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GROWTH AND FLOWER YIELD AS INFLUENCED BY PRUNING DATES AND MICRONUTRIENT DOSES IN *Jasminum sambac* CV. CO.1 GUNDUMALLI

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ABSTRACT

Jasminum sambac Ait. is an important commercial crop known for its loose flowers, and it is crucial to optimize both pruning techniques and the application of micronutrients to enhance its growth and yield. A field experiment was conducted from 2024 to 2026 at Dr. Y.S.R. Horticultural University, located in Venkataramannagudem. This study employed a Factorial Randomized Block Design, incorporating four different pruning dates along with four various foliar micronutrient treatments. The combined results indicated that pruning on December 25, alongside the application of $FeSO_4$ (0.5%) + $ZnSO_4$ (0.5%) + $MgSO_4$ (0.5%) (P_1M_3), achieved the highest measurements for plant height (90.89 cm), plant spread (62.83 m²), primary branches (21.13), secondary branches (49.81), total flower yield per plot (2952.02 g), and flower yield per hectare (3416.47 kg). Conversely, pruning conducted on February 25 with water spray treatment (P_4M_4) yielded the lowest measurements across these parameters. The findings of this study suggest that performing pruning on December 25 in conjunction with the foliar application of $FeSO_4$, $ZnSO_4$, and $MgSO_4$ at the specified concentrations significantly boosts both vegetative growth and flower production in *Jasminum sambac* cv. CO.1 Gundumalli.

***Keywords* :** Flower yield, foliar nutrition, *Jasminum sambac*, micronutrients, pruning.

Introduction

Jasmine (*Jasminum sambac* Ait.), belonging to the Oleaceae family, ranks among the three commercially significant jasmine species (*J. sambac*, *J. grandiflorum* and *J. auriculatum*), out of nearly 200 recognized species (Anderson, 1991). India is a major center for its origin, hosting 89 authentic species, with 40 found in the Indian subcontinent (Kiritikar and Basu, 2003). In Andhra Pradesh, during the period of 2025–26, *J. sambac* was cultivated over an area of 11.25 hectares, yielding a total production of 129.33 metric tons (Department of Agriculture & Farmers Welfare, 2026). The flowering season peaks from March to June; however, it diminishes during off-seasons leading to increased market prices. Low temperatures in winter negatively impact flower quality (Su and Wang, 2001). To counter this, winter pruning is employed to stimulate dormant buds, optimize nutrient use and enhance profitability (Pawar *et al*., 2019; Khanchana and Jawaharlal, 2019; Kalaimani *et al*., 2017). Pruning has also shown similar advantageous effects on *Bougainvillea glabra* (Saifuddin *et al*., 2010). Optimal nutrition is crucial for enhancing growth rates, yield levels and flower quality. Micronutrients play a vital role in regulating essential physiological functions (Ganesh and Kannan, 2013). Iron facilitates respiration, photosynthesis, and enzymatic activities (Wallihan *et al*., 1958), while its deficiency leads to chlorosis (Srivastava *et al*., 2003). Zinc contributes to auxin production, carbohydrate metabolism and pollen maturation (Thorne, 1957; Shukla *et al*., 2009), whereas magnesium is critical for chlorophyll synthesis as well as photosynthesis and enzyme activation (Mengel and Kirkby, 2001; Marschner, 2012). A lack of magnesium can diminish photosynthetic efficiency and overall productivity (Marschner, 2012). Consequently, this study aimed to assess the combined influence of pruning techniques and micronutrient applications on the flower yield and quality of *J. sambac*.

Material and Methods

The experiment was conducted from August 2024 to July 2026 at the department of Floriculture and Landscaping, College of Horticulture, Dr. Y.S.R. Horticultural University, Venkataramannagudem. The experiment was laid out in Factorial Randomized Block Design (FRBD) with two replications. The first factor consisted of four levels of pruning dates (P_1, P_2, P_3 and P_4) and the second factor consisted of four levels of micronutrient doses (M_1, M_2, M_3 and M_4). The details of treatment were as follows.

