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RESEARCH ARTICLE OPEN ACCESS

EFFECT OF DIFFERENT GROWING MEDIA ON GROWTH AND FLOWERING OF LILIUM CULTIVARS, NAMELY COLARES AND PAVIA, UNDER PROTECTED CONDITIONS OF THE WET TEMPERATE ZONE OF H.P

***Reshma Negi and Upinder Sharma**

Regional Horticultural Research & Training Station Mashobra, Shimla -171007

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****Corresponding author: Reshma Negi***

ABSTRACT

The present investigation was carried out during the year 2023-24 and 2024-25 to study the effect of different growing media on growth and flowering of lilium cultivars, namely Colares and Pavia. The earliest bulbs sprouting was recorded in the growing media leaf mould+control (23.50 days), followed by control+leaf mould+cocopeat (26.00 days). The minimum number of days taken to bud initiation was observed in the growing media leaf mould + control (127.50 days) compared to other growing media. Cultivar Colares recorded the earliest flower bud initiation (144.28 days). Flowering was observed earlier in growing media leaf mould + control (153.17 days), followed by control+leaf mould+cocopeat (159.33 days). The maximum number of flowers per plant among different growing media was observed in leaf mould+ control (5.50), followed by control+ leaf mould+cocopeat (5.53), when compared with cultivars Pavia recorded (4.50) maximum number of flowers per plant and minimum in Colares. The maximum flower diameter (18.00 cm) was recorded in the control + leaf mould + cocopeat, followed by leaf mould + control (17.66 cm) among cultivars, the maximum diameter observed in Colares (15.56 cm). Maximum stem length was (58.67 cm) was observed in growing media leaf mould+ control followed by control+ leaf mould+cocopeat (56.33 cm) and maximum stem length was recorded in cultivar Colares (43.83 cm) than Pavia. Over all, lilium growth and flowering parameters were found better in growing media leaf mould+ control followed by control+ leaf mould+cocopeat, and cultivars Colares performed better in all respect except number of flowers per plant.

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INTRODUCTION

Lily belongs to genus *Lilium* and is one of the most important bulbous crops of family *Liliaceae* grown commercially for cut flowers as well as pot in India. It comprised more than 80 species in North America, Asia, and Europe. It has beautiful, attractive and bright flowers with considerable variation in plant architecture, flower shapes, sizes, colours, fragrances and bulb morphologies (Grassotti and Gimelli 2011, De Jong 1974). Lily (Lilium spp.) is one of the most important cut flower species in the international market as well as pot plant worldwide (Burchi *et al*., 2011). *Lilium* ranks fourth among top ten cut flowers of the world next to rose, chrysanthemum and tulip also ranks same among the bulbous plants after tulip, gladiolus, and narcissus.It ranks 5th for total sales at the flower market of Aalsmeer, with a total supply of about 1,50,000,000 cut stems per year (www.aalsmeer.com 2005) and an annual sale of approximately 205 million pieces (Hanks, 2015). The trend for growing lilium as a pot plant is increasing day by day in Kashmir and other parts of the India (Wani *et al*. 2016). The nutritional requirements of genus lilum are complex and it varies with in the cultivar. To produce superior quality potted lilium plants, it is utmost important to identify suitable growing media with all required properties. It is necessary to choose growing medium with all desired characteristics for superior quality potted lilium plant keeping in view the sustainability, the investigation was undertaken during the year 2023-24 to find out the suitable growing medium for lilium cultivars namely Colares and Pavia.

