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# Effect of Different Organic Substrates and Plant Botanicals on Growth and Flowering of Chincherinchee (*Ornithogalum thyrosides* jacq)

Milan Sharma[1*] . Manju Rana[1] . Puscal Sharma[2] . Shaon Kumar Das[2]

[1]Department of Horticulture, Sikkim University, 6th mile, Tadong 737102 Gangtok

[2]ICAR Research Complex for NEH Region, Sikkim Centre, Tadong 737102 Gangtok

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ABSTRACT

A pot experiment was conducted to investigate the effect of different organic substrates and plant botanicals on the growth and flowering of chincherinchee under Sikkim agro-climatic condition. Four different organic substrate *i.e.* FYM, sewage sludge compost, vermicompost and spent mushroom compost, along with foliar spray of cow urine either alone, or with plant extract of neem and Artemisia was used. Maximum plant height (35.27 cm), leaf area (131.60 sq. cm) and total number of opened floret (59.44) was recorded in treatment soil + sewage sludge compost (1:1 v/v) + cow urine + Artemisia @ 10 % at every 15 days interval. Maximum number of leaves (10.22), minimum days for floret opening and maximum spike yield was also found on treatment soil + sewage sludge compost (1:1 v/v) + cow urine + Artemisia. Maximum rachis length and vase life was recorded in soil + sewage sludge compost (1:1 v/v) + cow urine + Artemisia). For better vegetative growth and flowering of potted chincherinchee FYM and sewage sludge compost with a foliar spray of cow urine with extraction of Artemisia are facilitated beneficial.

## 1. Introduction

Ornamental bulbous plants are economically important in floriculture worldwide. The subterranean organs of these plants store moisture, nutrients and other essentials for survival. Though the bulbous crops have potential for cultivation, only a few bulbous crops like Tuberose, Gladiolus, Tulips and Alstromeria are commercially exploited. Other bulbous plants like Amaryllis and Narcissus are also popular but are yet to be commercialized. In India**,** these crops along with other bulbous crops still remain minor crops in terms of commercial value (Alam *et al.,* 2013). Among the list of such flowering bulbous plants, one of the upcoming cut flower is *Ornithogalum thyrsoides* Jacq commonly known as 'Chincherinchee' belongs to hycinthaceae family which has been proven as an important ornamental bulbous plant having good commercial value. It is a perennial herb that grows between 20cm to 50cm tall.

There are about 100 species of genus *Ornithogalum* which are distributed all over Europe, Asia and Africa. Most of the *Ornithogalum* species are grown for producing long lasting cut flowers. Chincherinchee has large cones of tightly packed white blooms on tall straight stems and tunicated bulbs up to 1.5- 2.0 inch thick as rootstocks. This Plant bears 6-8 lanceolate leaves which are 6-12 inches long and 1-2 inches in width arranged in cluster at the base of a scapose raceme.

## 2. Materials and Methods

The present experiment was carried out at the Experimental Farm, Department of Horticulture, Sikkim University, 6th mile, Tadong, Gangtok during 2014-15. The elevation of the farm is 3000 feet above mean sea level at a longitude 27.29° N and latitude 88.59° E. Data were analyzed by ANOVA using completely randomized design. The healthy and disease free adequately rested bulbs of varying sizes of chincherinchee were brought from Y. S. Parmar university of Horticulture and Forestry, Nauni, Solan, Himanchal Pradesh.

*Corresponding author: milanacharyasharma@gmail.com

They were stored at room temperature till the planting was done for present study. Four growing substrates *viz*, soil + FYM (1:1 v/v), soil + sewage sludge compost (1:1 v/v), soi l + spent mushroom compost (1:1 v/v) were used to prepare growing medium after thoroughly mixing of ingredients in the given ratio.

## 3. Results and Discussions

. The maximum plant height at the time of harvesting was observed under soil + sewage sludge compost + cow urine + Artemisia (35.27 cm) and the minimum plant height was recorded under control plot (27.28 cm) (Table 1). Similar findings are reported by Tejasarwana (1998). The data for number of leaves in the randomly selected plants in each treatment was recorded at the time of harvesting and it is presented in Table 2. The maximum number of leaves per plant was recorded under soil + sewage sludge compost + cow urine + Artemisia (10.22). There is significant variation in leaf area under treatment of different organic substrate and plant botanicals. The maximum leaf area was found on the treatment soil + sewage sludge compost + cow urine + Artemisia (131.60 sq. cm). The results obtained in the present investigation are in accordance with Ikram *et al.* 2012 whereas the minimum leaf area was recorded under the control plot.

The result obtained after analysis of data shows significant effect of different treatments on the fresh weight of spike of chincherinchee (Table 2). The maximum weight of spike was recorded under soil + sewage sludge compost + cow urine + Artemisia (30.87g) whereas the minimum weight was sewage sludge compost + cow urine + Artemisia (19.28g). This may be due to the fact that this growing medium has provided congenial growing conditions required for the quality production of spikes in chincherinchee. A perusal of data in Table 2 envisages that the different treatments has non- significant effect on the diameter of lowest floret. However, the highest floret diameter was of soil + sewage sludge compost + cow urine + Artemisia (3.09cm). The data reveal non- significant effect of different treatments on the floret diameter of chincherinchee. It may also be due to the same size of bulb used for the experiment. The data pertaining to number of opened florets are presented in Table 2 revealed the significant effects of organic substrate and plant botanicals on total number of florets opened per spike.

The number of opened florets was found to be maximum in soil + sewage sludge compost + cow urine + Artemisia (59.44) whereas minimum number of florets opened per spike was recorded in treatment control (43.33). The result was similar to the finding of Barman et al. 2003. It is evident from the data that cut spikes of soil + sewage sludge compost + cow urine + Artemisia (25.44 days). The minimum vase life was exhibited by the treatment under control plot (17.44 days).

