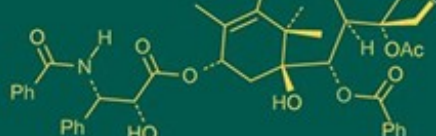
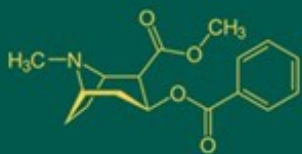


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Effect of different spacings on growth, flowering and spike yield of daisy (*Aster amellus* L.)

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ABSTRACT

A field experiment entitled "Effect of different spacings on growth, flowering and spike yield of daisy" was conducted during 2025–2026 at the experimental field of the Department of Floriculture and Landscaping, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The experiment was laid out in Randomized Block Design (RBD) with three replications and nine treatments viz., T_1 (20×15 cm), T_2 (20×20 cm), T_3 (25×15 cm), T_4 (25×20 cm), T_5 (25×25 cm), T_6 (30×15 cm), T_7 (30×20 cm), T_8 (30×25 cm) and T_9 (30×30 cm). Spacing significantly influenced major vegetative, flowering and yield parameters. Closest spacing, T_1 (20×15 cm), recorded maximum plant height of 58.19 cm, whereas widest spacing, T_9 (30×30 cm), recorded maximum number of leaves (154.00 plant⁻¹), number of suckers (26.20 plant⁻¹) and in flowering parameters, T_9 recorded maximum days to 50 per cent flowering (110.18 days), while T_1 recorded minimum (101.13 days). Maximum spike length (57.50 cm) was recorded under T_1 , whereas minimum (46.20 cm) was observed under T_9 . Regarding yield, T_9 recorded highest spike production per hectare (32,07,407.40 spikes ha⁻¹), while T_1 recorded lowest (15,48,148.14 spikes ha⁻¹). Thus, wider spacing, particularly 30×30 cm, was found superior for overall vegetative growth and spike production, whereas closer spacing was favourable for plant height, internodal distance and spike length.

Keywords: Daisy, *Aster amellus* L., Spacing, Vegetative growth, Flowering, Spike length, Spike yield

Introduction

Daisy (*Aster amellus* L.), commonly known as Italian aster, is an important perennial ornamental flower crop belonging to the family Asteraceae. It is valued for its attractive flowers, long flowering period and suitability as a filler flower in bouquets and floral arrangements. This crop is also used for landscape displays, garden decoration and cut-flower purposes. Importance of daisy as commercial flower crop has increased because of its attractive appearance and suitability for use in different floral arrangements. In daisy, suitable plant spacing is particularly important because crop produces numerous shoots and flowering spikes. Appropriate spacing can improve vegetative growth and flowering performance and may ultimately influence spike production per unit area. Previous studies on daisy and other ornamental crops have also demonstrated that plant density and spacing influence plant height, plant spread, branching and flower production. Therefore, the present investigation was undertaken to study the effect of different plant spacings on vegetative, flowering, and spike-yield parameters of daisy under agro-climatic conditions of Akola.

Material and Methods

The experiment entitled "Effect of different spacings on growth, flowering and spike yield of daisy (*Aster amellus* L.)" was conducted during 2025–2026 at the experimental field of the Department of Floriculture and Landscaping, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The soil of the experimental field was medium black, well drained and irrigated. The experiment was laid out in Randomized Block Design (RBD) with nine treatments consisted of T_1 (20×15 cm), T_2 (20×20 cm), T_3 (25×15 cm), T_4 (25×20 cm), T_5 (25×25 cm), T_6 (30×15 cm), T_7 (30×20 cm), T_8 (30×25 cm), T_9 (30×30 cm) and three replications. Daisy suckers were planted in July 2025. Regarding observations, five plants were randomly selected from each experimental plot and labelled. The mean of five selected plants was used to represent each treatment. Plant height and number of leaves were recorded at different growth stages, while suckers were recorded at 180 and 240 days after planting. Internodal distance and plant spread were recorded at 50 per cent flowering. Days to 50 per cent flowering were recorded as the number of days from planting until 50 per cent flowering in each treatment. Spike length was measured from the base of the plant to the flower head at 50 per cent flowering. Spike yield per hectare was calculated based on spike production obtained from the experimental plots. Experimental data were subjected to statistical analysis using analysis of variance. Standard error of

mean and critical difference at 5 per cent level of significance were calculated following the statistical procedures described by Panse *et al.* (1967) [1].

Results and Discussion

Vegetative parameters

Plant height (cm)

Plant height was significantly influenced by different spacing treatments. The maximum plant height of 58.19 cm at 150 DAP was recorded in treatment T₁ (20 × 15 cm), whereas the minimum plant height of 43.03 cm was recorded in treatment T₉ (30 × 30 cm). Greater plant height under closer spacing may be attributed to increased competition for light among plants, which encouraged vertical growth and stem elongation. The results are in agreement with the findings of Siddappa *et al.* (2018) [2], who reported greater plant height under closer spacing in daisy.

