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STUDY ON THE COMPARATIVE EFFECT OF FOLIAR SPRAY OF NEW GENERATION, PLANT GROWTH REGULATORS NAA AND MICRONUTRIENTS ON FLOWERING OF GUAVA *(PSIDIUM GUAJAVA* L.*)* UNDER MEADOW PLANTING SYSTEM

G. Lakshmi[1]*, D. Naga Harshita[2], Veena Joshi[2] and G. Sathish[3]

[1]Department of Fruit Science, Sri Konda Laxman Telangana Horticultural University, Mulugu, Siddipet, Telangana, India.
[2]College of Horticulture, Rajendranagar, Hyderabad, Telangana, India
[3]Post Graduate Institute Horticultural Science, Sri Konda Laxman Telangana Horticultural University, Mulugu, Siddipet, Telangana, India.
*Corresponding author E-mail: lakshmigulli5@gmail.com
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ABSTRACT

The present investigation entitled "Study on the comparative effect of foliar spray of new generation plant growth regulators, NAA and micronutrients on flowering of guava (*Psidium guajava* L.) under meadow planting system.'' was conducted from November 2024 to March 2025 at the Centre of Excellence, Mulugu, Siddipet district, SKLTGHU, Telangana. The experiment was conducted in a randomized design with factorial concept in three replications. The results revealed that Allahabad Safeda with nitrobenzene @1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% recorded minimum number of days for flowering (33.01) and maximum number of flowers per shoot (27.89) in guava however Allahabad Safeda with NAA @ 200ppm + $ZnSO_4$@ 0.2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% recorded minimum percentage of flower drop (22.80%).This suggest that nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2% showed best results in terms of number of days for flowering and number of flowers per shoot whereas NAA@ 200ppm + $ZnSO_4$@ 0. 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% recorded best results in flower drop (%)

***Key words*: New generation plant growth regulators, NAA, guava, flowering**

Introduction

Guava (*Psidium guajava* L.), is also known as the "Apple of the tropics," is a crucial fruit crop in tropical and subtropical regions. Belonging to the Myrtaceae family, it is native to Tropical America, ranging from Mexico to Peru. Over time, guava has gained commercial importance in various countries due to its dense foliage, abundant fruit production, rich in vitamin C content, appealing aroma and excellent flavor (Bhimrao, 2020). Guava was introduced to India by the Portuguese in the 17th century and has been cultivated ever since (Rajan *et al.*, 2007). In India, guava is cultivated in an area of 307 thousand hectares with a production of 4516 thousand metric tonnes and productivity of 14.58 metric tonnes per hectare (NHB, 2021- 2022). Guava as a low-calorie fruit, it is packed with dietary fiber. The fruit is an excellent source of vitamin C (235 mg/100g) and pectin (1.15%). Additionally, guava contains notable amounts of essential minerals, including phosphorus (23 to 37 mg/100g), calcium (14 to 30 mg/100g) and iron (0.6 to 1.4 mg/100g).

In South India, guava trees flower three times annually during the ambe bahar (February-March), mrig bahar (June-July), and hasth bahar (October-November) seasons. However, in other regions of South India, flowering occurs twice a year (Samson, 1980). Guava exhibits a naturally high fruit set, with approximately 80 to 86 percent of flowers developing into fruits. However, due to significant fruit drop, only about 34 to 56 percent of these fruits reach full maturity (Singh and Hoda, 1996). The quality of guava fruit is more significantly influenced

Table 1: Effect of pre harvest spray of plant growth regulators and micronutrients on days required for floral bud initiation of guava(*Psidium guajava* L.).