Description of treatments

(P_1M_1)	:	25th December + ($FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3%)
(P_1M_2)	:	25th December + ($FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4%)
(P_1M_3)	:	25th December + ($FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5%)
(P_1M_4)	:	25th December + Water spray
(P_2M_1)	:	15th January + ($FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3%)
(P_2M_2)	:	15th January + ($FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4%)
(P_2M_3)	:	15th January + ($FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5%)
(P_2M_4)	:	15th January + Water spray
(P_3M_1)	:	5th February + ($FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3%)
(P_3M_2)	:	5th February + ($FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4%)
(P_3M_3)	:	5th February + ($FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5%)
(P_3M_4)	:	5th February + Water spray
(P_4M_1)	:	25th February + ($FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3%)
(P_4M_2)	:	25th February + ($FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4%)
(P_4M_3)	:	25th February + ($FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5%)
(P_4M_4)	:	25th February + Water spray

The newly developed *J. sambac* clone, named as CO.1 Gundumalli also known as 'Nine Budded Gundumalli,' has been released by the Department of Floriculture and Landscape Architecture at Tamil Nadu Agricultural University in Coimbatore. This genetically unique variety produces a higher number of nine-budded cymes per plant, making it more prolific and productive compared to the traditional Ramanathapuram Gundumalli variety. Ten months old rooted cuttings were planted in the main field with a spacing of 1.2 x 1.2 meters. Pruning was done according to the treatment schedule upto a height of 50 cm above ground level and foliar application of micronutrients were done at monthly intervals after pruning.

The pruned plants were observed regularly, and the data was recorded for two years (2024-25 and 2025-26) at 30 Days after pruning (DAP), 60 DAP and 90 DAPfor the growth and flower yield parameters *viz*., plant height (cm), plant spread (cm^2), number of primary branches, number of secondary branches, flower yield per plot (g) and flower yield per hectare (kg). The data was analysed as per ANOVA outlined by Panse and Sukhatme (1985).

Results and Discussion

Vegetative parameters

Plant height (cm)

The data on plant height (cm) revealed variation due to pruning dates, micronutrient sprays and their interaction. The corresponding data are presented in Table 1, Fig. 1. In pooled analysis, 25th December pruning (P_1) recorded the maximum value (82.77 cm), followed by 15th January pruning (P_2) (78.94 cm). The minimum value was recorded with 25th February pruning (P_4) (73.62 cm). Among micronutrient sprays, $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (M_3) produced the highest response (82.01 cm), followed by $FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4% (M_2) (79.99 cm). Water spray (M_4) registered the lowest value (68.80cm).For the interaction effect, 25th December pruning + $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (P_1M_3) attained the maximum value (90.89 cm), followed by 25th December pruning + $FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4% (P_1M_2) (87.02cm). The least response was observed with 25th February pruning + Water spray (P_4M_4) (67.18 cm).

Plant spread (m^2)

The analysis of plant spread (m²) indicated notable differences influenced by the timing of pruning, the application of micronutrient sprays, and their interactions. The relevant data is summarized in Table 2. In pooled analysis, pruning on December 25th (P_1) resulted in the highest plant spread at 50.23 m², followed by pruning on January 15th (P_2), which achieved 44.12 m². The lowest plant spread was noted with pruning on February 25th (P_4), measuring 31.35 m².Among the various micronutrient treatments, the combination of $FeSO_4$ at 0.5% + $ZnSO_4$ at 0.5% + $MgSO_4$ at 0.5% (M_3) yielded the greatest plant spread of 48.84 m², succeeded by$FeSO_4$ at 0.4% + $ZnSO_4$ at 0.4% + $MgSO_4$ at 0.4% (M_2), which recorded a spread of 45.34 m², while the water spray (M_4) resulted in the least amount of growth, measuring only 27.70 m².Regarding interaction effects, the combination of December 25th pruning and $FeSO_4$ at 0.5% + $ZnSO_4$ at 0.5% + $MgSO_4$ at 0.5% (P_1M_3) produced the highest plant spread of 62.83 m², followed by, December 25th pruning and $FeSO_4$ at 0.4% + $ZnSO_4$ at 0.4% + $MgSO_4$ at 0.4% (P_1M_2)which reached a spread of 58.83 m². conversely, the least growth was found in the combination of February pruned plants treated with Water spray (P_4M_4), which measured just 23.95 m².

