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# INFLUENCE OF CORM SPLITTING AND PLANT SPACING ON GROWTH AND FLOWERING IN GLADIOLUS (*Gladiolus grandiflorus* L.) CV. WHITE PROSPERITY

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**ABSTRACT**

An experiment on "Influence of corm splitting and spacing on growth and flowering in Gladiolus (*Gladiolus grandiflorus* L.) cv. White Prosperity" was conducted during mid-October and February, 2025–2026 at the Horticulture Farm, Sheth. D. M. Polytechnic in Horticulture, Anand Agricultural University, Vadodara, Gujarat. Three corm splitting treatments (C), namely $C_1$: Whole corms, $C_2$: Corms split into two equal parts, and $C_3$: Corms split into three equal pieces, with three various spacing levels (S), $S_1$: 30 x 30 cm, $S_2$: 30 x 20 cm, and $S_1$: 20 x 20 cm, were included in the experiment comprising of nine combinations of treatment were used in the experiment, which was set up in a Randomized Block Design with factorial concept (FRBD) in three replications. Whole corms ($C_1$) recorded the highest value for leaf length (45.11 cm) with the lowest days taken to spike emergence (63.56 days) and produced significantly maximum spike length (78.78 cm), spike weight (60.20 g), the highest number of florets per spike (10.53), floret diameter (11.64 cm) and the longest vase life (8.68 days). Meanwhile, the corms split into two pieces ($C_2$) produced the greatest plant height (68.73 cm), number of leaves per plant (7.92), leaf width (2.76 cm), the maximum rachis length (43.32 cm), corm diameter (5.35 cm) and the highest average corm weight (47.08 g). Similarly, the earliest spike emergence (68.12 days), maximum number of leaves per plant (7.82), leaf width (2.71 cm), the maximum leaf length (44.28 cm), spike length (73.02 cm), spike weight (60.73 g), rachis length (43.36 cm), number of florets per spike (10.87), floret diameter (11.71 cm), prolonged vase life (8.73 days), and highest corm diameter (5.02 cm), average corm weight (43.42 g), were observed under the widest spacing, $S_1$, (30 × 30 cm). However, the interaction between the corm splitting and spacing caused a non-significant impact on growth and flowering parameters.

***Keywords*** **:** Whole corm, corm splitting, corm treatment, corm split into pieces and vase life.

## Introduction

*Gladiolus grandiflorus* L., of the Iridaceae family, which is native to South Africa and which comes under the most widely cultivated and popular cut flowers in the global floriculture industry. Among the bulbous ornamentals cultivated worldwide, it is also known as the "queen of bulbous flowers." After tulips, it is the popular bulbous flower in India and moreover, in the global cut flower trade, gladiolus has been ranked in the leading position among various cut flowers (Katiyar *et al*., 2012).

Since gladiolus is a cormous plant, new corms and cormels are used to propagate it for the subsequent season (Hartman *et al*., 1990). However, a major issue with the commercial production is the insufficient supply of quality planting material brought on by a decreased rate of multiplication (Singh and Dohare, 1994).

Lack of sufficient suitable planting material of a desired cultivar is one of the primary barriers to commercial gladiolus cultivation on a scale (Laishram *et al*., 2013). The cost of corms alone often accounts for more than half of the input cost used in gladiolus

growing, making it an important aspect of the economics of production. However, because of their slow pace of growth and the high percentage of corms that rot during storage, there is not enough planting material available in the market. Also, the scarcity in the market causes the price fluctuation, due to which farmers are bound to pay a higher price for the desirable variety planting material. Therefore, the availability of planting materials is necessary for commercial gladiolus production (Mahasena *et al*., 2015).

Gladiolus corms generally have numerous buds, which will turn into individual vegetative shoots after planting. A single mother corm can have three to four buds and possibly two or more flower spikes (Salam, 2016). Taking advantage of this, splitting the corms is practiced by splitting corms into multiple pieces, with each split corm piece having at least one viable growing bud, which will ensure the production of multiple plants from each split corm planting material.

Additionally, cultural aspects like plant spacing are the most important cultivation practice for improving light interception, which in turn affects crop development, quality and production. Moreover, different spacings also impact the development and yield of corm, cormel and high-quality flowers (Maniruzzaman *et al*., 2017).