**Table 1.** Effect of different organic substrate and plant botanicals on the vegetative characters of chincherinchee

| Treatment | Plant height (cm) | Number of leaves | Leaf area (sq. cm) |
|---|---|---|---|
| $T_1$ | 32.76 | 9.44 | 84.63 |
| $T_2$ | 29.13 | 10.10 | 79.93 |
| $T_3$ | 27.35 | 9.21 | 76.33 |
| $T_4$ | 25.05 | 8.44 | 76.50 |
| $T_5$ | 32.41 | 8.99 | 97.56 |
| $T_6$ | 30.83 | 9.11 | 95.60 |
| $T_7$ | 27.86 | 8.33 | 77.53 |
| $T_8$ | 29.53 | 8.44 | 70.20 |
| $T_9$ | 31.24 | 8.99 | 111.13 |
| $T_{10}$ | 34.59 | 9.22 | 99.40 |
| $T_{11}$ | 28.97 | 8.77 | 71.70 |
| $T_{12}$ | 28.28 | 8.88 | 97.23 |
| $T_{13}$ | 32.56 | 9.11 | 107.73 |
| $T_{14}$ | 35.27 | 10.22 | 131.60 |
| $T_{15}$ | 29.68 | 8.32 | 72.67 |
| $T_{16}$ | 27.76 | 8.22 | 78.03 |
| $T_{17}$ | 27.29 | 8.10 | 68.20 |
| LSD (P=0.5) | 3.05 | 0.87 | 17.41 |

** $T_1$ : Soil + FYM , $T_2$: Soil + sewage sludge compost, $T_3$ : Soil + Vermicompost , $T_4$ : Soil + Spent mushroom compost , $T_5$ : Soil + FYM + Cow urine, $T_6$ : Soil + Sewage sludge compost + Cow urine, $T_7$ : Soil + Vermicompost + Cow urine, $T_8$ : Soil + Spent mushroom compost + Cow urine, $T_9$ : Soil + FYM + Cow urine + Neem, $T_{10}$ : Soil + Sewage sludge compost + Cow urine + Neem , $T_{11}$ : Soil + Vermicompost + Cow urine + Neem, $T_{12}$ : Soil + Spent mushroom compost + Cow urine + Neem, $T_{13}$ : Soil + FYM + Cow urine + Artemisia, $T_{14}$ : Soil + Sewage sludge compost + Cow urine + Artemisia, $T_{15}$ : Soil + Vermicompost + Cow urine + Artemisia, $T_{16}$ : Soil + Spent mushroom compost + Cow urine + Artemisia, $T_{17}$ : Control*

**Table 2.** Effect of different organic substrates and plant botanicals on the vase life of chincherinchee cut spike

| Treatment | Total number of open floret per spike | Fresh weight of spike (gm) | Floret diameter (cm) | Vase life (Days) |
|---|---|---|---|---|
| $T_1$ | 44.87 | 26.66 | 2.66 | 19.44 |
| $T_2$ | 51.22 | 26.33 | 2.61 | 19.55 |
| $T_3$ | 44.88 | 19.89 | 2.87 | 21.11 |
| $T_4$ | 44.89 | 21.22 | 2.76 | 20.44 |
| $T_5$ | 51.22 | 25.15 | 2.87 | 21.77 |
| $T_6$ | 44.88 | 27.42 | 2.94 | 22.00 |
| $T_7$ | 47.22 | 24.67 | 3.08 | 23.11 |
| $T_8$ | 46.77 | 23.50 | 2.92 | 20.33 |
| $T_9$ | 53.00 | 29.88 | 2.99 | 24.33 |
| $T_{10}$ | 49.55 | 26.14 | 2.93 | 21.77 |
| $T_{11}$ | 48.11 | 23.72 | 2.92 | 22.44 |
| $T_{12}$ | 44.88 | 26.83 | 2.93 | 17.81 |
| $T_{13}$ | 55.44 | 30.27 | 2.93 | 25.33 |
| $T_{14}$ | 59.44 | 30.87 | 3.09 | 25.44 |
| $T_{15}$ | 45.78 | 25.59 | 2.88 | 20.89 |
| $T_{16}$ | 47.55 | 21.42 | 2.88 | 24.00 |
| $T_{17}$ | 43.33 | 19.28 | 2.71 | 17.44 |
| LSD (P=0.5) | 5.81 | 4.48 | NS | 4.06 |

***$T_1$ : Soil + FYM ,$T_2$:Soil + sewage sludge compost,$T_3$: Soil + Vermicompost ,$T_4$: Soil + Spent mushroom compost ,$T_5$: Soil + FYM + Cow urine, $T_6$: Soil + Sewage sludge compost + Cow urine, $T_7$: Soil + Vermicompost +Cow urine, $T_8$: Soil + Spent mushroom compost + Cow urine, $T_9$ :Soil + FYM + Cow urine + Neem, $T_{10}$: Soil + Sewage sludge compost + Cow urine + Neem ,$T_{11}$: Soil + Vermicompost +Cow urine + Neem, $T_{12}$: Soil + Spent mushroom compost + Cow urine + Neem, $T_{13}$: Soil + FYM + Cow urine + Artemisia, $T_{14}$: Soil + Sewage sludge compost + Cow urine + Artemisia, $T_{15}$: Soil + Vermicompost +Cow urine + Artemisia, $T_{16}$: Soil + Spent mushroom compost + Cow urine + Artemisia, $T_{17}$ :Control*

## Conclusion

The present study reveals that soil supplemented with FYM and sewage sludge compost with foliar application of cow urine with Artemisia plant extract are beneficial for the pot cultivation of chincherinchee under Sikkim agro climatic conditions.

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