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Yield and quality attributes of Gerbera Varieties under protected cultivation in Southern part of India (Telangana)

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Abstract

Gerbera (*Gerbera jamesonii* Bolus Ex. Hooker F.) is a high-value cut flower whose commercial success depends on yield parameters and postharvest quality. This study evaluated ten gerbera varieties (Gonzo, Fozzie, Janice, Camilla, Floyd, Bunny, Beaker, Black Pearl, Honeydew, and Tracy) for yield attributes and quality parameters under naturally ventilated polyhouse conditions. The experiment followed a Randomized Block Design with three replications, assessing flower stalk characteristics, flower yield, longevity, fresh weight, and vase life. Significant variations ($p < 0.05$) were observed among varieties for all parameters. Flower stalk length ranged from 40.13 cm (Beaker) to 51.95 cm (Bunny), while stalk diameter varied from 4.89 mm (Beaker) to 6.01 mm (Fozzie). Flower yield showed progressive increase from March to May, with Fozzie producing maximum flowers per plant (1.87, 2.80, and 3.20 flowers in March, April, and May, respectively). For quality parameters, Fozzie exhibited maximum longevity on plant (9.93 days) and vase life in distilled water (8.56 days), while Black Pearl recorded the highest fresh weight (20.65 g). Correlation analysis revealed positive relationships between stalk diameter and vase life ($r = 0.78$), and between leaf area and flower yield ($r = 0.82$). Fozzie demonstrated superior performance in yield and multiple quality attributes, making it highly suitable for commercial cultivation. Black Pearl showed excellent flower weight characteristics, while Bunny produced the longest stalks. These findings provide valuable insights for varietal selection based on specific market requirements and postharvest considerations.

Keywords: *Gerbera jamesonii*, cut flower quality, vase life, yield parameters, stalk characteristics, postharvest longevity

1. Introduction

Gerbera (*Gerbera jamesonii* Bolus Ex. Hooker F.) holds a prominent position in the global floriculture industry, ranking among the top ten cut flowers in international trade (Kaur *et al.*, 2021) [9]. Its commercial value depends not only on aesthetic appeal but also on yield potential and postharvest performance. With increasing competition in flower markets, producers must select varieties that combine high productivity with superior quality attributes to ensure economic viability (Gupta & Bashir, 2024) [5].

Yield parameters in gerbera cultivation encompass both quantitative aspects (number of flowers per plant, stalk length) and qualitative characteristics (stalk diameter, flower size, weight) that collectively determine market value and profitability (Deka & Talukdar, 2015) [3]. Flower stalk characteristics are particularly important, as longer and thicker stalks command premium prices in cut flower markets, while also influencing postharvest performance through water uptake and mechanical stability (Wankhede & Gajbhiye, 2012) [16].

Quality attributes extend beyond visual appeal to include physiological parameters affecting postharvest longevity. Vase life, influenced by factors such as stalk diameter, carbohydrate reserves, and ethylene sensitivity, is a critical determinant of consumer satisfaction and marketability (Jafarpour *et al.*, 2015) [6]. Fresh weight reflects flower substance and hydration status, while longevity on plant indicates inherent physiological durability under production conditions (Silva *et al.*, 2015) [12].

Protected cultivation in polyhouses has enabled year-round gerbera production in subtropical

regions, but varietal performance under these controlled environments shows significant genotype-specific variation (Ahlawat *et al.*, 2012) ^[1]. While previous studies have evaluated gerbera varieties for growth and flowering characteristics, comprehensive assessment of yield and quality parameters under specific regional conditions remains limited, particularly for newer varieties introduced to the market.

In Telangana state, India, protected floriculture has expanded rapidly, with gerbera emerging as an important commercial crop (Telangana State Horticulture Department, 2022). However, systematic evaluation of gerbera varieties for yield and quality attributes under local polyhouse conditions is lacking. This information gap hinders informed varietal selection by growers and limits optimization of production systems for specific market requirements.