MATERIALS AND METHODS

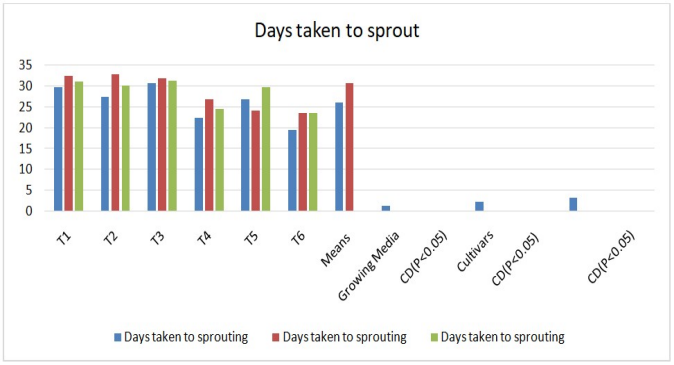
The present investigation was carried out during the year 2023-24 and 2024-25 at the experimental field of Regional Horticultural Research and Training Station Mashobra Shimla (H.P.). The RHR&TS, Shimla (H.P.) is situated at 31.1oN latitude and 77.1o E longitude, North West of Shimla with an elevation of 2286 meters above mean sea level is typically a temperate region. June and July are the hottest months (up to 30°C) and December, January are the coldest (sometimes below freezing temperatures). Two cultivars namely Colares and Pavia of lilium bulbs were selected for the experiment. Diseases free and healthy bulbs of selected cultivars were planted in 15 cm size plastic pots containing 4 to 5 holes at the bottom. After planting of bulbs, pots were placed in a protected condition. Different media composition used for filling of pots were: T1: Control (Soil+ Sand +FYM, 1: 1: 1 v/v), T2: cocopeat + control, (1: 1 v/v), T3: cocopeat (v/v), T4:control+ leaf mould + coco peat (1:1:1v/v), T5: leaf mould (v/v), T6: leaf mould +control (1: 1 v/v).The experiment

was laid out in a complete randomized design (CRD) with 3 replications. Planting was done in October 2023. Data was recorded on characters such as days taken to bulb sprouting, plant height (cm), stem length (cm), days taken to bud initiation, days taken to flowering, number of buds/spike, number of flowers per plants etc. The data were statistically analyzed as suggested by Gomez and Gomez (1984). A probability of $P \leq 0.05$ was considered significant.

RESULTS AND DISCUSSION

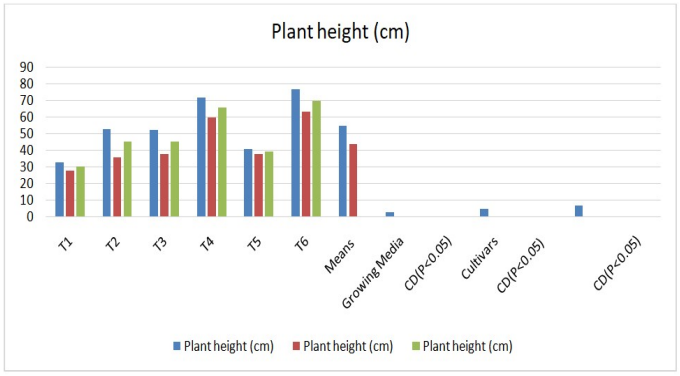
The data presented in table 1 revealed that minimum number of days taken to sprouting was recorded in T4 (24.33 days) and maximum days taken to sprouting were observed in T3 (31.17).

Table 1. Pooled data on effect of growing media composition on days taken to sprout



Among interaction between treatment number of days taken to sprouting was recorded in T6 (19.33 days) and between cultivars minimum number of days taken to sprouting was observed in cultivar Colares.

Table 2. Pooled data on effect of growing media composition on plant height (cm)



Maximum plant height was recorded in T6 (9.67 cm) and minimum was observed in T1 (29.83 cm) among cultivar maximum plant height was recorded in Colares followed by Pavia. Interaction between treatment and cultivar maximum plant height was recorded in T6 (76.33 cm) in cultivar Colares and minimum was observed in T1 (27.33 cm) in cultivar Pavia. Data in the table reveals that maximum number of leaves per plant was observed in T6 (47.67) and minimum number of leaves was recorded in T3 (37.17). Maximum number of leaves per plant was recorded in cultivar Colares (45.22) followed by Pavia (42.22). Interaction between treatment and cultivar maximum number of leaves per plant was observed in Colares (52.33) in T4 followed by cultivar Pavia in same media. Media with good water holding capacity, proper drainage, supply appropriate nutrients to plant which provide better condition for root and shoot development in the specified media containing coco peat, leaf mould and control. The findings of the present investigation are in close conformity with the reports of Treder (2011) in Oriental lily, Khan *et al*., (2020) and Singh *et al*., (2015) in Chrysanthemum.

