Environment & Ecology 35 (3B) : 2046—2049, July—September 2017
Website : environmentand ecology.com ISSN 0970-0420

Crop Regulation in Guava (*Psidium Guajava*) CV L-49

Rebecca Eko, Barun Singh, Senpon Ngomle

Received 10 October 2016; Accepted 1 November 2016; Published online 21 November 2016

Abstract The present investigation was carried out in the year 2011, on four year old guava orchard of cv L-49 planted at a spacing of 6m × 6m in the fruit research farm. The experiment was laid out in randomized block design with six treatments and four replications with the objective of attaining higher productivity with better quality fruits during the winter season. The trees were treated with the treatments T_1 -single spray of urea 10%, T_2-single spray of urea 15%, T_3-pruning of lateral shoots 50% of length, T_4-pruning of lateral shoot 75% of length, T_5-hand deblossoming and T_6-Control (no treatment). Maximum increase in production of winter season fruits (32.79kg/tree) was recorded in treatment T_2 -single spray of urea 15% while yield was minimum (4.91 kg/tree) in control. The maximum flowering percentage, minimum time taken for flowering and earliest fruit maturity was recorded with 10% and 15% urea sprays. Treatment T_4-pruning of lateral shoot 75% of length showed maximum fruit size (60.84mm polar and 57.85 mm equatorial) and weight (124.12g). The treatment T_2 -single spray of urea 15% recorded maximum pectin content (0.76%), reducing sugar (8.55%) and also was high in TSS (14.13B) and total sugar (11.57%) . Hence the treatment T_2-single spray of urea 15% was considered the best treatment among all the other treatments in attaining better quality fruit during winter season.

Keywords Guava, L-49, Treatment, Urea, Winter season guava.

Introduction

Guava, the "poor man's fruit" or "apple of the tropics" is a popular tree frut of the tropical and subtropical climate . But it has adopted so well in India that it appears to be an Indian fruit. Guava bears fruits almost round the year . Guava bears thrice in a year, viz., rainy , winter and summer which constitute respectively to about 70, 27 and 3%. This is quite evident from the fact that the heaviest flowering has always been obtained in the summer season [1]. But the productions of fruits are generally of inferior

Rebecca Eko, Barun Singh, Senpon Ngomle*
College of Horticulture and Forestry,
Central Agriculture University, Pasighat,
East Siang 791102, Arunachal Pradesh, India
e-mail : Snganle29@gmail.com
*Correspondence

quality and are more susceptible to fruit fly attack [1,2]. Better quality fruit production has always been found at lower temperature. The development of sweetness, color and aroma depend upon low temperature and dry atmosphere. Owing to this fact, the quality of winter season fruits is better compared that of rainy or spring season ones. Hence, there is a need to regulate guava fruit crop in such a way that only quality fruits is harvested in winter season.

Materials and Methods

The experiment was carried out during the summer season of 2011 in the fruit research farm, Department of Fruit Science, College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh. The Fruit research farm is situated in the foot hills of Eastern Himalayan range at an altitude of 153 in above mean sea level, 28°04′, North latitude and 95°22′ East longitudes. The climate of this area is humid-subtropical. The experiment was laid out in randomized block design with four replications and six treatments in four year old guava orchard of cv L-49 planted at a spacing of 6m × 6m (277 plants/ha). The treatments were imposed during the month of May 2011.

The trees were sprayed with urea (10% and 15%), pruning of lateral shoots (50% and 75% of the length) were done and the flowers and flower were removed manually by hand . A common dose of fertilizer, N-400 g + P_2O_5-200 g + K_2O-400 g + 40 kg FYM per plant was applied at the time of imposition of treatment. Twenty shoots on each tree were tagged for various observations. Uniform cultural practices were given in each treatment. The fruits were analyzed according to the standard methods for various physico-chemical analysis.