Ideally, in gladiolus, according to the size of corms, smaller corms to larger corms are planted at 20 x 20 cm to 30 x 30 cm, respectively. In the case of the splitting of corms, spacing becomes an important factor to study as the size of the corm is greatly reduced. Hence, the integration of both corm splitting and plant spacing has been performed in the current study.

## Material and Methods

The experiment was carried out at the Horticulture Farm, Sheth D.M. Polytechnic, AAU, Vadodara, which is geographically located at 22.32° N latitude and 73.17° E longitude, at an elevation of about 35.5 m above Mean Sea Level.

The experimental design was FRBD, Randomized Block Design (Factorial) comprising nine treatment combinations, each having three levels of corm splitting ($C_1$: Whole corms, $C_2$: Corms split into two equal pieces, $C_3$: Corms split into three equal pieces) and spacings ($S_1$: 30x30 cm, $S_2$: 30x25 cm, $S_3$: 20x20 cm). Wide range of growth and yield parameters were observed and analyzed *viz*. plant height (cm), number of leaves per plant, leaf width (cm), days to flower spike emergence (days), spike length (cm), rachis length (cm), floret diameter (cm), vase life (days), corm diameter (cm), average corm weight (g), number of spikes per plot, number of spikes per ha, number of corms per plot and number of corms per ha.

One of the popular varieties, 'White prosperity', was chosen for the study. The planting material was sourced from a farmer in Uttar Pradesh. For whole corm treatment, complete corms were directly sown as they were and for the split corm treatment; after removing the scales, the corms were cut into two and three equal pieces according to the treatment requirement, with each piece containing a portion of the basal plate (root zone) and at least one viable bud. After soaking the corms in 0.1 % Bavistin for 30 minutes, corms were planted in ridges at a depth of 5-6 cm, at various spacings of 30 × 30 cm, 30 × 20 cm and 20 × 20 cm, according to the treatment requirements.

Complete agronomic practices, including regular irrigation, weeding, staking, and plant protection measures, were followed to achieve good growth and yield. Full dosage of P (150 kg $P_2O5$/ ha) and K (150 kg $K_2O$/ ha) were applied at the time of planting. ½ dosage of N (120 kg N / ha) was applied at the time of planting, and the remaining ½ dose of N (120 kg N / ha) was applied in two equal splits, *viz*., at 30 and 60 DAP.

Observations were recorded from five randomly selected tagged plants from the net plot. The observed parameter data were analysed according to the statistical procedures outlined by Panse and Sukhatme (1985).

## Results and Discussion

The data presented in Tables 1 and 2 show that corm-splitting methods and spacing have a significant effect on growth and yield parameters of gladiolus in this experiment.

### Effect of corm splitting on growth and flowering in gladiolus

From the results (Tables 1 and 2), it has been found that various corm splitting treatments and spacing had a significant effect on the growth and flowering parameters of Gladiolus cv. White prosperity. With $C_1$ treatment, planting of whole corms, lowest days to spike emergence (63.56 days), the highest number of florets per spike (10.53), floret diameter (11.64 cm), maximum leaf length (45.11 cm), maximum spike length (78.78 cm), spike weight (60.20 g), and longest vase life (8.68 days) were recorded. Superior performance of whole corms is because it had more stored food materials, carbohydrate and nutritional reserve and better photosynthates accumulation. In addition to that, the intact apical bud

favours quick and uniform growth compared to split corms. Studies of Laishram *et al.* (2013), Sarkar *et al*. (2014), Bhande et al. (2015), Mahasena *et al*. (2015), Bharti *et al.* (2017), Maniruzzaman *et al.* (2017) and Dodiya *et al.* (2024) also indicate similar results for gladiolus, as well as Ahmad *et al*. (2009) in tuberose.

Meanwhile, the corms split into two pieces, $C_2$, produced significantly maximum plant height (68.73 cm), number of leaves per plant (7.92), leaf width (2.76 cm), the maximum rachis length (43.32 cm), the largest corm diameter (5.35 cm) and the highest average corm weight (47.08 g), while the lowest values were noted in $C_3$, corms split into three equal pieces. This result may be because of the breaking of apical dominance during splitting, which in turn enhances the vigour and growth of other dormant buds. At the same time, the stored proportion of food reserves in half-split corms remains sufficient to produce taller plants and better vegetative growth. In contrast, corms divided into three smaller pieces exhibit reduced growth, which might be due to insufficient stored nutrients available for early development. These findings align closely with those reported by Khanna and Gill (1983), Borrelli (1984), Laishram *et al.* (2013), Mahasena *et al.* (2015) and Maniruzzaman *et al.* (2017).