Treatments	Sprayings								
Varieties	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**	**S_6**	**S_7**	**S_8**	**Mean**
Allahabad Safeda	23.92	21.71	23.08	22.37	22.56	21.49	19.24	23.65	**22.25**
Lucknow-49	22.04	19.19	23.68	22.37	23.93	21.14	22.99	25.15	**22.56**
Mean	**22.98**	**20.45**	**23.38**	**22.37**	**23.25**	**21.32**	**21.12**	**24.40**	
	SE(m)±			**CD at 5%**			**CV%**		
Varieties(V)	0.46			NS			10.06		
Sprayings(S)	0.92			NS			-		
V×S	1.30			NS			-		

S_1- Triacontanol @100 ppm; **S_2**- Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**- NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control

by temperature and humidity during the winter season compared to the rainy season. In contrast, the summer season sees a decline in fruit set and an increase in fruit drop due to high temperatures and low humidity. Producing high-quality fruits during the off-season can enhance consumer appeal and necessitate prices in the market (Vani. 2019).

Plant growth regulators (PGRs), whether naturally occurring or synthetically produced, influence plant hormones by either promoting or inhibiting their activity (Kumar *et al.*, 2012). Triacontanol and nitrobenzene are recognized as new-generation plant growth regulators holding significant potential for enhancing crop productivity (Mani *et al.*, 2021).

Naphthalene acetic acid (NAA), an auxin-based growth regulator, reduces fruit drop and enhances fruit set. It also improves fruit quality, especially total soluble solids (TSS) (Badal & Thripathi, 2021). Triacontanol boosts photosynthesis by enhancing net assimilation, leading to greater dry matter, fruit weight, and overall plant growth. It also improves flowering, fruit set, and fruit quality (Eriksen *et al.*, 1981). Nitrobenzene, combined with seaweed-derived growth regulators, acts as a plant energizer, enhancing flowering and improving yield potential (Aziz & Miah, 2009). In addition to these well-established PGRs, there are certain regulators whose effectiveness has been scientifically validated but remain underutilized. This limited adoption is primarily due to technological gaps and insufficient awareness regarding their impact on fruit crops. Zinc (Zn) is vital for enzymatic activity, chlorophyll production, and sugar metabolism, promoting overall growth and fruit development. Its application enhances fruit weight, size, and quality (Jayachandran *et al.*, 2005). Boron (B) supports cell division, nutrient balance, and sugar transport, enhancing nitrogen use and cell wall formation. Its pre-bloom application boosts pollen viability and fruit set (Hada, 2013). Magnesium (Mg) is vital for photosynthesis, protein synthesis, and carbohydrate transport, enhancing crop yield and quality. Its deficiency reduces photosynthetic efficiency and leads to poor plant health (Jitendra *et al.*, 2019). Copper (Cu) is essential for enzyme function, carbohydrate and protein use, and reproductive growth in plants. Deficiency causes shoot dieback, leaf spotting, delayed flowering, and early aging (Jat *et al.*, 2020).

The quality of summer crop fruits is good and demand is high, but yield is very low. Though various experiments have been conducted earlier on use of growth regulators and micronutrients for flowering and yield in guava, the percentage of flowering and fruiting, poor fruit retention, poor yield and quality of fruits are of still a major concern of the fruit growers. Also, meagre work has been done on the foliar sprays of new generation plant growth

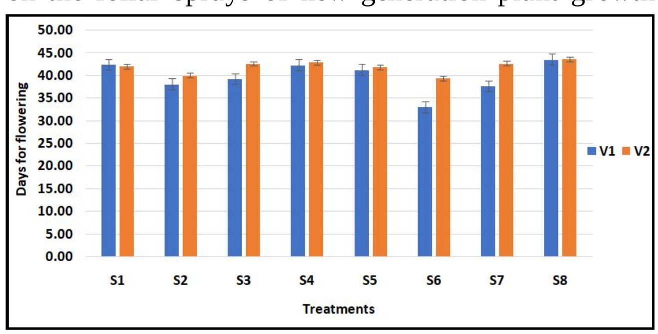

Fig. 1: Effect of pre harvest spray of plant growth regulators and micronutrients on number of days for flowering of guava (*Psidium guajava* L.). **[V_1**-Allahabad safeda; **V_2**-Lucknow-49; **S_1**- Triacontanol @100 ppm; **S_2**- Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**- NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control]

Table 2: Effect of pre harvest spray of plant growth regulators and micronutrients on number of days for flowering of guava(Psidium guajava L.).