Number of primary branches

Assessment of the number of primary branches revealed a distinct pattern influenced by the various pruning and foliar nutrition treatments applied. The detailed data can be found in Table 3. When analyzing the aggregated values, it was noted that pruning conducted on December 25th (P_1) achieved the highest value at 17.12, while pruning on January 15th (P_2) followed with a value of 15.65. The lowest recorded value was associated with pruning on February 25th (P_4), which stood at 12.68. Among the micronutrient applications, the combination of $FeSO_4$ at 0.4% + $ZnSO_4$ at 0.4% + $MgSO_4$ at 0.4% (M_2) yielded the most significant response at 17.30, equaled by the mixture of $FeSO_4$ at 0.5% + $ZnSO_4$ at 0.5% + $MgSO_4$ at 0.5% (M_3). Additionally, treatment M_3 demonstrated statistical equivalence to the top-performing micronutrient application; in contrast, water spray (M_4) exhibited the lowest response at 10.65. Regarding interaction effects, the combination of December 25th pruning with $FeSO_4$ at 0.5% + $ZnSO_4$ at 0.5% + $MgSO_4$ at 0.5% (P_1M_3) reached a peak value of 21.13, while December pruning combined with $FeSO_4$ at 0.4% + $ZnSO_4$ at 0.4% + $MgSO_4$ at 0.4% (P_1M_2) recorded a value of 19.12. Conversely, the least response was noted for February pruning coupled with water spray (P_4M_4), which measured only 9.11.

Number of secondary branches

Pruning schedules and micronutrient applications, both separately and in combination, had an impact on the number of secondary branches. The relevant data can be found in Tables 4. Analysis of the combined data indicated that pruning on December 25th (P_1) yielded the highest value (42.80), with January 15th pruning (P_2) following closely behind at (40.10). In contrast, the lowest value was associated with February 25th pruning (P_4), which recorded a value of (31.03). Among the various micronutrient sprays applied, the combination of $FeSO_4$ at 0.5%, $ZnSO_4$ at 0.5%, and $MgSO_4$ at 0.5% (M_3) resulted in the most significant effect, producing a value of (42.77). This was followed by $FeSO_4$ at 0.4%, $ZnSO_4$ at 0.4%, and $MgSO_4$ at 0.4% (M2), which achieved a value of (41.50) that was statistically comparable to the top-performing treatment. The water spray (M_4) showed the least effectiveness with a recorded value of (26.48). Regarding interaction effects, the combination of December 25th pruning with $FeSO_4$ at 0.5%, $ZnSO_4$ at 0.5%, and $MgSO_4$ at 0.5% (P_1M_3) reached the highest recorded value of (49.81). This was succeeded by another combination: December 25th pruning with $FeSO_4$ at 0.4%, $ZnSO_4$ at 0.4%, and $MgSO_4$ at 0.4% (P_1M_2), which attained a maximum value of (48.19). Conversely, the least response occurred with February 25th pruning coupled with water spray (P_4M_4), resulting in a value of (22.35).

Pruning on 25th December (P_1) recorded markedly higher growth values than the later dates 15th January (P_2), 5th February (P_3) and 25th February (P_4). Early pruning could have stimulated robust shoot regeneration by removing apical dominance and activating dormant axillary buds, eventually resulting in the increased number of primary and secondary branches and, consequently, greater leaf production as well as greater canopy spread. Plants pruned early also benefited from a longer vegetative period prior to flowering, allowing more light interception and accumulation of photosynthates. Enhanced canopy aeration and light distribution further improved photosynthetic performance, yielding taller plants, larger leaf area and greater biomass. On the contrary, pruning at later dates would not have provided much time for development of sufficient vegetative frame work. Reduced growth under delayed pruning dates, likely resulted from a shortened recovery window and diminished assimilate accumulation.