Table 3. Pooled data on effect of growing media composition on number of leaves per plant

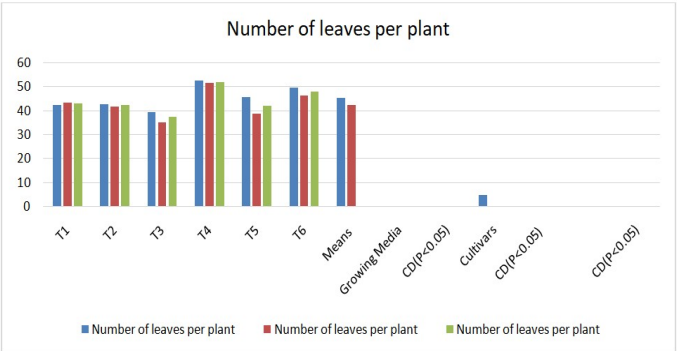
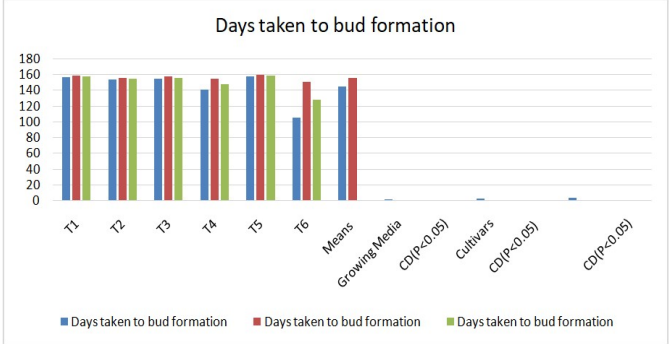
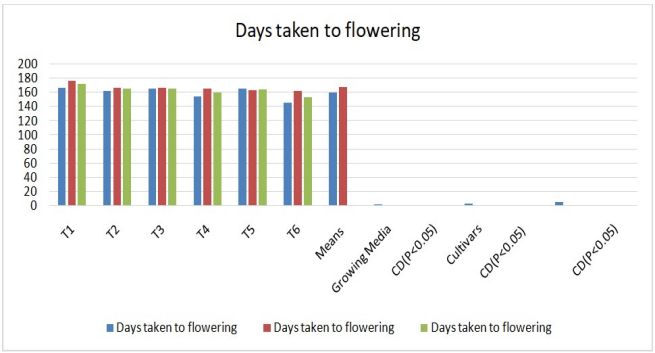


Table 4 Pooled data on the effect of growing media composition on bud formation (days)



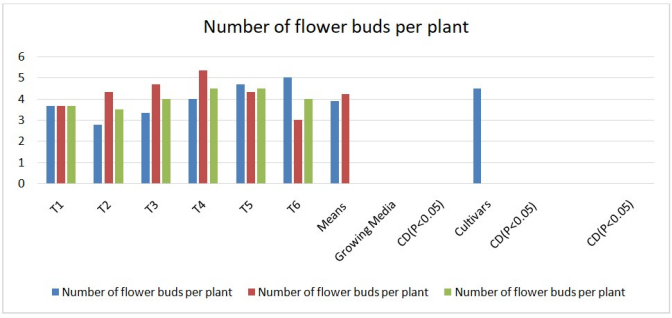
Perusal of the data presented in the table reveals that a lesser number of days taken to bud formation was observed in T6 (127.50 days), and the maximum number of days taken to flowering was recorded in T5 (158.17 days). Among cultivars, the minimum number of days taken to bud formation was recorded in cultivar Colares and the maximum number of days taken to bud formation was recorded in cultivar Pavia. Interaction between cultivars to treatment it was observed that minimum number of bud formation was observed in T6 (105.00 days) and the maximum number of days taken to flowering was observed in T5 (158.17 days) with cultivar Pavia.