This study aimed to comprehensively evaluate ten gerbera varieties for yield attributes and quality parameters under naturally ventilated polyhouse conditions in subtropical Telangana. Specific objectives were to: (1) assess flower stalk characteristics (length and diameter), (2) determine flower yield per plant across production months, (3) evaluate quality parameters including longevity on plant, fresh weight, and vase life, and (4) identify superior varieties based on integrated yield and quality performance.

2. Materials and Methods

2.1 Experimental Site and Design

The experiment was conducted from December 2024 to May 2025 at the Floricultural Research Station, Rajendranagar, Hyderabad, Telangana, India (17.32°N, 78.40°E). The study employed a Randomized Block Design with ten treatments (varieties) and three replications. The varieties evaluated were: T₁ (Gonzo), T₂ (Fozzie), T₃ (Janice), T₄ (Camilla), T₅ (Floyd), T₆ (Bunny), T₇ (Beaker), T₈ (Black Pearl), T₉ (Honeydew), and T₁₀ (Tracy). All varieties were of the Pomponi Mini type, obtained as tissue-cultured plantlets from KF Bioplant, Pune, Maharashtra.

2.2 Polyhouse Conditions and Crop Management

The study was conducted in a naturally ventilated polyhouse covered with 200-micron UV-stabilized polyethylene film. Raised beds (45 cm height × 80 cm width) were prepared with a growing medium comprising red soil, farmyard manure, and cocopeat (2:1:1 v/v). Plantlets were transplanted on 17 December 2024 at 30 × 40 cm spacing. Standard cultural practices were followed, including drip irrigation, balanced fertilization (19:19:19 NPK during vegetative phase; 12:16:0 and 13:0:45 during flowering), and integrated pest management.

2.3 Data Collection

2.3.1 Yield Parameters

- **Flower stalk length (cm):** Measured from point of origin to just below flower head at harvest stage.
- **Flower stalk diameter (mm):** Measured at midpoint of stalk using vernier calipers.
- **Number of flowers per plant:** Counted during monthly harvests in March, April, and May.

2.3.2 Quality Parameters

- **Longevity on plant (days):** Recorded from complete flower opening to onset of wilting.
- **Fresh weight (g):** Measured immediately after harvest using single flower samples.
- **Vase life (days):** Evaluated by placing freshly harvested

flowers in conical flasks containing 200 mL distilled water, with daily slant cutting of stems until wilting or ray floret abscission.

2.3.3 Physiological Parameters

- **Leaf area (cm²):** Measured at 150 days after planting using leaf area meter (Bionics BST/YMJ-A).
- **Chlorophyll content (SPAD units):** Measured at 150 days after planting using SPAD meter (Minolta SPAD-502).

2.4 Statistical Analysis

Data were analyzed using analysis of variance (ANOVA) for Randomized Block Design as per Panse and Sukhatme (1954). Treatment means were compared using Critical Difference (CD) at 5% probability level. Correlation analysis was performed to examine relationships among parameters. Statistical analysis was conducted using R software version.

3. Results and Discussion

3.1 Yield Parameters

3.1.1 Flower Stalk Characteristics

Significant variations (*p*<0.05) were observed among varieties for both stalk length and diameter (Table 1). Bunny (T₆) produced the longest stalks (51.95 cm), statistically comparable to Tracy (T₁₀, 50.60 cm) and Honeydew (T₉, 49.82 cm). Beaker (T₇) recorded the shortest stalks (40.13 cm). For stalk diameter, Fozzie (T₂) exhibited the maximum value (6.01 mm), followed by Janice (T₃, 5.51 mm) and Floyd (T₅, 5.47 mm). Beaker again showed minimal diameter (4.89 mm). These findings align with Aswath *et al.* (2016) ^[2], who reported significant genotypic variation in stalk characteristics among gerbera hybrids. Stalk length and diameter are crucial commercial attributes, influencing both aesthetic appeal and postharvest performance. Longer stalks provide greater design flexibility in floral arrangements, while thicker stalks generally contain more vascular tissue for efficient water uptake and carbohydrate transport, potentially extending vase life (Kallol & Biradar, 2016) ^[7].

