

Effect of pruning and growth regulators on physico-chemical characters of guava during rainy season planted at different spacing

Haropinder Jit Singh* and J. S. Bal

Department of Horticulture, Punjab Agricultural University, LUDHIANA (PUNJAB) INDIA

ABSTRACT

The present investigation were conducted in the Department of Horticulture, Punjab Agricultural University, Ludhiana during 2004-05 to ascertain the effect of pruning (10 and 20 cm) and growth regulators (paclobutrazol and ethephon @ 500 and 1000 ppm) on physico-chemical characters of guava cv. Allahabad Sufeda during rainy season planted with four different spacings (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). Maximum fruit weight and minimum seed number per fruit was recorded in 6 x 3 m and 6 x 5 m, respectively. Minimum seed number per fruit and maximum palatability rating, TSS were observed with ethephon 1000 ppm. Paclobutrazol @ 1000 ppm resulted maximum fruit size and fruit weight. Whereas 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.

Key words: Guava, Spacing, Pruning, Growth regulators, Physico-chemical characters

INTRODUCTION

Guava is highly prolific and remunerative fruit which grows well under wide range of soil and agroclimatic conditions. In India, it is the fourth major fruit crop and occupies an area of 2.2 lakh ha with an annual production of 17.80 lakh mt (Anon 2005). The fruit is nutritious being rich in vitamin C (200-300 mg/100g of pulp). It also contains a fair source of vitamin A, riboflavin, thiamine and minerals like calcium, phosphorus and iron. Furthermore, guavas are processed commercially into jam, jellies and other products. Under Punjab conditions, guava flowers twice in a year i.e., April-May and July-August and produce about 90 per cent crop in rainy season. In spite of being a popular fruit, meager information is available on suitable planting density for guava. Now, pruning has emerged as a commercial and alternative method for regulating the crop in guava (Lal 1983, Tiwari *et al* 1992). Thus, the pruning may be helpful in reducing the tree size and improving the fruit quality as well. Also, the growth regulators like paclobutrazol helps in controlling the tree size and improves the fruit quality as it restricts the vegetative growth by inhibiting the GA synthesis and shift more carbohydrates from source (vegetative growth) to sink (fruits). Whereas, ethephon acts as a ripening hormone and enhances the ripening process and thus helps in improving the fruit quality.

Keeping in view, the studies were thus planned to see the effect of pruning and growth regulators on physico-chemical characters of guava planted during rainy season at different spacing.

MATERIALS AND METHODS

Present investigations were carried out in the New Orchard, Department of Horticulture, Punjab Agricultural University, Ludhiana during 2004-05 on one year old plants of guava cv. Allahabad Sufeda raised on 'Sardar' guava rootstock. The plantation was made with four different spacings viz., 6 x 2 m, 6 x 3 m, 6 x 4 m and 6 x 5 m having three replications. The plants were pruned in March, 2004 by removing the terminal part of branch up to 10 and 20 cm. Then, the growth regulators viz., paclobutrazol and ethephon @ 500 and 1000 ppm were sprayed on the whole trees after pruning. The data on physical and chemical characters of rainy season fruits were recorded in July-August. The observation of Fruit size (length and breadth), fruit weight and number of seeds per fruit were recorded. Palatability rating in terms of general appearance, taste and flavour were recorded by panel of five judges and evaluation was made out of 20 points. Total soluble solids were determined with the help of Bausch and Lomb hand refractometer in terms of degree Brix. The values of TSS were corrected at 20°C. The acidity was estimated by titrating a known volume of pulp against 0.1 N NaOH using

phenolphthalein as an indicator. The results were expressed in percentage of citric acid. Vitamin C was recorded according to the method of AOAC (1990).

RESULTS AND DISCUSSION

Physical Characters

Fruit size :

Spacing had significant effect on fruit length as well as on fruit breadth (Table 1,2). The mean maximum fruit size was recorded in wider spacing of 6 x 5 m i.e. (6.7 cm and 6.3 cm length and 6.8 cm and 6.2 cm breadth) at 10 cm and 20 cm pruning levels, respectively. The average minimum fruit size was observed in closer spacing of 6 x 2 m. The results obtained by Mitra and Bose (1990), Sidhu *et al* (1992), Lal *et al* (2000), Singh and Bal (2002) and Bal and Dhaliwal (2003) in guava are in agreement with the present investigation. The maximum mean fruit length was observed with paclobutrazol 1000 ppm (5.8 cm) and minimum with ethephon 1000 ppm (5.1 cm) at 10 cm pruning level. The maximum average fruit length at 20 cm pruning was noted with paclobutrazol 1000 and ethephon 500 ppm (5.7 cm) and minimum with paclobutrazol 500 ppm and control (5.4 cm). The mean maximum fruit breadth was obtained with paclobutrazol 1000 ppm i.e. 5.7 cm and 5.6 cm at 10 cm and 20 cm level of pruning, respectively. The average least fruit breadth at 10 cm pruning level was noted with paclobutrazol 500 and ethephon 1000 ppm (5.3 cm). Control at 20 cm pruning level produced the least average fruit breadth of 5.2 cm. Pruning level had no significant effect on fruit size of guava. The interactions between pruning x spacing x PGR treatments with regard to fruit length and fruit breadth was found significant. The wider spacing of 6 x 5 m gave maximum fruit length (7.2 cm) and fruit breadth (7.4 cm) with paclobutrazol 1000 ppm. The minimum fruit length was noted with paclobutrazol 500 ppm in 6 x 4 m (4.6 cm) spacing at 10 cm level of pruning and minimum with ethephon 1000 ppm in 6 x 2 m (4.8 cm) at 10 cm and 20 cm level of pruning, respectively.

Fruit weight :

The fruit weight was obtained maximum in 6 x 3 m spacing i.e. 110.9 g at 10 cm and 115.3 g at 20 cm pruning level (Table 3). The minimum fruit weight was observed in 6 x 4 m (88.3 g at 10 cm) spacing and in 6 x 2 m (94.9g at 20 cm) spacing. The similar results were obtained by Sidhu *et al* (1992) in Allahabad Sufeda, Singh and Bal (2002) and Bal and Dhaliwal (2003) in Sardar guava, who reported maximum fruit weight in widely spaced trees. An average maximum fruit weight of 124.8 g and 119.2 g was obtained, when the plants were sprayed with paclobutrazol 1000 ppm at both the levels of

*Author for correspondence