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Review on Canopy management in guava

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Abstract

The current study was conducted to examine the response of pruning in canopy management and high density planting in Guava orchard in Western Uttar Pradesh. Observation revealed that with pruning and high density with plant spacing (from 3.0 × 3.0 m) increased in yield significantly, similarly, with an increase in spacing wise pruning in canopy management and high density was needed to increase.

Plant growth in terms of stock girth (47.20 cm) of P. guajava cv. Florida seedless and scion girth (44.7 cm) of P. guajava cv. Allahabad seedless, tree spread (N-S) and canopy volume increased with the plant spacing (3.0 × 3.0 m), while tree height decreased. To increase in plant spacing, the number of fruits per plant, yield per plant and fruit density was higher at 3.0 × 3.0 m and least at 6.0 × 6.0 m plant spacing. Pruning in canopy management and high planting density were discovered to be better owing to maximum absorption of solar radiation and optimum microclimate in the orchard, leading to better yield in plants, higher fruit density, and yield efficiency. The consistency of the fruits in the control and other therapies, on the other hand, was comparable. However, the yield per hectare was maximum 3.0 3.0 m space during the rainy season and at 6.0 3.0 m space during winter.

Keywords: Pruning, Canopy management, High density and Guava orchard.

Introduction

The guava (Psidium guajava L.) is a common tropical fruit crop in India. It is a hardy, prolific bearer, and highly profitable fruit crop that can be cultivated successfully in a variety of soil and climatic conditions. It is the fourth most important fruit crop in the world, after mango, pear, litchi, and banana, with a total area of 284 million hectares and an annual production of 24.8 million metric tonnes. Guava is the second most common fruit in Meerut, after mango, with a total area of 1423 ha and an output of 4205 MT. Vitamin C is abundant in guava fruit, and also contains a good amount of calcium, potassium, pantothenic acid, riboflavin, thiamine, and niacin. The fruits are used to make juice, jam, jellies, and a variety of other culinary products. Guava fruit is also high in antioxidants and has been shown to lower systolic blood pressure. Guava flowers twice a year, in April-May for the rainy season crop and in the axils of fresh leaves for the dry season crop. The guava tree responds well to annual pruning and is a good candidate for dense planting.

Guava (Psidium guajava L.), also known as the "poor man's fruit" and "tropical apple," is a common tropical and subtropical fruit tree that is native to Tropical America and can be found from the Caribbean to Central America. From Mexico to Peru It is a member of the Myrtaceae family. As the most commonly grown plant of this genus, it has received a lot of attention kinship Guava is regarded as one of the most beautiful fruits. Fruit harvest that is both nutritious and profitable. It is exceptional. In terms of productivity, hardiness, and adaptability, it outperforms most

other fruit crops. As well as its nutritive importance guava flowers in the axils of new leaves and bears on the current season's growth, so it responds well to pruning. Guava pruning is one of the most time-consuming tasks.

Significant activities that affect vigour, competitiveness, and profitability the fruit is quality (Gadgil and Gadgil, 1933). Several years until they bear fruit, and the total expense of the volume per unit area has been improved even further. As a result, there is a pressing need to upgrade the current planting scheme and use canopy management to manipulate tree growth. Tree growth rates, tree structure, and sustaining a high fruit yield are all factors to consider the size and consistency of the commodity that you like (Gorakh Singh, 2001). Reduces trunk breakage and encourages the growth of remaining fruits a normal bearing Fruit set, fruit size, fruit weight, and fruit quality are all factors to consider. In comparison to the previous study, organoleptic values were also found to be increased.

Command Thinned plants' flowers and fruits dropped less than control plants' flowers and fruits (Tahir and Kamran Hamid, 2002). The findings of the above study would be extremely useful to farmers in terms of increasing production levels and reducing costs. Fruit quality should be maintained in proven high-density plantings. In terms of the above, the current research was undertaken. The aim of this analysis was to see how pruning intensities and fruit yields affected each other. The impact of high-density planting on guava yield and quality. As a result, the primary focus should be on tree canopy management in order to maximise the number of fruits per unit area. Guava trees should be planted at a spacing of 7.5 m to 6.0 3.0 m in the state, but there is still room to improve yield. ISSN 2394-5168(Print), 2454-6445 South Asian J. Food Technol. Environ., 2(3&4): 458-464 (2016) ISSN 2394-5168(Print), 2454-6445 (online) 2(3&4): 458-464 in South Asian J. Food Technol. Environ (2016) 459 and revenue from a unit land area by good tree canopy maintenance. To achieve high productivity per unit area, high density plantations with maintained canopies are the order of the day.