Results and Discussion

The foliar spray of urea showed more pronounced effect with regards to inducing flowering when in compared with the other treatments (Table 1). The maximum flowering percentage was recorded under 10% foliar spray of urea, closely followed by 15% foliar spray of urea. Similarly 50% pruning of lateral shoots also showed significant results. Moderate pruning treatments showed better results than severe pruning as reported by Singh [4] . Gopalkrishna [5] also reported that severe pruning of branches in guava cv Sardar adversely affected the production of flowers. However, the degree of adversity was less in moderate pruning as compared to severe pruning. Concerning the effects of the different treatments on the time of flowering and days to maturity of guava fruit tree (Table 1), the untreated trees took the maximum days to flowering as well as days to maturity of fruits. While the minimum days were taken by foliar spray of 10% urea, closely followed by 15% foliar spray of urea and hand deblossoming. These results go parallel with the findings of Bagchi et al. [6], who reported that the flower initiation stage takes near about 41-52 days after the application of the

Table 1. Effect of urea spray and pruning on flowering and the physical parameters of the guava crop.

Treatments		Time of flowering (days from imposition of treatment)	Flowering (%)	Days of maturity (days from imposition of treatment)	Fruit size (mm) Polar diameter	Fruit size (mm) Equatorial diameter	Fruit weight (g)	Yield (kg/tree)
T_1	10% single spray of urea	44.00	98.75	123.00	56.85	55.82	100.21	24.13
T_2	15% single spray of urea	45.25	97.50	127.25	50.12	45.66	93.91	32.79
T_3	50% pruning of lateral shoots	51.50	92.50	137.50	56.60	52.62	114.11	13.92
T_4	75% pruning of lateral shoots	50.25	65.00	130.00	60.84	57.85	124.42	9.40
T_5	Hand deblossoming	45.50	78.75	132.75	60.22	56.02	99.24	6.08
T_6	Control	54.25	56.25	143.25	50.71	46.42	78.97	4.91
	SEm±	0.61	2.48	1.12	1.53	1.41	1.75	0.78
	CD at 5%	1.85	7.48	3.38	4.62	4.26	5.27	2.37

treatments. Urea spray decreased the duration of flowering compared with untreated trees. The maximum flowering observed on the tree was mainly due to high carbohydrate content in the leaves of the treated plants (by deblossoming the summer season flowers), which was not utilized for fruit development. The high carbohydrate content was hence used to increase the flowering and fruiting for the next season i.e. winter season. The pruning treatments did not show much increase as pruning delayed the emergence of vegetative and flowering buds as reported by Dhaliwal and Kaur [7]. In support of the above result for days to maturity of fruits, Dwivedi et al. [8] reported that fruit set decreased with the increased concentration of urea.

During winter season maximum size of fruits with respect to length , width and weight was observed under 75% pruning of lateral shoots. While the lowest fruit weight and smallest fruit size was observed in untreated trees. In support of the present study, similar results were also given by Singh and Reddy [9]. Observation recorded on fruit yield (kg/tree) showed significant variation among the treatments. Comparison of data recorded on fruit yield showed that the treatment 15% foliar spray of urea recorded the maximum fruit yield (32.79 kg/tree) which was significantly superior over other treatments. While the least fruit yield was recorded in control treatment (4.91 kg/tree).

The maximum TSS was obtained in hand deblossoming (14.23°B), closely followed by 15% foliar spray of urea (Table 2). While the minimum TSS was recorded in control treatment. In support of the above data recorded, some earlier workers [2] reported that the TSS content in different varieties (Hafsi, 'Apple color', 'Allahabad Safeda', 'Sardar', 'Red fleshed guava', 'L-49') varies from 8.0 to 15.0%. The total sugar, reducing sugar and non-reducing sugars showed significant variations in all the treatments. The fruits from treatment 15% foliar spray of urea recorded maximum reducing sugar (8.55%) and also showed significant increase in both total sugar and non-reducing sugar. Chandra and Govind [10]. reported that 15% spray of urea increased maximum acidity. Similar result was also observed in the present investigation (Table 2). Maximum acidity (0.415) was recorded in 15% foliar spray of urea, while minimum (0.32%) was recoded in 75% pruning of lateral shoots. With increase in pruning intensity the acidity content of guava fruits decreased as reported by Dubey et al. [11]. The vitamin C and pectin content of fruit was also affected by these treatments. Maximum ascorbic acid content (368.50 mg/100gm) was recorded in treatment hand deblossoming, followed by 15% foliar spray of urea. While maximum pectin content (0.76%) was recorded in 15% foliar spray of urea. Pectin content range between 0.47 to 1.00% in different varieties ('Allahabad safeda', 'Banarsisurkh,' 'Lucknow-49', 'Shambati' and 'Shendi') of guava [12, 13]. Earlier workers [14, 15] also confirmed that the application of urea improved the pectin content of guava fruits.