Treatments	Sprayings								
Varieties	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**	**S_6**	**S_7**	**S_8**	**Mean**
Allahabad Safeda	42.44	38.06	39.27	42.31	41.23	33.01	37.67	43.52	**39.69^{B}**
Lucknow-49	41.99	39.99	42.61	42.92	41.85	39.41	42.65	43.58	**41.88^{A}**
Mean	**42.21^{ab}**	**39.02^{bc}**	**40.94^{ab}**	**42.61^{ab}**	**41.54^{ab}**	**36.21^{c}**	**40.16^{ab}**	**43.55^{a}**	
	SE(m)±			**CD at 5%**			**CV%**		
Varieties(V)	0.41			1.20			5.02		
Sprayings(S)	0.83			2.41			-		
V×S	1.18			3.41			-		

S_1- Triacontanol @100 ppm; **S_2**- Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**- NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control

regulators in guava especially in summer crop. Therefore, based on the possible benefits of triacontanol and nitrobenzene, the present work has been done.

Material and Methods

The research work was conducted in 7 years old established guava orchard at Centre of excellence, Mulugu Centre of excellence, Mulugu, situated at an atltitude of 611 feet above mean sea level on 17.72 north latitude and 78.62 east longitude. The experiment was laid out in a Factorial Randomized Block Design (FRBD) with sixteen treatments and three replications. Factor 1: V_1-Allahabad Safeda, V_2-Lucknow-49, Factor 2: Growth regulators and micronutrients sprayings S_1- Triacontanol @ 100 ppm, S_2- Nitrobenzene @ 1000 ppm, S_3- NAA @ 200 ppm, S_4- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%, S_5- Triacontanol@ 100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%, S_6- Nitrobenzene@ 1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @0.2% + $MgSO_4$ @ 0.2%, S_7- NAA @200ppm + $ZnSO_4$ @ 2% + Boric acid@ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%, S_8- Control. The study was carried out with 16 different treatments involving different combinations Factor 1 and 2.

To prepare the aqueous solution of NAA at 200 ppm, 2 g of Naphthalene Acetic Acid was weighed and dissolved in a small amount of 1N NaOH, the solution was then diluted with distilled water to a final volume of 10 litres.Triacontanol solution is prepared by dissolving 0.1g of triacontanol in a small volume of a suitable solvent etanol and mixed well until it dissolved fully and diluted with 1 litre of water. Nitrobenzene solution is prepared by dissolving 1 gram in small amount of water and volume made upto 1 litres with distilled water. Boron, zinc, magnesium, and copper solutions at 0.2% concentration were prepared by dissolving 20 g each of boric acid, zinc sulphate, magnesium sulphate, and copper sulphate in a small amount of distilled water, then making up the volume to 10 litres for each. The plant growth regulators and micronutrients were applied using a hand sprayer. Four branches were randomly tagged and observations are taken.

Result and Discussion

Days required for floral bud initiation

The data pertaining to pre harvest spray of plant growth regulators and micronutrients on days required for floral bud initiation of guava (*Psidium guajava* L.) are presented in the Table 1.

Regarding days required for floral bud initiation on varieties, non-significant effect was observed in guava. Plant growth regulators and micronutrients also showed non-significant effect on days required for floral bud initiation in guava. It was observed from the data that