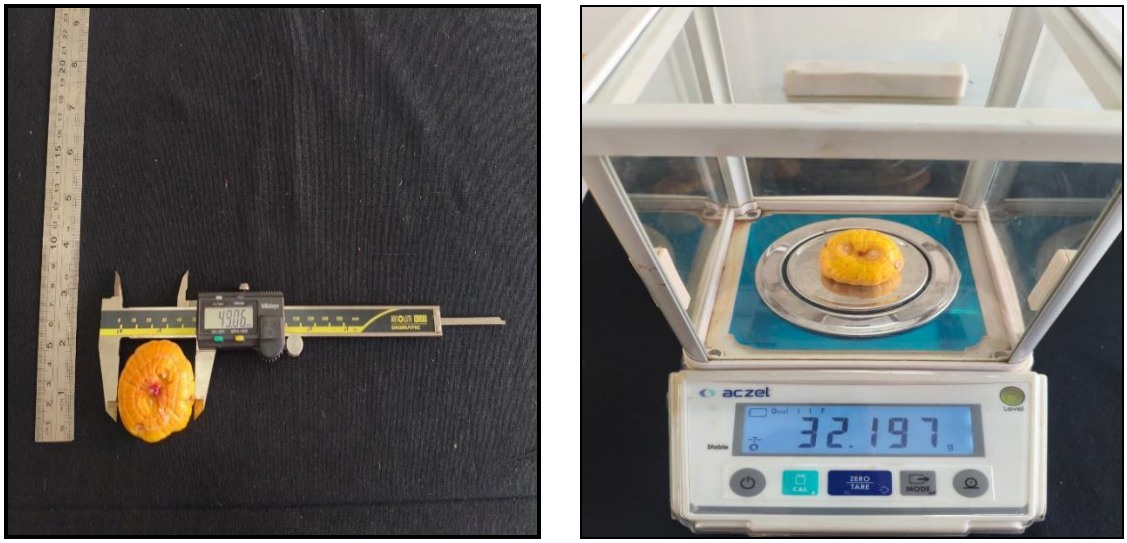


**Fig. 1 :** Selection of healthy and uniform-sized corms after descaling

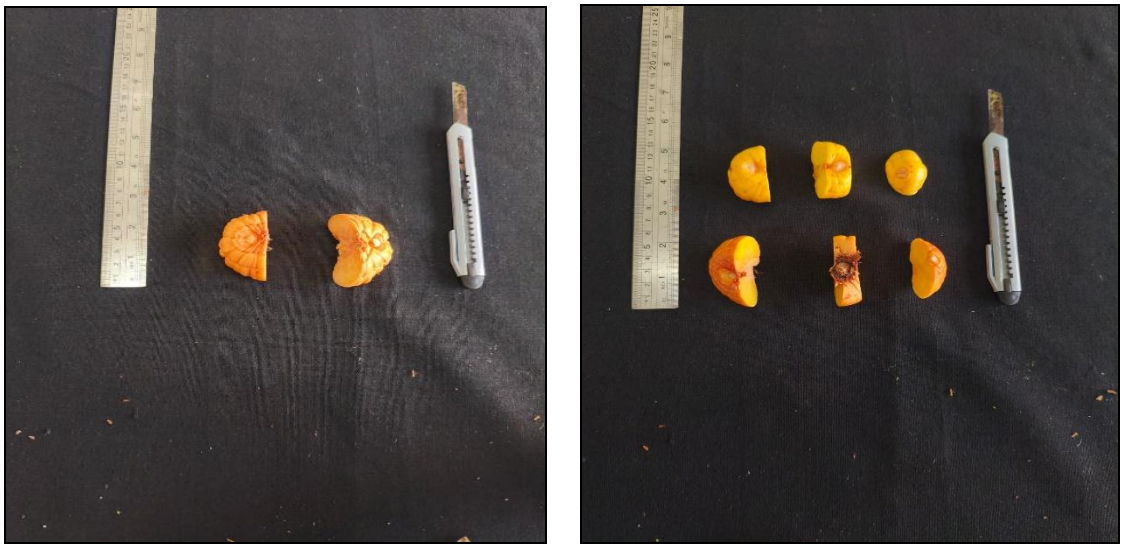

**Fig. 2 :** Splitting of corms into pieces with active buds

**Table 1:** Effect of corm splitting and spacing on the vegetative growth in gladiolus

| Treatment | Plant height (cm) at 60 DAP | No. of leaves per plant at 60 DAP | Leaf width (cm) at 60 DAP | Leaf length (cm) at 60 DAP | Days to spike emergence (days) |
|---|---|---|---|---|---|
| **Splitting of corms (C)** | | | | | |
| $C_1$: Whole corms | 64.50 | 7.69 | 2.53 | 45.11 | 63.56 |
| $C_2$: Corms split into two equal pieces | 68.73 | 7.92 | 2.76 | 45.08 | 67.11 |
| $C_3$: Corms split into three equal pieces | 57.77 | 6.82 | 2.44 | 37.72 | 84.70 |
| S.Em. ± | 1.49 | 0.20 | 0.08 | 1.22 | 1.64 |
| C.D. at 5% | 4.47 | 0.61 | 0.24 | 3.65 | 4.92 |
| **Spacing (S)** | | | | | |
| $S_1$: 30 x 30 cm | 61.00 | 7.82 | 2.71 | 44.28 | 68.12 |
| $S_2$: 30 x 20 cm | 62.81 | 7.62 | 2.66 | 43.66 | 72.89 |
| $S_3$: 20 x 20 cm | 67.19 | 6.98 | 2.36 | 39.98 | 74.36 |
| S.Em. ± | 1.49 | 0.20 | 0.08 | 1.22 | 1.64 |
| C.D. at 5% | 4.47 | 0.61 | 0.24 | 3.65 | 4.92 |
| **Interaction (C x S)** | | | | | |
| S.Em. ± | 2.58 | 0.35 | 0.14 | 2.11 | 2.84 |
| C.D. at 5% | NS | NS | NS | NS | NS |
| C.V.% | 7.03 | 8.15 | 9.27 | 8.56 | 6.70 |