Canopy management in Guava

Pruning and the use of growth retardants singly or in conjunction can be used to manage the canopies of trees in high density planting situations. However, in a high-density planting environment, light and other microclimatic conditions play an important role in guava fruit vegetative development, yield, and quality. While extensive research has been conducted on temperate fruits such as apple, pear, and peach, little research has been conducted on tropical and sub-tropical fruit crops**.** Since the guava tree responds well to canopy modification in terms of vegetative and reproductive growth (Singh and Canaan, 2005), canopy modification by pruning and the use of some growth regulators in high-density orchards may be measures to improve production yield. Guava leaves have a higher proportion of ‘shade' to ‘sun' leaves, which are photo synthetically inactive under deeper shade and serve as an unproductive drain (Singh and Singh, 2007).

As a result, light interception and translocation of light energy into chemical energy are functions of vegetative growth, fruit yield, and quality. Fruit quality is a function of light absorption, and light is directly proportional to fruit tree yield (Jackson, 1980; Palmer, 1989). Light interception was higher in guava trees planted at wider spacing, and it decreased dramatically with the depth of the canopies as planting densities were examined (Singh et al., 2005). With low light interception at higher planting densities, fruit yield and consistency of guava fruits decreased (Singh and Dhaliwal, 2007).

As a result, canopy control under high density planting is essential for proper light penetration. Guava fruits with narrow spacing (6 2 m) had slightly higher total soluble solids, vitamin C, sugars, and lower acidity levels than those with wider spacing (6 2 m) (Chundawat et al.,1992). Singh et al., (1980); Mitra et al., (1984); and Avila'n and Milla'n have all recorded increased guava yield per unit area by the plant population (1984).

High density planting has many benefits, including early harvest, high yields per hectare, and effective fertiliser and irrigation water usage (Purohit, 1988). In the hopes of becoming a common fruit, little attempt has been made to decide the appropriate planting density for guava, and little information is available on this subject under the conditions of western Uttar Pradesh. It is now proposed to plant at a density of 132 plants per hectare (6 5 m). As a result, proper plant population under a high density planting scheme is needed in order to produce good quality fruits and obtain the highest yield per unit land area.

Pruning has now become a viable commercial and alternative form of guava crop management (Tiwari et al.,1992). As a result, pruning will help reduce the tree's size while also increasing the consistency of the berries. As a result, the number of trees planted per unit area can be increased, resulting in a higher yield. Even after 3–4 years of planting, untrained or untrained guava trees grow to be enormous and unmanageable. The bearing area shrinks, and the plant's interior remains fruitless.

By cutting the crowded and crisis-crossed leaves, trees may produce more high-quality fruits. To produce single trunk trees with well spaced scaffold branches to support the heavy frame work, training and pruning starts at an early stage of plant development. For better canopy design, apical growth should be managed during the first year of planting. Trees are uniformly topped at a height of 60-75 cm above the ground.

As a result, new shoots Virendra Pal, Naveen Chandra, Anant Kumar, and Mukesh Kumar South Asian J. Food Technol. Environ., 2(3&4): 458-464 (2016) 460 Virendra Pal, Naveen Chandra, Anant Kumar, and Mukesh Kumar The key scaffold branches of the tree are formed by retaining 3 to 4 evenly spaced shoots across the stem. This shoots are held on the stem until they reach a length of around 40-50 cm. The chosen shoots are then pruned to half their original length to induce several shoots from the buds under the cut ends, resulting in the emergence of new shoots. This is mostly achieved in order to achieve the perfect form. During the second year after density planting, the pruning operation begins to optimise fruiting. The short branches inside the canopy create a compact and solid structure after two years. Every year between May and June, all of the plants are confined to a fence.

Guava canopies are pruned as part of their canopy management.

As part of their canopy management, guavas have their canopies pruned.

• Improve plant design and manage plant canopy.

• Regulate or guide plant growth to achieve the optimal tree canopy.

• Promote flower and fruit production to increase the amount of high-quality fruit produced per unit area.

• Make harvesting easier and more effective by maximizing the tree's carrying area and achieving the optimal leaf-to-fruit ratio.

• Increase the amount of sunshine and air circulation in the tree. It is crucial for getting the best yield and fruit quality. The lack of air circulation caused by dense plant canopies encourages the growth of fungal and insect pests within the tree.

• Rejuvenate the plant by cutting any dying or unnecessary wood or shoots.

• Improve the effectiveness of spraying and cultural activities.