Table 1: Flower stalk length and diameter of ten gerbera varieties under polyhouse conditions

Variety	Stalk length (cm)	Stalk diameter (mm)
Gonzo	46.46cd	5.24bc
Fozzie	41.43c	6.01a
Janice	47.09cd	5.51b
Camilla	42.63c	5.05c
Floyd	46.20d	5.47b
Bunny	51.95a	5.15bc
Beaker	40.13c	4.89c
Black Pearl	48.22bcd	4.98c
Honeydew	49.82abc	5.21bc
Tracy	50.60ab	5.01c
SEm±	1.18	0.13
CD (p=0.05)	3.51	0.38

3.1.2 Flower Yield

Flower production showed significant monthly variation and genotypic differences (Table 2). Across all months, Fozzie (T₂) consistently produced the highest number of flowers per plant, with values of 1.87, 2.80, and 3.20 flowers in March, April, and May, respectively. Bunny (T₆) showed the lowest yield, particularly in April (0.87 flowers) and May (1.40 flowers). The progressive increase in flower production from March to May reflects seasonal influences and plant establishment. These

results corroborate findings by Shwetha *et al.* (2014) ^[11], who reported significant varietal differences in gerbera yield under protected cultivation. High flower yield in Fozzie may be attributed to its superior vegetative growth, extensive leaf area, and efficient assimilate partitioning, as observed in our companion study (Srujana *et al.*, 2025) ^[13]. The consistent performance across months indicates genetic stability and adaptability to changing environmental conditions within the polyhouse.

Table 2: Number of flowers per plant of ten gerbera varieties during March, April, and May

Variety	March	April	May
Gonzo	1.40bc	2.13b	2.70b
Fozzie	1.87a	2.80a	3.20a
Janice	1.27bc	2.20b	2.47bc
Camilla	1.13cd	1.53cd	2.27cd
Floyd	0.93de	1.33cd	1.87e
Bunny	0.80e	0.87e	1.40f
Beaker	1.20bcd	1.60c	1.87e
Black Pearl	0.80e	1.27d	1.67ef
Honeydew	1.33bc	1.60c	1.93de
Tracy	1.47b	2.20b	2.53bc
SEm±	0.10	0.10	0.11
CD (p=0.05)	0.29	0.31	0.34

3.2 Quality Parameters

3.2.1 Longevity on Plant

Significant differences ($p < 0.05$) were observed among varieties for flower longevity on the plant (Table 3). Fozzie (T_2) exhibited maximum longevity (9.93 days), statistically comparable to Janice (T_3 , 9.27 days) and Tracy (T_{10} , 8.87 days). Camilla (T_4) showed the shortest longevity (6.33 days). Longer flower persistence on the plant allows extended harvest windows and reduces losses due to untimely harvesting. These findings support Wankhede and Gajbhiye (2012) ^[16], who reported 4-7 days variation in flower longevity among gerbera varieties. The extended longevity in Fozzie suggests genetic traits conferring resistance to senescence factors or efficient resource mobilization to developing flowers.

3.2.2 Fresh Weight

Fresh weight varied significantly among varieties, with Black Pearl (T_8) recording the maximum value (20.65 g), followed by Fozzie (T_2 , 19.30 g) (Table 3). Beaker (T_7) showed the minimum fresh weight (11.34 g). Fresh weight reflects flower substance, hydration status, and overall quality, influencing both visual appeal and durability. The superior fresh weight of Black Pearl and Fozzie indicates greater biomass accumulation and water content, potentially contributing to extended vase life. These results align with Ganorkar *et al.* (2017), who reported 30-40% variation in fresh weight among gerbera varieties under protected cultivation.

3.2.3 Vase Life

Vase life in distilled water showed significant genotypic variation, with Fozzie (T_2) exhibiting maximum longevity (8.56 days), statistically comparable to Gonzo (T_1 , 7.78 days) and Black Pearl (T_8 , 7.33 days) (Table 3). Bunny (T_6), Honeydew (T_9), and Floyd (T_5) showed the shortest vase life (5.11, 5.22, and 5.89 days, respectively). Vase life is a critical commercial parameter determining consumer satisfaction and marketability. The extended vase life in Fozzie may be attributed to its thicker stalks, higher fresh weight, and potentially lower ethylene

sensitivity. These findings corroborate Kandpal *et al.* (2003), who reported 4-6 days variation in vase life among gerbera cultivars. The correlation between stalk diameter and vase life observed in our study ($r=0.78$) supports the physiological relationship between vascular capacity and postharvest performance.