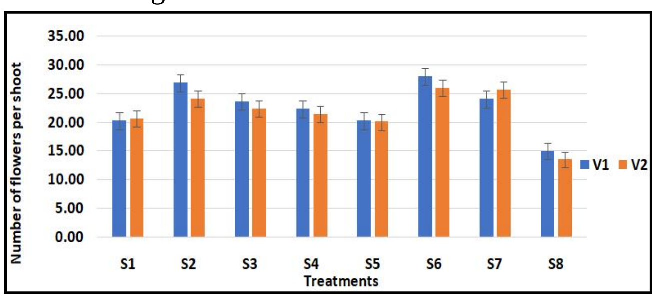

Fig. 2: Effect of pre harvest spray of plant growth regulators and micronutrients on number of flowers per shoot of guava (*Psidium guajava* L.). [**V_1**-Allahabad safeda; **V_2**-Lucknow-49; **S_1**- Triacontanol @100 ppm; **S_2**-Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**-$ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**-NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control]

Table 3: Effect of pre harvest spray of plant growth regulators and micronutrients on number of flowers per shoot of guava (*Psidium guajava* L.).

Treatments	Sprayings								
Varieties	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**	**S_6**	**S_7**	**S_8**	**Mean**
Allahabad Safeda	20.25	26.78	23.56	22.22	20.19	27.89	24.01	14.98	**22.49^{A}**
Lucknow-49	20.54	24.03	22.36	21.39	20.03	25.93	25.59	13.47	**21.67^{B}**
Mean	**20.40^{e}**	**25.41^{ab}**	**22.96^{cd}**	**21.81d^{e}**	**20.11^{e}**	**26.91^{a}**	**24.80^{bc}**	**14.23^{f}**	
	SE(m)±			**CD at 5%**			**CV%**		
Varieties(V)	0.22			0.65			5.06		
Sprayings(S)	0.45			1.31			-		
V×S	0.64			1.86			-		

S_1- Triacontanol @100 ppm; **S_2**- Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**- NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control

interaction effect of varieties, plant growth regulators and micronutrient exhibited a non-significant result on days required for floral bud initiation in guava.

Number of days for flowering

The data related to the pre harvest spray of plant growth regulators and micronutrients on number of days for flowering of guava (*Psidium guajava* L.) are presented in the Table 2 and represented in Fig. 1. In the present investigation varieties had significant effect on number of days for flowering in guava. Among two varieties, minimum number of days for flowering (39.69 days) was observed in Allahabad Safeda and maximum number of days for flowering (41.88 days) were observed in Lucknow-49. Plant growth regulators and micronutrients had significant influence on number of days for flowering. Minimum days for flowering (36.21 days) was observed in Nitrobenzene @ 1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% which was statistically on par with Nitrobenzene@1000 ppm (39.02 days). Maximum days for flowering (43.55 days) was observed in control.Regarding the interaction of varieties, plant growth regulators and micronutrients, significant difference was observed in number of days for flowering. Minimum number of days for flowering (33.01 days) was observed in Allahabad Safeda with Nitrobenzene @ 1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%. Maximum number of days for flowering (43.58 days) was observed in Lucknow-49 with control.

The present study demonstrated that plant growth regulators and micronutrients had a significant positive effect on the number of days for flowering. Application of nitrobenzene and its movement to the axillary buds might have enhanced sink strength and quicker translocation of photo-assimilates. This enhanced resource allocation might have supported an earlier shift from the vegetative to the reproductive stage, as early initiation of flower buds could be attributed to the activation of specific metabolic pathways and a reduction in the carbon-to-nitrogen ratio, due to a notable buildup of carbohydrates (Kohombang *et al*., 2019).

This might also be due to the ability of zinc in enhancing auxin synthesis in plants, boron in regulating metabolic processes such as carbohydrate translocation, cell wall development, and RNA synthesis (Ram and Bose, 2000), magnesium playing a crucial role in photosynthesis, carbohydrate transport, and the synthesis of proteins and nucleic acids (Jitendra *et al*., 2019). Also, copper (Cu), a crucial component of enzyme systems involving in the utilization of carbohydrates and proteins, playing a significant role in reproductive growth (Jat *et al*., 2020), further leading to early flowering in guava.