• The length of time it takes to complete the project.

Guava fruit carries on the development of the current season and responds well to pruning. The time of pruning will influence the development season of guavas. Fruit can be picked later if pruning is performed later in the season.

There are three basic methods for pruning: thinning, heading out, and pinching or tipping. Thinning entails removing whole trees at the point of origin. Guava fruit continues to grow over the season and reacts well to pruning. Guavas' growth season is influenced by when they are pruned. If pruning is done later in the season, the fruit can be harvested later.

Pruning can be done in three ways: thinning, going out, and pinching or tipping. Thinning involves cutting whole trees from their original location.

The importance of rootstocks in dense planting and canopy management

High density planting and canopy management will benefit greatly from root stocks and dwarfing cultivars. Unfortunately, very little progress has been made in this area. There is currently no dwarfing rootstock or cultivar available.

(Sharma et al., 1992) tested different guava rootstocks with Allahabad safeda guava at IARI New Delhi and discovered that Psidiumpimilum has a dwarfing effect as tree spread; plant height and stem girth were the smallest of the rootstocks tested.

Sharma et al. (1992) have produced an aneuploidy dwarfing guava rootstock. The aneuploidno. 82 had a significant impact on plant growth restriction (Table 2). When Allahabad safeda guava was grafted on aneuploid no. 82 guava, plant height, spread, and canopy volume were substantially reduced. However, due to an issue of instability, the study could be halted. More research along these lines should be carried out in this direction.

Guava plantation at a high density

The conventional method of cultivation has always responded to canopy management and high density planting in guava orchards in western Uttar Pradesh due to the huge tree canopy.458-464 (2016) 461 South Asian J. Food Technol. Environ., 2(3&4): 458-464 (2016) 461 posed challenges in achieving targeted fruit productivity per unit region. As a result, it is essential to alter the guava output mechanism by altering the natural plant canopies.

There is currently a global movement towards higher density planting in order to monitor tree size and preserve desired architecture for increased productivity. Improved light interception and microclimatic conditions in the orchard and within the plant canopy increased production while also improving fruit quality and reducing pest and disease stress. As a result, high density or meadow recharging helps to improve fruit yield and efficiency by handling plant canopies in various ways.

Farmers' perspectives are shifting away from efficiency and towards sustainability and profitability, which can be accomplished with high density planting. There has recently been a movement to plant fruit trees closely together, resulting in a high density or meadow orchard. Densely planted orchards, judicious canopy maintenance, and the use of appropriate tree training programmes result in higher and higher quality yield. (Singh, 2008)

Guava needs high density planting (HDP).

Guava needs high density planting due to: • Its poor productivity compared to its production capacity.

• Plants with a lot of vegetative growth that responds well to canopy change.

• It has an impact on current season growth, which is very useful for crop management during the year.

High-density planting has the following advantages:

• Facilitates more productive use of fertilisers and water, particularly during the first 10-15 years; • High productivity and nett returns per unit area of soil, especially during the first 10-15 years.

• Marijuana prevention that works.

• The preservation of soil fertility.

• Cost-cutting in the manufacturing process.

High-density planting orchard (HDP) establishment:

During the year 2013-2014, orchard establishment was studied at Research Farm, Krishi Vigyan Kendra, Hastinapur, and Sardar Vallabhai Patel, University of Agriculture & Technology, Meerut. The rectangular planting/layout scheme is favoured because it makes orchard operations easier. Planting is possible in the months of February and March, as well as August and September.

Pits of around 50 50 50 cm are drilled according to the construction plan. Each pit is filled with soil mixed with 10 to 15 kg organic manure and 500 gm single super phosphate after 7 to 10 days, with Chlorpyriphous 20 percent @ 2.5 ml per litre used at the time of planting. Guava has a high density planting spacing of 3 3m, which accommodates 1111 plants per hectare. It is crucial to space the tree planting. The spacing of the plants in the system is determined by soil fertility, water supply, sunlight intensity, and wind exposure. (Singh 2008)

Strategies for the future

• Dwarf and semi-vigorous guava varieties must be developed for high-density planting.

• Dwarfing rootstock selection and recognition

• Standardize pruning procedures to monitor canopy development and maximize light interception.

• The most effective use of different growth retardants, as well as their concentrations, must be determined.

Conclusion

In most temperate fruit growing areas, high density planting and canopy management for better production of quality fruit per unit area has already taken the lead. However, with the advent of growth retardants, pruning, and training strategies in topical and subtropical berries, the idea of high density planting is gaining traction. By standardising the preparation and procedures, a high density planting orchard can be exploited by maintaining the plant canopies.