Comparable results were documented by Ratikanth (2005), Lokhande *et al*. (2015) and Pawar *et al*. (2019) in *J. sambac*, who reported improved height, canopy spread, branching and vegetative vigour with appropriate pruning. Nair *et al*. (2009) in *J. sambac* and Santhoshini (2014) in rose similarly attributed growth improvements to increased light penetration and extended vegetative activity resulted from timely pruning.

The incremental rise in growth parameters by the application of nutrients from a strength of $FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3% (M_1) to $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (M_3) highlights the positive impact of escalating micronutrient concentrations on plant development. Iron, zinc and magnesium are essential for numerous physiological functions underlying growth, iron contributes to chlorophyll formation, electron transport and respiration; zinc regulates auxin production and activates enzymes; magnesium is central in chlorophyll and is vital for photosynthesis and carbohydrate translocation. Increasing micronutrient levels from M_1 to M_3 could enhance chlorophyll content, photosynthetic efficiency and metabolic activity, boosting the accumulation of photosynthetic assimilates and their movement. This supported cell division, elongation and tissue differentiation, manifesting as greater plant height, canopy expansion, branching and foliage development. The superiority of M_3 suggests that its concentration supplied adequate iron, zinc and magnesium to meet crop demands and optimize physiological processes.

Among the combinations tested, P_1M_3 consistently produced the greatest values across all growth metrics, while P_4M_4 yielded the lowest. The superior outcomes under P_1M_3 can be ascribed to the synergistic effect of timely pruning and a balanced foliar supply of iron, zinc and magnesium, which promoted vegetative vigour, canopy spread, nutrient use efficiency and biomass accumulation.

Yield parameters

Flower yield per plot (g)

The experimental treatments produced measurable variation in flower yield per plot (g). The corresponding data are presented in Table 5, Fig. 2. Evaluation of pooled means established that 25th December pruning (P_1) recorded the maximum value (2213.93 g), followed by 15th January pruning (P_2) (2004.71 g). The minimum value was recorded with 25th February pruning (P_4) (1199.96 g). Among micronutrient sprays, $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (M_3) produced the highest response (2232.99 g), followed by $FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4% (M_2) (2053.94 g). Water spray (M_4) registered the lowest value (976.41 g). For the interaction effect, 25th December pruning + $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (P_1M_3) attained the maximum value (2952.02 g), followed by 25th December pruning + $FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4% (P_1M_2) (2796.65 g). The least response was observed with 25th February pruning + Water spray (P_4M_4) (746.22 g).

Flower yield per hectare (kg)

The data on flower yield per hectare (kg) revealed variation due to pruning dates, micronutrient sprays and their interaction. The corresponding data are presented in Table 6.In pooled analysis, 25th December pruning (P_1) recorded the maximum value (2562.25 kg), followed by 15th January pruning (P_2) (2320.12 kg). The minimum value was recorded with 25th February pruning (P_4) (1388.75 kg). Among micronutrient sprays, $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (M_3) produced the highest response (2584.32 kg), followed by $FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3% (M_1) (2377.09 kg). Water spray (M_4) registered the lowest value (1130.03 kg). For the interaction effect, 25th December pruning + $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5% (P_1M_3) attained the maximum value (3416.47 kg), followed by 25th December pruning + $FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4% (P_1M_2) (3236.65 kg). The least response was observed with 25th February pruning + Water spray (P_4M_4) (863.63 kg).

The highest flower bud yield per plot recorded by the treatment combination P_1M_3, can be viewed as the integrated result of improved reproductive efficiency rather than merely vegetative vigour. Optimal pruning could balance vegetative and reproductive growth, by regulating sink strength, while micronutrient application could enhance physiological capacity to sustain continuous flowering. Efficient assimilate partitioning to reproductive organs improved bud retention and reduced bud drop, yielding maximum production. Lokhande *et al*. (2015) emphasized optimum pruning as an effective method to maximize jasmine flower yield. Jennoah*et al*. (2012) also reported that greater carbohydrate reserves after pruning, significantly boosted flower production in *J. sambac*.

