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A Review on Foliar Spray of Zinc Sulphate and Gibberelic Acid on Guava

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Guava (*Psidium guajava L.*), "the apple of the tropics", is one of the most common fruits in India. The guava belongs to the family 'Myrtaceae'. It is originated from tropical America and is a subtropical, hardy, evergreen fruit tree. The Guava covers an area of 2.20 Lac ha. Bihar has largest area covering about 29.2 thousand ha. followed by Uttar Pradesh (39.9 thousand ha.) and Karnataka (7.2 thousand ha.) The average productivity of guava is 12 mt/ha. The productivity is higher in M.P i.e. 29 mt/ha (Mishra and Singh, 2005). Guava produced in Allahabad region of U.P. is best in the quality in the world (Chadha, 2001). It is highly tolerant to alkaline and saline soils and it can be grown successfully even upto pH 8.5, it can withstand to the maximum temperature at 46 0C, even with scantly rainfall of less than 25 cm. Guava in one of the cheapest and good source of Vitamin-C and pectin. The ripe its contain 86.9% moisture, 19.3% dry matter, 0.76% ash, 0.40% crude fat, 1.13% crude protein and 6.2% crude fiber but its composition varies widely with cultivars, stage of maturity and season (Ghosh and Chattopadhyay, 1996). In northern India, guava flowers mainly twice in a year, April-May which provides the crop in. rainy season, whereas, August-September flowering gives the winter season crop. In Maharashtra and Tamil Nadu, there is a third crop produced with flower appearing in October-November. The natural fruits setting in guava are quite high (80-86%) of which only 34-36% fruit reach maturity. Guava fruits are consumed either fresh or processed in the form of product like jam, jelly, nectar and good quality RTS beverages. The rainy season crop of guava is rough, insipid, poor in quality, less nutritive and it is attacked by several insect-pest and diseases. On the other hand, winter season crop is superior in quality, free from the pest and diseases, having long storage life. It further needs improvement in nutritive value, market value and demand so that it fetches more prices in market as compared to the rainy season crop. Recently it was observed that foliar application of plant growth regulator (GA3) exerted favorable effect on the physico--chemical characters of guava fruits at harvest (Kher et al. 2005). Micronutrients such as Zinc play important role in growth and development of fruits, vegetables and cereals. It is one of the essential elements for the formation of chlorophyll and hence useful towards photosynthetic activity. Zinc is a constituent of some enzymes and possibly takes part in synthesis on Indol Acetic Acid in plant.

Botanical Description of Guava

Guava is scientifically known as *Psidium guajava* and it is native to tropical Americal Americas. Guava is a shrub typically of not more than 5-10m but can sometimes reach a height of 15m. The trunk is covered with greyish-brown bark that is smoothed and flaky. The leaves are simple and oppositely arranged with the entire leaf margin. The flowers have 4 petals and 4 sepals with numerous stamens. Fruits are round with light green to the yellow outer skin and juicy pulp that is perforated with many with seeds. which commonly known as Yel . Regional name Marathi - Bor, Hindi – Ber, Sanskrit – Badri, Tamil – Elandhai, Manipuri – Boroi Indian Jujube, Indian Plum comes in category Fruit Plants, Trees. Which belongs to family Rhamnaceae. Which require high sun light and normal water for growth . ber was primarly grown for fruit and seed. Flowering season of ber was April, May, June, July, August, September , October. with Flower colour of Green and Yellow and Foliage colour was Green Normally Plant Height of ber plant is 8 to 12 meters long and Plant Spread or Width is 6 to 8 meters plant spreading upright or erect. Special Character of ber plant is it is a Indigenous (native to India) Fragrant flowers or leaves. Ber plants are Good for screening and also good for hedges and borders.

Origin

Tropical America (from Mexico to Peru) Guava is a subtropical crop. It is one of the most common and major fruits of India and is considered the fourth most important fruit in area and production after mango, banana, and citrus. It is a hardy and prolific bearer and highly remunerative fruit. Guava is native to tropical America and seems to have been growing from Mexico to Peru. It is believed to be introduced in to India during early 17th century. In A.P it is commercially grown in Telengana, North coastal districts and Ananthapur in Rayalaseema. Guava is the rich source of Vitamin C, and a fair source of Vitamin A and B2 and minerals like calcium, phosphorus and iron. The vitamin C content of Guava is 2-5 times higher than oranges.

Climate

Guava cultivation can be extended to varying agro-climatic regions owing to wider adaptability. Guava can be successfully cultivated both under tropical and subtropical conditions. It does well up to an altitude of 1,000-1,500 meters. It grows best with an annual rainfall below 100cm restricted between June-September. Places having more than 250cm rainfall are not suitable for guava. Optimum temperature requirement is 23-28OC.