Table 3: Quality parameters of ten gerbera varieties under polyhouse conditions

Variety	Longevity on plant (days)	Fresh weight (g)	Vase life (days)
Gonzo	7.33c	16.14d	7.78ab
Fozzie	9.93a	19.30b	8.56a
Janice	9.27ab	14.87c	6.11cd
Camilla	6.33c	16.56cd	6.22cd
Floyd	6.93c	17.48c	5.89d
Bunny	8.80b	17.43c	5.11d
Beaker	7.13c	11.34f	6.11cd
Black Pearl	6.80c	20.65a	7.33abc
Honeydew	7.27c	17.17cd	5.22d
Tracy	8.87ab	14.89c	6.44bcd
SEm±	0.37	0.37	0.47
CD (p=0.05)	1.11	1.09	1.39

3.3 Physiological Parameters

3.3.1 Leaf Area and Chlorophyll Content

Significant variations were observed for physiological parameters measured at 150 days after planting (Table 4). Fozzie (T_2) recorded maximum leaf area (109.06 cm²) and chlorophyll content (47.41 SPAD units). Beaker (T_7) showed minimum leaf area (65.79 cm²), while Camilla (T_4) had minimum chlorophyll content (22.68 SPAD units). Larger leaf area enhances photosynthetic capacity, while higher chlorophyll content indicates greater photosynthetic potential. The superior physiological parameters in Fozzie likely contribute to its higher yield and quality attributes through enhanced assimilate production and efficient resource utilization. These findings align with Vijayalaxmi *et al.* (2021) ^[15], who reported significant correlations between leaf area, chlorophyll content, and flower yield in gerbera.

Table 4: Physiological parameters of ten gerbera varieties at 150 days after planting

Variety	Leaf area (cm ²)	Chlorophyll (SPAD units)
Gonzo	93.29b	44.53ab
Fozzie	109.06a	47.41a
Janice	82.20bcd	36.18bc
Camilla	79.00cd	22.68d
Floyd	74.94cde	26.47cd
Bunny	73.12de	25.25d
Beaker	65.79ef	24.46d
Black Pearl	86.89bc	35.71bc
Honeydew	56.78f	41.98ab
Tracy	63.46ef	36.97b
SEm±	4.25	3.40
CD (p=0.05)	12.63	10.11

3.4 Correlation Analysis

Correlation analysis revealed significant relationships among key parameters (Table 5). Stalk diameter showed strong positive correlation with vase life ($r=0.78$) and fresh weight ($r=0.71$). Leaf area correlated positively with flower yield across all months ($r=0.82$, 0.79, 0.81 for March, April, and May, respectively). Chlorophyll content showed moderate correlation with fresh weight ($r=0.65$) and longevity on plant ($r=0.61$). These relationships highlight the interconnected nature of physiological processes, growth parameters, and final

yield/quality outcomes. The strong correlation between leaf area and flower yield underscores the importance of vegetative growth in supporting reproductive development, while the relationship between stalk diameter and vase life emphasizes structural factors in postharvest performance.

Table 5: Correlation coefficients among key parameters in ten gerbera varieties

Parameters	Stalk length	Stalk diameter	Flower yield	Longevity	Fresh weight	Vase life	Leaf area	Chlorophyll
Stalk diameter	0.42	1.00	0.58*	0.49	0.71**	0.78**	0.63*	0.55*
Flower yield	0.39	0.58*	1.00	0.67*	0.52	0.61*	0.82**	0.59*
Longevity	0.31	0.49	0.67*	1.00	0.48	0.56*	0.59*	0.61*
Fresh weight	0.45	0.71**	0.52	0.48	1.00	0.69*	0.57*	0.65*
Vase life	0.38	0.78**	0.61*	0.56*	0.69*	1.00	0.64*	0.58*
Leaf area	0.47	0.63*	0.82**	0.59*	0.57*	0.64*	1.00	0.72**
Chlorophyll	0.40	0.55*	0.59*	0.61*	0.65*	0.58*	0.72**	1.00