**Table 2:** Effect of corm splitting and spacing on flowering in gladiolus

| Treatment | Spike length (cm) at harvest | Spike weight (g) at harvest | Rachis length (cm) at harvest | Number of florets per spike at harvest | Floret diameter (cm) at harvest | Vase life (days) | Corm diameter (cm) | Average corm weight (g) |
|---|---|---|---|---|---|---|---|---|
| **Splitting of corms (C)** | | | | | | | | |
| $C_1$: Whole corms | 78.78 | 60.20 | 41.32 | 10.87 | 11.33 | 8.68 | 5.26 | 44.49 |
| $C_2$: Corms split into two equal pieces | 76.21 | 56.53 | 43.32 | 10.53 | 11.64 | 8.31 | 5.35 | 47.08 |
| $C_3$: Corms split into three equal pieces | 54.25 | 53.70 | 39.72 | 9.91 | 10.36 | 7.64 | 3.25 | 23.20 |
| S.Em. ± | 1.67 | 1.14 | 0.70 | 0.25 | 0.23 | 0.12 | 0.09 | 0.90 |
| C.D. at 5% | 5.02 | 3.42 | 2.09 | 0.75 | 0.67 | 0.37 | 0.27 | 2.70 |
| **Spacing (S)** | | | | | | | | |
| $S_1$: 30 x 30 cm | 73.02 | 60.73 | 43.36 | 10.87 | 11.71 | 8.73 | 5.02 | 43.42 |
| $S_2$: 30 x 20 cm | 69.83 | 54.47 | 41.69 | 10.61 | 11.22 | 8.07 | 4.80 | 37.94 |
| $S_3$: 20 x 20 cm | 66.39 | 51.89 | 39.31 | 9.83 | 10.40 | 7.83 | 4.05 | 33.40 |
| S.Em. ± | 1.67 | 1.14 | 0.70 | 0.25 | 0.23 | 0.12 | 0.09 | 0.90 |
| C.D. at 5% | 5.02 | 3.42 | 2.09 | 0.75 | 0.67 | 0.37 | 0.27 | 2.70 |
| **Interaction (C x S)** | | | | | | | | |
| S.Em. ± | 2.90 | 1.97 | 1.21 | 0.43 | 0.39 | 0.22 | 0.16 | 1.56 |
| C.D. at 5% | NS | NS | NS | NS | NS | NS | NS | NS |
| C.V.% | 7.20 | 6.13 | 5.05 | 7.16 | 6.07 | 4.53 | 5.83 | 7.05 |