Soil

Guava adapts well to a wide range of soils. Well-drained, light sandy loam to clay soils is good. Since it is a hardy fruit crop, it can be grown on alkaline soils wastelands etc. It is sensitive to waterlogged conditions. It tolerates a wide range of pH from 4.5 to 8.5.If the soils are having a pH of 7.5 and above there are more chances of getting guava wilt. Some varieties like Lucknow- 49 can be grown in saline soils also.

Economic Significance

- Fruits are eaten as such or canned, preserved spiced or made into jam, butter, marmalade, pies, ketchups and chutneys. Are one of the richest source of Vitamin C. Dehydrated guavas may be reduced to a powder which can be used to flavour ice cream, confections and fruit juices, or boiled with sugar to make jelly, or utilized as pectin to make jelly of low-pectin fruits. Seeds yield a fatty

oil. Leaves contain an essential oil which is used as flavouring.

- Leaves used as an astringent for bowel troubles; also used for tanning. Decoction of bark given in diarrhoea. Fruits tonic, cooling, and laxative, useful in colic and bleeding gums. The leaf decoction is taken as a remedy for coughs, throat and chest ailments, gargled to relieve oral ulcers and inflamed gums; and also taken as a vermifuge, and treatment for leucorrhoea. It has been effective in halting vomiting and diarrhoea in cholera patients. It is also applied on skin diseases. A decoction of the new shoots is taken as a febrifuge. The leaf infusion is prescribed in India in cerebral ailments and nephritis. A combined decoction of leaves and bark is given to expel the placenta after childbirth.

Effect of Gibberellic Acid on Growth0, Yield and Quality

The maximum number of fruits per plant (122.00) was recorded with T18 (Two spray GA3 100 ppm + Urea @ 2 %) treatment. However, the minimum number of fruits per plant (79.66) was recorded under control treatment. The higher number of fruits per plant might be due to fact that nitrogen is component of chlorophyll and gibberellic acid help in chlorophyll formation that regulate the buildup of proper C: N ratio, which controls the flowering and fruiting of plants. It is also assumed that gibberellin play role in photosynthetic activity and better translocation of metabolites for developing fruit lets. However, the minimum weight of fruit (146.44 g) was recorded under control. Increase in fruit weight may be attributed to the strengthening of middle lamella and consequently cell wall, which later may have increase solutes in free passage of the fruits. By the application of GA3 with urea certain changes of fruit are improved which reflected in more accumulation of water and enhanced deposition of soluble solids. However, the minimum estimated fruit yield (3.26 tonnes / ha.) was recorded under control. The increased yield attributes particularly increased number of fruit per plant and yield (kg per plant) which contributed towards such an increase in average yield tonnes per hectare in guava. On the basis of results obtained from the field experiment, it may be concluded that the foliar spray of GA3, However, among different interaction treatments, T18 treatment (Two spray of GA3 100 + Urea 2 %) has given significantly maximum number of fruits per plant, fruit weight, fruit yield per plant, estimated yield per hectare and ascorbic acid. Further, T17 treatment (Two spray of GA3 100 + Urea 2 %) has also significantly maximum TSS, total sugar, reducing sugar content of fruit.

Effect of Zinc Sulphate on Growth, Yield and Quality

The data presented in table 2 revealed that foliar application of nutrients in general (treated) improved all fruit characters and yield significantly by larger margin over simple water spray (control) treatment. It might be attributed to the fact that Boron and Zinc appear to have indirect role in hastening the process of cell division and cell elongation which perhaps improved the size, weight and volume of fruits and finally the fruit yield per plant. Among nutrient spray treatments, increasing levels of Zn So4 spray increased fruit weight, fruit volume and fruit yield per plant with upto 1.00% Zn So4 solution spray which was found at par with 0.75% solution spray of Zn So4. Increasing levels of boron spray were found more effective on fruit characters and yield than Zn So4 sprays. Fruit length, width, weight, volume and yield per plant were recorded significantly highest values with highest level of 0.6% borax solution spray. It is believed that boron improves the physiological activities of plant which might have improved size, weight, volume of fruits and ultimately higher fruit yield per plant. Besides, fruit yield per plant is also attributed to fruit retention percentage. Thus, fruit yield per plant seems to be the combined effect on single fruit weight and number of fruits per plant. borax solution spray. However, effect of increasing borax levels was found more than Zn So4 in all cases. It might be attributed to the fact that boron directly affects the photosynthesis activity of plant and helps in sugar transport. Besides, the boron also plays an important role in activating the synthesis of ascorbic acid. The results of present study may be

concluded that foliar spray of Borax @ 0.6% solution and of Zn So4 @ 0.75% solution on guava plants twice i.e. once before first flowering and again after fruit setting are beneficial to get higher yield of quality fruits from winter season crop. This practice improved flowering, fruit set, fruit retention, fruit size, weight, volume, yield per plant and fruit quality parameters viz., total sugar, TSS and Ascorbic acid significantly over other practices of foliar nutrient application

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