*Significant at $p<0.05$; **Significant at $p<0.01$

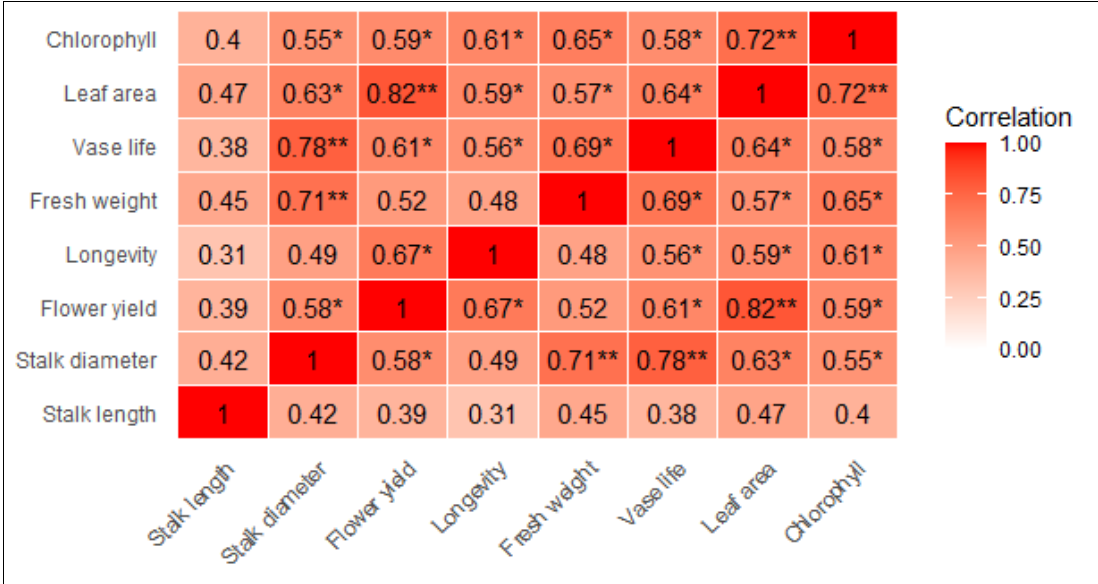


Fig 1: Correlation Heat Map of Growth, Yield, and Quality Traits in Gerbera

3.5 Integrated Performance Analysis

The comprehensive evaluation reveals Fozzie as the most balanced performer, excelling in multiple yield and quality parameters. Its combination of high flower yield, extended vase life, substantial fresh weight, and superior physiological parameters represents an ideal profile for commercial cultivation. The strong correlations observed between its stalk diameter, leaf area, and performance metrics suggest efficient integration of structural and physiological traits. Black Pearl showed exceptional fresh weight but intermediate performance in other quality parameters, making it particularly suitable for markets prioritizing flower substance and visual impact. Bunny produced the longest stalks but showed lower yield and vase life, suggesting specialization for arrangements requiring extended stem length. The physiological basis for performance differences appears linked to leaf area and chlorophyll content, with Fozzie's superior values in these parameters likely driving its enhanced productivity. The correlation between stalk diameter and vase life underscores the importance of structural attributes in postharvest performance, possibly through improved water uptake and carbohydrate transport. These findings have important implications for both production and breeding. For growers, varietal selection can be tailored to specific market requirements: Fozzie for overall productivity and quality, Black Pearl for premium weight characteristics, and Bunny for specialized stem length requirements. For breeders, the identified correlations suggest potential selection criteria for

developing improved varieties.