Number of leaves per plant

Number of leaves per plant was significantly affected by spacings during the later stages of crop growth. At 150 DAP, the maximum number of leaves (154.00 plant⁻¹) was recorded in treatment T₉ (30 × 30 cm), whereas the minimum (132.67 plant⁻¹) was recorded in treatment T₁ (20 × 15 cm). Wider spacing provided greater availability of light, moisture, nutrients and growing space, which favoured vegetative development and leaf production.

Number of suckers per plant

Spacing significantly influenced sucker production. At 240 DAP, Maximum number of suckers (26.20 plant⁻¹) was recorded in treatment T₉ (30 × 30 cm), whereas the minimum number (15.40 plant⁻¹) was recorded in T₁ treatment (20 × 15 cm). Wider spacing reduced inter-plant competition and provided better opportunity for lateral growth and sucker formation. Similar responses in daisy were reported by Suma (2003) [3] and Patil (1998) [4].

Table 1. Effect of different spacings on selected vegetative parameters of daisy

Treatment details		Plant height (cm) at 150 DAP	Leaves plant ⁻¹ at 150 DAP	Suckers plant ⁻¹ at 240 DAP
T ₁	20 × 15	58.19	132.67	15.40
T ₂	20 × 20	53.13	134.20	15.80
T ₃	25 × 15	50.05	135.73	16.00
T ₄	25 × 20	48.07	143.07	17.87
T ₅	25 × 25	48.02	142.40	19.93
T ₆	30 × 15	54.03	142.93	20.40
T ₇	30 × 20	51.06	147.60	21.47
T ₈	30 × 25	45.05	144.00	23.60
T ₉	30 × 30	43.03	154.00	26.20
‘ F ’		Sig.	Sig.	Sig.
SE(m) ±		0.78	0.99	0.39
CD at 5%		2.34	2.97	1.16

Flowering parameters and yield parameter

Days to 50 per cent flowering

Plant spacing significantly influenced days to 50 per cent flowering. Maximum duration of 110.18 days was recorded in treatment T₉ (30 × 30 cm), whereas minimum duration of 101.13 days was recorded in treatment T₁ (20 × 15 cm). The delayed flowering under wider spacing may be associated with greater vegetative development and a prolonged vegetative phase because of better availability of growth resources.

Length of spike (cm)

Spike length was significantly influenced by plant spacing. The maximum spike length of 57.50 cm was recorded in treatment T₁ (20 × 15 cm), followed by treatment T₃ (55.20 cm), whereas minimum spike length of 46.20 cm was recorded in treatment T₉ (30 × 30 cm). Greater spike length under closer spacing may be attributed to competition for light, which promotes shoot elongation and results in longer flowering stems.

Table 2. Effect of different spacings on flowering and spike yield parameters of daisy

Treatment details (cm)		Days to 50% flowering	Spike length (cm)	Spikes ha ⁻¹
T ₁	20 × 15	101.13	57.50	15,48,148.14
T ₂	20 × 20	110.93	54.30	23,35,185.18
T ₃	25 × 15	107.20	55.20	24,82,407.40
T ₄	25 × 20	106.60	54.12	21,87,037.03
T ₅	25 × 25	105.93	52.25	20,83,333.33
T ₆	30 × 15	107.18	50.00	26,40,092.59
T ₇	30 × 20	108.33	48.50	27,19,444.44
T ₈	30 × 25	109.20	47.80	30,38,888.88
T ₉	30 × 30	110.18	46.20	32,07,407.40
‘ F ’		Sig	Sig	Sig.
SE(m) ±		0.73	0.65	4488.12
CD at 5%		1.89	1.57	13455.38

(continued on next page)

Number of spikes per hectare

Plant spacing significantly influenced spike production per hectare. Maximum spike yield of 32,07,407.40 spikes ha⁻¹ was recorded in T₉ (30 × 30 cm), followed by T₈ (30,38,888.88 spikes ha⁻¹), whereas the minimum spike yield of 15,48,148.14 spikes ha⁻¹ was recorded in T₁ (20 × 15 cm). The higher spike production under wider spacing may be attributed to greater individual plant growth, increased sucker production and development of more flowering shoots. Thus, under the conditions of the present investigation, 30 × 30 cm spacing resulted in highest spike yield per hectare.

Conclusion

The present investigation revealed that plant spacing significantly influenced major vegetative, flowering and spike-yield parameters of daisy. The 20 × 15 cm spacing (T₁) favoured vertical growth, recording the maximum plant height and spike length. In contrast, the 30 × 30 cm spacing (T₉) promoted better individual plant growth, recording the maximum number of leaves, number of suckers.

Wider spacing also delayed flowering, with T₉ (30 × 30) recording maximum days to 50 per cent flowering, whereas T₁ (20 × 15 cm) recorded the earliest 50 per cent flowering. Maximum spike yield per hectare was recorded under T₉ (30 × 30 cm) with 32,07,407.40 spikes ha⁻¹, while the minimum was recorded under T₁ (20 × 15 cm) with 15,48,148.14 spikes ha⁻¹.

Therefore, based on selected parameters and overall performance, 30 × 30 cm spacing may be recommended for daisy cultivation under the agro-climatic conditions of Akola. To obtain better vegetative development and higher spike production per hectare. The closer spacing

of 20 × 15 cm may be preferred where longer spikes and greater plant height are specifically required.

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