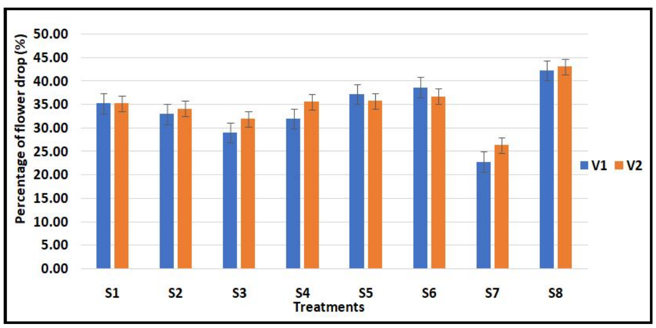

Fig. 3: Effect of pre harvest spray of plant growth regulators and micronutrients on percentage of flower drop of guava (*Psidium guajava* L.). **[V_1**-Allahabad safeda; **V_2**-Lucknow-49; **S_1**- Triacontanol @100 ppm; **S_2**-Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**-$ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**-NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control]

Table 4: Effect of pre harvest spray of plant growth regulators and micronutrients on percentage of flower drop (%) of guava(*Psidium guajava* L.).

Treatments	Sprayings								
Varieties	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	Mean
Allahabad Safeda	35.23	32.97	28.99	31.94	37.20	38.67	22.80	42.23	**33.75^{B}**
Lucknow-49	35.23	34.10	31.97	35.61	35.77	36.79	26.37	43.11	**34.87^{A}**
Mean	**35.23^{bc}**	**33.54^{cd}**	**30.48^{d}**	**33.77^{c}**	**36.48^{bc}**	**37.73^{b}**	**24.59^{e}**	**42.67^{a}**	
	SE(m)±			CD at 5%			CV%		
Varieties(V)	0.35			1.03			5.10		
Sprayings(S)	0.71			2.06			-		
V×S	1.01			2.91			-		

S_1- Triacontanol @100 ppm; **S_2**- Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**- NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control

Similar findings were observed in findings of Kohombange *et al*., (2019) in sweet cucumber.

Number of flowers per shoot

The data reflecting pre harvest spray of plant growth regulators and micronutrients on number of flowers per shoot in guava (*Psidium guajava* L.)are presented in the Table 3 and represented in Fig. 2. With regarding varieties, significant effect on number of flowers per shoot was observed in guava. Among two varieties, maximum flowers per shoot (22.49) were observed in Allahabad Safeda and minimum flowers per shoot (21.67) were observed in Lucknow-49. Plant growth regulators and micronutrients had significant influence on number of flowers per shoot. Maximum flowers per shoot (26.91) was observed in Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid@ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% which was statistically on par with Nitrobenzene@1000 ppm (25.41). Minimum flowers per shoot (14.98) were observed in control.Interaction of varieties, plant growth regulators and micronutrients showed significant difference in number of flowers per shoot. Maximum number of flowers (27.89) were observed in Allahabad Safeda with Nitrobenzene @1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%. Minimum flowers per shoot (13.47) were observed in Lucknow-49 with control.

The nitrobenzene could be rapidly absorbed by plants modulating their biochemical pathways, leading to enhanced nutrient use efficiency. This, in turn, might have promoted improved vegetative and reproductive growth (Tania *et al*., 2020). Also, application of micronutrients i.e., boron applied in the form of borax might have enhanced phenological traits of plants and stimulated flowering related characteristics (Raipuriya *et al*., 2024), zinc contributing to improved plant growth and flowering (Kumar *et al*., 2017), magnesium regulating the absorption of other nutrients (Ram and Bose, 2000), copper acting as a cofactor for several enzymes that are crucial to vital processes such as photosynthesis and respiration and various metabolic functions (Jayakumar *et al*., 2024), ultimately resulting in maximum flowers per shoot. Similar findings were observed in the works

Table 5: Effect of pre harvest spray of plant growth regulators and micronutrients on days taken for 50% flowering in guava (*Psidium guajava* L.).