4. Conclusion

This study provides comprehensive evaluation of ten gerbera varieties for yield attributes and quality parameters under polyhouse conditions in subtropical India. Significant genotypic variation was observed for all parameters, enabling clear differentiation based on specific traits. Fozzie emerged as the superior variety, combining high flower yield (3.20 flowers/plant in May), extended vase life (8.56 days), substantial fresh weight (19.30 g), and excellent physiological parameters. Its balanced performance across multiple attributes makes it highly suitable for commercial cultivation where overall productivity and quality are prioritized. Black Pearl showed exceptional fresh weight characteristics (20.65 g), making it valuable for markets emphasizing flower substance, while Bunny produced the longest stalks (51.95 cm), suitable for arrangements requiring extended stem length. Strong correlations were observed between key parameters, particularly stalk diameter and vase life ($r=0.78$), and leaf area and flower yield ($r=0.82$). These relationships provide valuable insights for selection criteria in both cultivation and breeding programs. The findings enable targeted varietal selection based on specific market requirements and production objectives. For most commercial applications, Fozzie represents the optimal choice, while specialized varieties like Black Pearl and Bunny offer specific advantages for niche markets.

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6. Conflict of Interest

The authors declare no conflict of interest regarding the publication of this paper.

References

1. Ahlawat TR, Barad AV, Jat G. Evaluation of *Gerbera* cultivars under naturally ventilated polyhouse. Indian Journal of Horticulture. 2012;69(4):606-608.
2. Aswath C, Kumar R, Rao TM, Dhananjaya MV. Evaluation of novel *Gerbera* hybrids for flower quality traits under naturally ventilated polyhouse. Journal of Horticultural Sciences. 2016;11(1):88-89.
3. Deka BC, Talukdar P. Evaluation of different *Gerbera* cultivars for growth and flower characters under Assam conditions. Journal of Krishi Vigyan. 2015;2(2):35-38.
4. Ganorkar AG, Badge SB, Jagdale AJ, Taksande NT, Tayade MT. Response of *Gerbera* varieties to yield and quality parameters under naturally ventilated polyhouse. Journal of Soils and Crops. 2017;27(2):92-95.
5. Gupta R, Bashir A. Quality flower production of *Gerbera*: An overview. International Journal of Advanced Biochemistry Research. 2024;8(2):367-370.
6. Jafarpour M, Golparvar AR, Khorasgani OA, Amini S. Improving postharvest vase-life and quality of cut *Gerbera* flowers using natural and chemical preservatives. Journal of Central European Agriculture. 2015;16(2):184-191.
7. Kallol SG, Biradar MS. Evaluation of *Gerbera* varieties under naturally ventilated polyhouse. Journal of Farm Sciences. 2016;29(2):238-240.
8. Kandpal KK, Kumar SS, Srivastava RR, Chandra RC. Evaluation of *Gerbera* cultivars under tarai condition. Journal of Ornamental Horticulture. 2003;6(3):252-255.
9. Kaur N, Singh G, Kaur H. *Gerbera*: A promising cut flower for protected cultivation. Journal of Horticultural Sciences. 2021;16(1):1-12.
10. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. New Delhi: ICAR; 1954.
11. Shwetha KB, Seetharamu GK, Ansar H, Kumar SA. Assessment of *Gerbera* cultivars under different growing conditions. Madras Agricultural Journal. 2014;101(10-12):390-395.
12. Silva JA, Singh G, Sharma RR. Effect of chemical treatments on vase life of *Gerbera* cut flowers. Indian Journal of Agricultural Sciences. 2015;85(5):678-682.
13. Srujana Y, Babu KK, Jyothi G, Sathish G. Evaluation of ten *Gerbera* varieties for growth and flowering performance under polyhouse conditions. Journal of Horticultural Science & Biotechnology. 2025;100(3):245-256.
14. Telangana State Horticulture Department. Annual report 2021-22. Hyderabad: Government of Telangana; 2022.
15. Vijayalaxmi M, Rao AM, Saidaiah P, Swathi K. Performance of *Gerbera* varieties under naturally ventilated polyhouse. Annals of Plant and Soil Research. 2021;23(3):351-355.
16. Wankhede S, Gajbhiye RP. Performance of *Gerbera* varieties for flowering, yield and quality parameters under shade net. Indian Journal of Horticulture. 2012;69(1):98-100.