**Effect of spacing on growth and yield in gladiolus**

Under the widest spacing, $S_1$ (30 × 30 cm), minimum number of days required for shoot emergence (7.79 days) and spike emergence (68.12 days), highest number of leaves per plant (7.82), leaf width (2.71) and leaf length (44.28 cm), the maximum spike length (73.02 cm), spike weight (60.73 g), rachis length (43.36 cm), number of florets per spike (10.87), floret diameter (11.71 cm), longest vase life (8.73 days), along with highest corm diameter (5.02 cm), and average corm weight (43.42 g).

The closest spacing, 20 × 20 cm, $S_3$ gave and the lowest values for leaves per plant (6.98), leaf width (2.36) and leaf length (39.98 cm), spike length (66.39 cm), spike weight (51.89 g), rachis length (39.31 cm), florets per spike (9.83), floret diameter (10.40 cm), vase life (7.83 days), corm diameter (4.05 cm) and corm weight (33.40 g) but the maximum plant height (67.19 cm). (Tables 1 and 2). The reason could be that there is less competition in wider spacing for water, light, nutrients and resources. The results align with those of Rana *et al*. (2005), Bhat and Khan (2007), Ramachandrudu and Thangam (2007), Rohidas *et al*. (2010), Dogra *et al*. (2012), Pandey *et al*. (2012), Ram

*et al*. (2012), Kumari *et al*. (2013), Bhande *et al*. (2015), Verma *et al*. (2015), Regar *et al*. (2016), Maniruzzaman *et al*. (2017), *et al*. (2017), Singh *et al*. (2018), Deepashree *et al*. (2019), Methela *et al*. (2019) and Prasad *et al*. (2022).

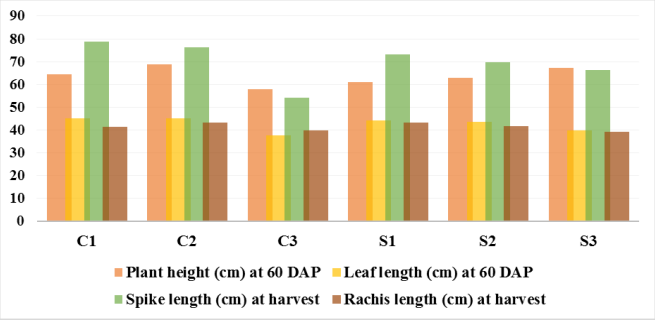


**Fig. 3 :** Effect of corm splitting and spacing on growth and flowering parameters of gladiolus

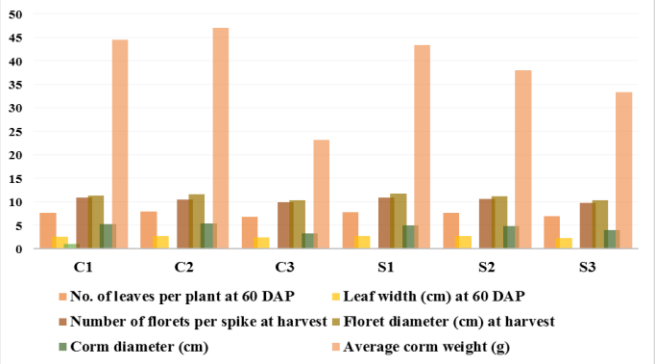


**Fig. 4:** Effect of corm splitting and spacing on growth and flowering parameters of gladiolus

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## Conclusion

The results of this study indicate that the planting of whole corms is the best method for enhancing the quality and growth of gladiolus spikes. However, planting corms that were split into two equal halves also produced a similar effect on the growth and flowering parameters. Also, it can be suggested that planting the corms at a distance of 30 × 30 cm was the ideal spacing for optimal growth and development as well as flowering.

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