Conclusion

Pruning date and foliar application of micronutrients significantly influenced the growth and flower yield of *Jasminum sambac* cv. CO.1 Gundumalli. Among the treatments, P_1M_3 (25 December pruning + $FeSO_4$ 0.5% + $ZnSO_4$ 0.5% + $MgSO_4$ 0.5%) recorded the highest vegetative growth and flower yield. Hence, pruning on 25 December followed by monthly foliar application of $FeSO_4$, $ZnSO_4$ and $MgSO_4$ each at 0.5% is recommended for maximizing productivity under the agro-climatic conditions of Andhra Pradesh.

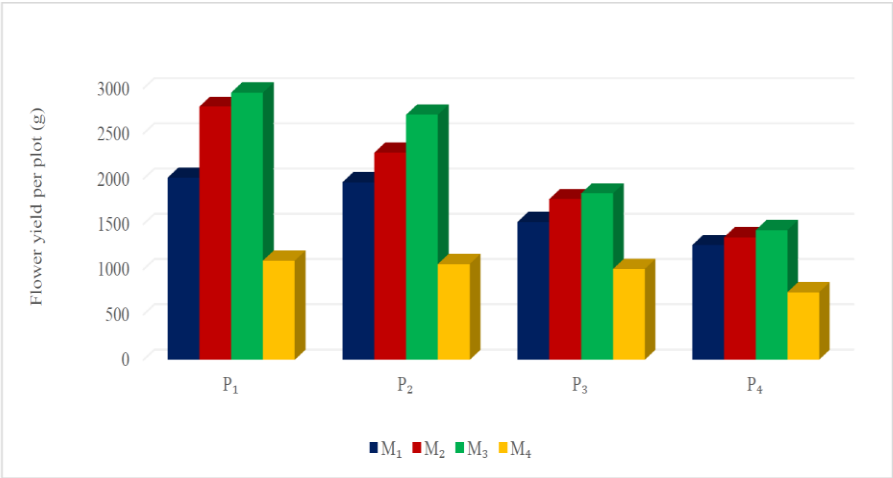

Fig. 1 : Flower yield per plot (g) as influenced by pruning dates and micronutrient sprays.

P_1	:	25th December	M_1	:	$FeSO_4$ @ 0.3% + $ZnSO_4$ @ 0.3% + $MgSO_4$ @ 0.3%
P_2	:	15th January	M_2	:	$FeSO_4$ @ 0.4% + $ZnSO_4$ @ 0.4% + $MgSO_4$ @ 0.4%
P_3	:	5th February	M_3	:	$FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% + $MgSO_4$ @ 0.5%
P_4	:	25th February	M_4	:	Water spray

Pruning on 25th December + application of (FS + ZS + MS) (P_1M_3)

Pruning on 25th February + application of water (P_4M_4)

FS - $FeSO_4$ @ 0.5%; ZS – $ZnSO_4$ @ 0.5%; MS – $MgSO_4$ @ 0.5%

Fig. 2 : Plant height of best and least performed treatments

Table 1 : Plant height (cm) as influenced by pruning dates, micronutrient sprays and their interaction at different growth stages

Pruning dates (P)	30 DAP					60 DAP					90 DAP				
	Micronutrient sprays (M)														
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
P_1	69.61	74.46	78.70	58.12	**70.22**	75.13	80.06	83.93	64.23	**75.84**	82.13	87.02	90.89	71.06	**82.77**
P_2	68.08	71.26	72.53	56.96	**67.21**	73.21	77.10	78.06	61.92	**72.57**	77.95	83.87	84.96	68.99	**78.94**

P_3	63.04	64.69	65.75	56.08	**62.39**	68.15	69.97	70.93	61.26	**67.58**	75.15	76.99	78.09	67.98	**74.55**
P_4	69.15	60.13	61.42	54.63	**61.33**	74.06	65.16	67.19	60.15	**66.64**	81.14	72.07	74.10	67.18	**73.62**
Mean	**67.47**	**67.63**	**69.60**	**56.45**	***65.29***	**72.64**	**73.07**	**75.03**	**61.89**	***70.66***	**79.09**	**79.99**	**82.01**	**68.80**	***77.47***