References

Avila'n, R.L. and Milla'n, F.M. (1984). A consideration of guava (PsidiumguajavaL.) planting system in Venezuela. Agronomy Tropical, 34 (4- 6): 69-80.

Chundawat, B.S., Kikani, K.P. ,Verma, L.R. and Jadav, R.G.(1992). Studies on hedge row plantation in 'Allahabad Safeda guava. Indian Journal of Horticulture, 49(2): 134-137

Jackson, J.E. (1980). Light interception and utilization of orchard system. Horticulture Review, 2: 208-267.

Mitra, S.K., Sen, S.K., Maiti, S.C. and Bose, T.K.(1984). Effect of planting density on growth, yield and fruit quality in guava. Bangladesh Horticulture Journal, 12: 7-9.

Palmer, J.M. (1989). The effect of row orientation, tree height, time of year and latitude on light interception and distribution in model apple hedgerow canopies. Journal of Horticultural Science, 64: 137-145.

Purohit, A.G. (1988). High density planting of fruit trees - A review, definition, concepts and effect on utilization of resources, tree growth and yield Maharashtra. African University Journal, 13(2) : 152-57.

Sharma, Y.K., Goswami, A.M. and Sharma, R.R. (1992). Effect of dwarfing aneuploid guava rootstock in high density orcharding. Indian Journal of Horticulture, 49(1): 31-36.

Singh, A. and Dhaliwal, G.S. (2007). Solar radiation interception and its effect on physical characteristics of fruits of guava cv. Sardar. Acta Horticulture, 735: 297-302.

Singh, A., Dhaliwal, G.S. and Hundal, S.S.(2005). Effect of planting distance on radiation interception behavior of guava (Psidiumguajava L.). Journal of Agrometeoro-logy, 7(2): 220- 224.

Singh, G. and Canaan, Y.R. (2005). Influence of pruning intensity and pruning frequency on vegetative and reproductive attributes in guava cv. L-49 Abstract: 1st Inter Guava Symposium, CASH , Lucknow Pp: 52.

Singh, G.(2008). High density and meadow orcharding in guava. A technical bulletin published by Central Institute for Sub-tropical horticulture, Lucknow. Pp: 1-20

Singh, I.S., Singh, H.K. and Chauhan, K.S.(1980). Effect of high and low density plantation on yield and quality of guava under semi-arid conditions. Journal of Research-. Haryana Agric. Univ.,10: 421-423.

Singh, V.K. and Singh, G. (2007). Photosynthesis efficiency. Canopy micro climate and yield of rejuvenated guava trees. Acta Horticulture.735: 249-257. 14. Tiwari, R.B., Tiwari, J.P. and Lal, S. (1992). Effect of shoot pruning, NAA and urea on cropping pattern of guava. Indian Journal of Horticulture, 49: 305- 308.

Singh, I.S., Singh, H.K. and Chauhan, K.S.(1980). Effect of high and low density plantation on yield and quality of guava under semi-arid conditions. Journal of Research-. Haryana Agric. Univ.,10: 421-423.

Singh, V.K. and Singh, G. (2007). Photosynthesis efficiency. Canopy micro climate and yield of rejuvenated guava trees. Acta Horticulture.735: 249-257.

Rawal, R.D. and Ullasa, B.A. (1988). Management of fruit diseases of guava *Psidium guajava L*. Through fungicidalsprays. *Indian J.Agric. Sci*., 58:950-52.
Singh G (2013). Guava. Westuille Publication House, New Delhi, India.
SinghG,SinghAKandVermaA (2000).Economicevaluation of crop regulation treatments in guava (*Psidium guajava L*). *Indian Journal of Agricultural Sciences* 70(4): 226-230.
Singh, G., and Reddy, Y.T.N. (1997). Regulationof Cropping in guava. *Indian J. Hort*., 54:44-49.
SinghG,SinghAKandVermaA (2000).Economicevaluation of crop regulation treatments in guava (*Psidium guajava L*). *Indian Journal of Agricultural Sciences* 70(4): 226-230.
Singh, G., Singh, A.K. andPandey, D. (2000). Effect of cropping pattern on fruiting behaviour of guava (Psidium guajava L.).*Tree Am. Agric. Res*, 22:175-82.
Singh R (1963). Fruits. National Book Trust, New Delhi, India, pp 135-144.

Singh S and Singh J (2011). Regulation of cropping in guava. *Orissa Journal of Horticulture* 29(2): 97-99.