cv Kazi to study the induction of flowers during winter. In order to regulate the cropping pattern, six treatments viz., 1-leaf pair pinching from tip (T_1); 10 cm pruning from tip (T_2); 20 cm pruning from tip (T_3); bending of shoot (T_4); girdling of branches (T_5) and control (T_6) were undertaken. Through the investigation, maximum number of vegetative shootlets (18.75) and reproductive shootlets (6.20) per branches were noticed by bending of shoot and 20 cm pruning, respectively. 20 cm pruning of shoot also showed the highest number of fruit set (3.00) per shootlet and maximum yield (20.97 kg) per plant. Treatment with 10 cm pruning from tip resulted in maximum fruit weight (233.75 g) and highest Vit-C (224.25 mg/100g of pulp) in fruit. The highest TSS (10.18 °Brix), total sugar (7.71%), moderate acidity (0.341%) and maximum TSS : acid ratio (29.85) in fruit were recorded when the plant received 20 cm pruning from

tip.

Keywords Guava, cv Kazi, Pruning, Bending, Girdling.

Introduction

Guava (*Psidium guajava* L.), the apple of tropics is one of the important fruit crop in India owing to its high nutritional value, high yielding and good processing quality. Guava is a hardy, shallow rooted plants and obtains 3-10 m in height. Guava usually flowers twice in a year during Feb-March (ambe bahar), June-July (mrig bahar) and occasionally in October (hasth bahar). Winter season crop is considered as superior in quality, free from diseases and fetch premium market price as compared to rainy season crop reported by Prakash et al. [1]. To skip rainy season crop, the different practices like shoot and root pruning, thinning of flowers and fruits, bending and girdling of shoots has been advocated by several scientists in india. But in foot hill of Nagaland under subtropical condition, there is no such type of works to be executed on this aspect. During the month of February to April, Maximum pockets of Nagaland under subtropics suffer from severe water scarcity. And with the onset of rain in 1st week of May, the plants start put forth with new shoots, leaves and flowers. Without forcing the plant it starts bearing heavily from May to September. So keeping in view, an experiment was conducted to study the effect of

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bending, shoot pruning and girdling under subtropical condition of Nagaland.

Materials and Methods

The investigation was carried out at the Experimental Farm, School of Agricultural Sciences and Rural development, Medziphema, Nagaland University during 2014 to 2015. The experiment was conducted in randomized block design with four replications and six treatments viz., 1-leaf pair pinching from tip (T_1), 10 cm Pruning from tip (T_2), 20 cm Pruning from tip (T_3), Bending of shoots (T_4), Girdling of branches (T_5) and Control (T_6). The experiment was carried out on 6 years old guava plant with spacing of 6m × 6m. Before application of treatments, all the leaves were removed from the shoot except in control plant. Manures and fertilizers were applied uniformly @ FYM 20 kg as basal dose and 400 g N_2 , 500g P_2O_5 and 400 g K_2O per plant in two equal split doses, once 15 days before imposing of treatments and again at during marble stage of fruit growth. Irrigation and adequate plant protection measures were adopted as per requirement. Different plant morphological changes like number of vegetative and reproductive shoot per branches, yield per plant and bio-chemical constituents like TSS, total sugar, reducing sugar, ascorbic acid, acidity and TSS : acid ratio estimated by standard procedure of AOAC [2].

Results and Discussion

Growth and development of shoot

Imposing of pruning, bending and girdling of shoot showed significant variation in differentiation of vegetative and reproductive shoots on branches. The more number of vegetative shoots (18.75) was observed in bending of shoot (T_4) followed by 10 cm pruning (17.50) and 1-leaf pair pinching from tip (15.7) whereas the less number of new shootlets (12.75) was recorded in girdling of shoot (T_5). Maximum number of reproductive shootlet per branch was noticed by 20 cm pruning (5.25) and 10 cm pruning from tip (4.00) as compared to control (2.00) in Table 1. This might be due to the fact that photo-synthates during rainy season were diverted for the development of more fruits during winter season. Bagchi et al. [3]

also reported that pruning and bending of shoot increases lipid, tryptophan, proline, polyphenol oxidase, catalase, and peroxidase levels in leaves, bark and fruits which results in greater flowering and fruiting during winter. In terms of fruit set per shootlet it was found to vary from 1.25 to 3.00. The highest number of fruits per shootlet was observed by 20 cm pruning (3.00) followed by 10 cm pruning (2.25) whereas the lowest was noticed in control (1.25). The similar observation was also reported by Dalal et al. [4] as fruit set increases with increase in pruning intensity.

Fruit morphological characters and yield

The size of fruit was increased by receiving of plant 10 cm (233.75g) and 20 cm pruning (231.75g) and both the treatments were statistically at par. Mohammed et al. [5] also found maximum fruit weight with 30 cm pruning in winter season. It may be due to better transportation and accumulation of carbohydrate and other minerals from source to sink. Sarkar and Ghosh [6] observed to increase fruit size weight with improved fruit quality by pruning of 20 cm branches. The highest yield of 20.97 kg per plant was noted by 20 cm pruning followed by 10 cm pruning (15.19 kg yield/plant) as compared to control (3.92 kg) and bending of shoot (3.95 kg) in Table 1. Similar findings by using 10 to 30 cm pruning of shoot were observed by Dhaliwal and Singh [7]. Pruning induced new shoot emergence and also caused vigor to the plant which could be attributed to the fact that there was an increased demand for photosynthesis and auxin by the developing fruits and lightly pruned plants could efficiently supply these substances in required quantities which has resulted greater fruit set and yield.

Chemical composition of fruits

The plants pruned with 20 cm shoots from tip enhanced TSS (10.18°Brix) and total sugar content (7.71%) which was at par with 10 cm pruning (9.51 °Brix TSS and 6.81% total sugar) in Table 2. TSS content in the fruit was found to be higher in the fruits of pruned trees as compared to un-pruned ones observed by Brar et al. [8]. Among the different pruning intensity Dalal et al. [4] showed that medium pruning increased the total sugar of fruits with low

acidity. Less amount of acid content (0.335%) in fruit was noticed with 1-pair of leaf pinching followed by 20 cm pruning (0.341%) as compared to bending of shoot (0.392%). In the experiment titratable acidity of the fruits was no much altered by different treatments. Titratable acidity was found minimum in fruit with 1-leaf pair pruning from tip by Sharma et al. [9]. the highest ascorbic acid content (224.25 mg/100 g of pulp) in the fruits was obtained from 10 cm pruning from tip (T_2) followed by 20 cm pruning from tip (T_3) with 221.25mg/100 g of pulp. The lowest (211.50 mg/100 g of pulp) ascorbic acid content of fruits was noticed in control (T_0). These observations also corroborated with the findings obtained by Dalal et al. [4]. In the experiment, ascorbic acid content in fruit was found to increase with pruning intensity as compared with control plant. 20 cm pruning also showed to increase TSS : acid ratio (29.85) as compared to control (22.52).

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