Factor	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**
P	0.19	0.58	0.07	0.20	0.06	0.17
M	0.19	0.58	0.07	0.20	0.06	0.17
P×M	0.38	1.15	0.13	0.40	0.11	0.34

Table 2 : Plant spread (m^2) as influenced by pruning dates, micronutrient sprays and their interaction at different growth stages

Pruning dates (P)	**30 DAP**					**60 DAP**					**90 DAP**				
	Micronutrient sprays (M)														
	M_1	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**
P_1	39.92	51.02	55.10	25.23	**42.82**	43.12	55.09	59.03	27.88	**46.28**	48.63	58.83	62.83	30.61	**50.23**
P_2	38.93	42.03	46.62	23.99	**37.89**	41.86	45.17	49.96	26.20	**40.80**	45.25	48.49	53.72	29.03	**44.12**
P_3	32.83	33.97	35.68	22.35	**31.21**	35.87	36.99	38.74	24.70	**34.08**	38.55	40.01	41.99	27.20	**36.94**
P_4	26.83	28.39	31.06	19.60	**26.47**	29.56	31.21	34.11	21.81	**29.17**	30.62	34.02	36.82	23.95	**31.35**
Mean	**34.63**	**38.85**	**42.11**	**22.79**	***34.60***	**37.60**	**42.12**	**45.46**	**25.15**	***37.58***	**40.76**	**45.34**	**48.84**	**27.70**	***40.66***

Factor	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**
P	0.07	0.20	0.05	0.15	0.08	0.24
M	0.07	0.20	0.05	0.15	0.08	0.24
P×M	0.13	0.40	0.10	0.31	0.16	0.48

Table 3 : Number of primary branches as influenced by pruning dates, micronutrient sprays and their interaction at different growth stages

Pruning dates (P)	**30 DAP**					**60 DAP**					**90 DAP**				
	Micronutrient sprays (M)														
	M_1	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**
P_1	12.54	15.38	17.36	8.36	**13.41**	14.11	17.19	19.16	10.06	**15.13**	16.29	19.12	21.13	11.93	**17.12**
P_2	12.28	13.12	14.22	7.12	**11.68**	14.43	15.30	16.42	9.25	**13.85**	16.19	17.17	17.88	11.36	**15.65**
P_3	10.40	11.17	11.36	6.24	**9.79**	12.26	13.15	13.30	8.14	**11.71**	14.28	15.22	15.20	10.20	**13.72**
P_4	9.10	9.31	10.08	5.30	**8.45**	11.08	11.30	12.25	7.18	**10.45**	13.26	13.37	14.99	9.11	**12.68**
Mean	**11.08**	**12.25**	**13.25**	**6.75**	***10.83***	**12.97**	**14.23**	**15.28**	**8.65**	***12.78***	**15.00**	**16.22**	**17.30**	**10.65**	***14.79***

Factor	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**
P	0.06	0.20	0.04	0.12	0.05	0.15
M	0.06	0.20	0.04	0.12	0.05	0.15
P×M	0.13	0.39	0.08	0.24	0.10	0.30

Table 4 : Number of secondary branches as influenced by pruning dates, micronutrient sprays and their interaction at different growth stages

Pruning dates (P)	**30 DAP**					**60 DAP**					**90 DAP**				
	Micronutrient sprays (M)														
	M_1	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**
P_1	38.45	41.20	42.51	32.14	**38.57**	41.03	46.42	48.18	28.20	**40.96**	43.18	48.19	49.81	30.03	**42.80**
P_2	36.59	37.72	38.98	29.50	**35.70**	39.95	42.12	44.26	26.42	**38.19**	41.92	44.30	45.96	28.21	**40.10**
P_3	32.38	33.79	34.58	26.50	**31.81**	35.31	37.22	38.31	23.42	**33.57**	37.17	39.11	40.10	25.32	**35.43**
P_4	28.36	29.02	30.34	23.10	**27.70**	30.27	32.23	33.20	20.33	**29.01**	32.19	34.40	35.20	22.35	**31.03**
Mean	**33.94**	**35.43**	**36.60**	**27.81**	***33.45***	**36.64**	**39.50**	**40.99**	**24.59**	***35.43***	**38.62**	**41.50**	**42.77**	**26.48**	***37.34***