Conclusion

In order to get maximum winter season crop of guava

Table 2. Effect of urea and pruning on the bio-chemical characters of guava fruits.

Treatments		TSS (°B)	Total sugar (%)	Reducing sugar (%)	Non-reducing (%)	Ascorbic acid content (mg/100g)	Acidity (%)	Pectin content (%)
T_1	10% single spray of urea	12.20	12.24	8.51	3.55	431.25	0.33	0.74
T_2	15% single spray of urea	14.13	11.57	8.55	2.87	486.75	0.41	0.76
T_3	50% pruning of lateral shoots	12.55	11.14	7.93	3.06	456.50	0.38	0.75
T_4	75% pruning of lateral shoots	12.18	10.73	6.90	3.64	391.75	0.32	0.67
T_5	Hand deblossoming	14.23	10.18	6.68	3.33	618.50	0.37	0.72
T_6	Control	10.00	9.62	7.07	2.43	431.75	0.37	0.54
	SEm±	0.20	0.24	0.15	0.12	16.17	0.008	0.01
	CD at 5%	0.62	0.74	0.46	0.38	48.74	0.02	0.03

cv L-49, the trees were sprayed with aqueous solution of urea (10 and 15%), pruning severities (pruning of lateral shoots 50 and 75% of length) and hand deblossoming. Among all the different treatments, 15% foliar spray of urea was found superior and gave maximum winter season fruits which were good both in terms of quantity as well as quality. Treatments 10% foliar spray of urea and 50% pruning of lateral shoots also showed significantly better response as compared to other treatments. Hence 15% urea spray was found to be optimum in regulating the guava crop with no adverse effect on the yield and quality of fruits.

References

1. Singh RN, Singh G (2008) Growing better and more guavas. Directorate of extension, Ministry of Agriculture, New Delhi.
2. Pandey AK, Singh IS (2008) Physico-chemical studies on utilization of guava varieties. Prog Hort 30 : 73—75.
3. Radler F (1965) The effect of temperature on the ripening of Sultana grapes. Am J Enol Vitic 16 : 38—41.
4. Singh UP (2006) Crop regulation studies in guava. PhD thesis. RAU, Pusa, Bihar.
5. Gopikrishna NS (2006) studies on the effect of pruning on vegetative growth, flowering and fruiting on 'Sardar guava (*Psidium guajava* L.). Ind J Hort 49 : 127—133.
6. Bagchi TB, Sukul P, Ghosh B (2008) Biochemical changes during off-season flowering in guava (*Psidium guajava* L.) induced by bending and pruning. J Tropical Agric 46 : 64—66.
7. Dhaliwal GS, Kaur R (2003) Effect of time and pruning inten sity on the age of bearing shoots and fruit quality of 'Sardar' guava. Haryana J Hort Sci 32 : 21—24.
8. Dwivedi R, Pathak RK, Pandey SD (2005) Effect of various concentrations of urea on crop regulation in guava (*Psidium guajava* L.) cv Sardar. Prog Hort 22 : 134—139.
9. Singh G, Reddy YTN (2007) Regulation of cropping in guava. Ind J Hort 54 : 44—49.
10. Chandra R, Govind S (2004) Effect of urea and ethrel on growth, flowering and fruiting in guava under intensive planting system. Ind J Hort 51 : 340—345.
11. Dubey AK, Singh DB, Dubey N (2006) Effect of foliar spray of urea on fruit yield and quality of guava (*Psidium guajava* L.). Prog Hort 33 : 37—40.
12. Rodriguez R, Agarwal PC, Saha NK (2007) Physico-chemical changes during development of safeda guava fruit. Ind Food Packer 25 : 5—20.
13. Panda R, Panda H, Parkash K, Panda A (2009) Guava pulp and leather . Science Tech. Entrepreneur, India.
14. Singh NP, Rajput CBS (2009) Chemical composition of guava (*Psidium guajava* L.) fruit as influenced by nitrogen application. Prog Hort 9 : 67—70.
15. Dubey AK, Singh DB, Dubey N (2007) Deblossoming of summer season flowering of guava (*Psidium guajava* L.). Prog Hort 33 : 165—168.