Treatments	Sprayings								
Varieties	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	Mean
Allahabad Safeda	45.27	43.20	42.62	44.88	43.07	44.23	40.74	45.30	**43.66**
Lucknow-49	40.53	43.30	42.34	43.16	41.20	43.67	41.76	45.47	**42.68**
Mean	**42.90**	**43.25**	**42.48**	**44.02**	**42.13**	**43.95**	**41.25**	**45.38**	
	SE(m)±			CD at 5%			CV%		
Varieties(V)	0.80			NS			9.13		
Sprayings(S)	1.61			NS			-		
V×S	2.27			NS			-		

S_1- Triacontanol @100 ppm; **S_2**- Nitrobenzene @1000 ppm; **S_3**- NAA @ 200 ppm; **S_4**- $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2%+ $MgSO_4$ @ 0.2%; **S_5**- Triacontanol@100 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_6**-Nitrobenzene@1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @0.2%; **S_7**- NAA@ 200ppm + $ZnSO_4$ @ 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%; **S_8**- Control of Tania *et al*., (2020) in cucumber and Raipuriya *et al*., (2024) in guava.

Percentage of flower drop (%)

The data concerningpercentage of flower drop in guava affected by pre harvest spray of plant growth regulators and micronutrients are presented in the Table 4 and represented in Fig. 3.

In the present investigation, varieties showed significant difference in percentage of flower drop in guava. Among the varieties, minimum percentage of flower drop (33.75%) was observed in Allahabad Safeda and maximum percentage of flower drop (34.87%) was observed in Lucknow-49. Plant growth regulators and micronutrients had significant influence on percentage of flower drop. Minimum percentage of flower drop (24.59%) was observed in NAA@200 ppm + $ZnSO_4$ @ 0.2% + Boric acid@ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% followed by NAA @ 200 ppm (30.48). Maximum flower drop (42.67%) was observed in control.Regarding the interaction effect of varieties, plant growth regulators and micronutrients, significant difference was observed on percentage of flower drop in guava. Minimum percentage of flower drop (22.80%) was observed in Allahabad Safeda with NAA@200 ppm + $ZnSO_4$ @ 0.2% + Boric acid+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2%. Maximum percentage of flower drop (43.11%) was observed in Lucknow-49 with control.

NAA might have enhanced the internal concentration of auxin, a hormone essential for initiating floral primordia and in determining both the quantity and types of floral organs (Cheng and Zhao, 2007). Boron might have enhanced phenological traits of plants and stimulated flowering-related characteristics and thereby contributing to improved reproductive development and overall plant productivity. Zinc affects auxin metabolism and protein synthesis, both of which play essential roles in ensuring proper flowering and fruit development (Raipuriya *et al*., 2024). Also, copper and magnesium play vital roles in plant growth and development by enhancing flowering and supporting the absorption of essential macronutrients (Sushmitha, 2015). All these might have contributed for minimum percentage of flower drop by the application of NAA and micronutrients.These findings are consistent with those reported by Dubey *et al*., (2002) and Yadav *et al*., (2001) in guava, as well as by Ram *et al*., (2005) in ber.

Days taken for 50 % flowering

The data pertaining to effect of pre harvest spray of plant growth regulators and micronutrients on days taken for 50 % floweringinguava (*Psidium guajava* L.) are presented in the Table 5.

In the present investigation on days taken for 50 % flowering, a non-significant result was observed with different varieties, plant growth regulators micronutrients and their interaction in guava.

Conclusion

Based on the results of present study it could be concluded from the field experiment that nitrobenzene @1000 ppm + $ZnSO_4$ @ 0.2% + Boric acid @ 0.2% + $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% showed best results in terms of number of days for flowering and number of flowers per shoot whereas NAA@ 200ppm + $ZnSO_4$ @ 0. 2% + Boric acid @ 0.2%+ $CuSO_4$ @ 0.2% + $MgSO_4$ @ 0.2% recorded best results in flower drop (%).

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