Factor	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**	**SEm±**	**CD @ 5%**
P	0.02	0.07	0.07	0.20	0.07	0.21
M	0.02	0.07	0.07	0.20	0.07	0.21
P×M	0.05	0.14	0.13	0.40	0.14	0.41

Table 5. Flower yield per plot (g) as influenced by pruning dates, micronutrient sprays and their interaction during period from February – June.

Pruning dates (P)	2024-25					2025-26					Pooled				
	Micronutrient sprays (M)														
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
P_1	1975.17	2768.61	2924.73	1066.29	**2183.70**	2047.17	2824.68	2979.30	1125.45	**2244.15**	2011.17	2796.65	2952.02	1095.87	**2213.93**
P_2	1928.85	2262.27	2662.56	1027.56	**1970.31**	1995.75	2315.04	2754.24	1091.43	**2039.12**	1962.30	2288.66	2708.40	1059.50	**2004.71**
P_3	1488.87	1740.72	1807.08	970.23	**1501.73**	1559.73	1812.75	1871.70	1037.88	**1570.52**	1524.30	1776.74	1839.39	1004.06	**1536.12**
P_4	1244.13	1329.60	1410.66	718.17	**1175.64**	1291.32	1377.84	1453.68	774.27	**1224.28**	1267.73	1353.72	1432.17	746.22	**1199.96**
Mean	**1659.26**	**2025.30**	**2201.26**	**945.56**	*1707.84*	**1723.49**	**2082.58**	**2264.73**	**1007.26**	*1769.51*	**1691.37**	**2053.94**	**2232.99**	**976.41**	*1738.68*

Factor	SEm±	CD @ 5%	SEm±	CD @ 5%	SEm±	CD @ 5%
P	1.52	4.59	2.96	8.91	2.00	6.03
M	1.52	4.59	2.96	8.91	2.00	6.03
P×M	3.05	9.19	5.91	17.82	4.00	12.07

Table 6 : Flower yield per hectare (kg) as influenced by pruning dates, micronutrient sprays and their interaction during period from February – June.

Flower yield per hectare (kg)															
Pruning dates (P)	2024-25					2025-26					Pooled				
	Micronutrient sprays (M)														
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
P_1	2285.93	3204.20	3384.89	1234.05	**2527.27**	2369.26	3269.10	3448.04	1302.52	**2597.23**	2327.59	3236.65	3416.47	1268.29	**2562.25**
P_2	2232.32	2618.20	3081.47	1189.23	**2280.31**	2309.75	2679.27	3187.57	1263.15	**2359.94**	2271.04	2648.74	3134.52	1226.19	**2320.12**
P_3	1723.12	2014.59	2091.39	1122.88	**1738.00**	1805.13	2097.96	2166.18	1201.17	**1817.61**	1764.12	2056.27	2128.79	1162.03	**1777.80**
P_4	1439.87	1538.79	1632.60	831.16	**1360.61**	1494.49	1594.62	1682.39	896.09	**1416.90**	1467.18	1566.71	1657.50	863.63	**1388.75**
Mean	**1920.31**	**2343.95**	**2547.59**	**1094.33**	*1976.54*	**1994.66**	**2410.24**	**2621.05**	**1165.73**	*2047.92*	**1957.48**	**2377.09**	**2584.32**	**1130.03**	*2012.23*

Factor	SEm±	CD @ 5%	SEm±	CD @ 5%	SEm±	CD @ 5%
P	1.76	5.32	3.42	10.31	2.32	6.98
M	1.76	5.32	3.42	10.31	2.32	6.98
P×M	3.53	10.64	6.84	20.62	4.63	13.96

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