Table 5 Pooled data on effect of growing media composition on days taken to flowering (days)



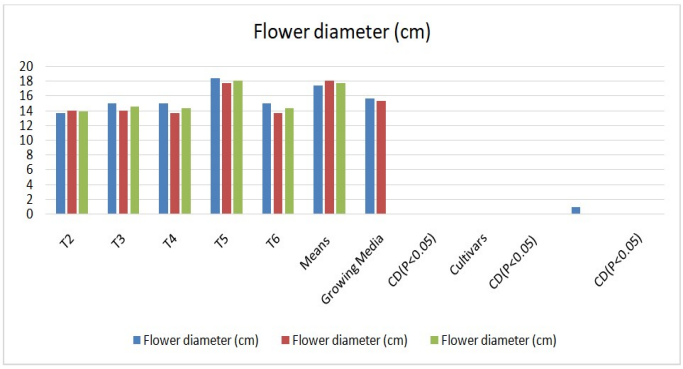
Data presented in the Table 4 indicated that minimum number of days taken to flowering was recorded in T6 (153.17) followed by T4 (159.33 days) and maximum was observed in T1 (171.00). Among cultivar minimum number of days taken to flowering was observed in cultivar Colares followed by Pavia. Interaction between treatment and cultivar minimum number of days taken to flowering was observed in T6 (145 days) and maximum was observed in cultivar Pavia T1 (176.33).

Table 6. Pooled data on effect of growing media composition on the number of flower buds per plant



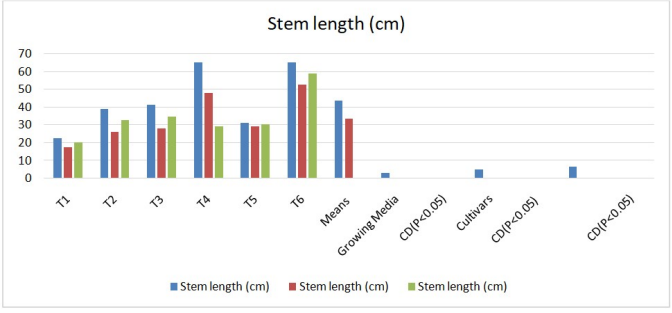
The data embodied in the table shows that maximum number of flowers buds per plant was observed in T4 and T5 (4.50) and minimum was observed in T2 (3.5). Among cultivars Pavia recorded maximum number of flower buds per plant than Colares (3.89). Interaction between treatment and cultivar maximum number of flower buds per plant was observed in T6 (5.00) in cultivars Colares and minimum was observed in T2 (2.76).

Table 7. Pooled data on effect of growing media composition on flower diameter (cm)



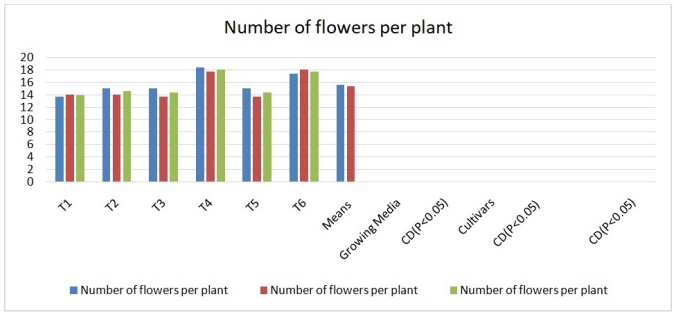
Data in the table reveals that maximum flower diameter (cm) was observed in T4 (18.00 cm) followed by T6 (17.67 cm) and between cultivar maximum flower diameter was observed in cultivar Colares (15.56 cm) followed by cultivar Pavia (15.27 cm). Interaction between treatment into cultivar it is revealed from data that maximum flower diameter was observed in cultivar T4 (18.33 cm) followed by T6 (18.00 cm) and minimum was observed in T1, T3 and T5 (13.67 cm).

Table 8 Pooled data on effect of growing media composition on stem length (cm)



Stem length was recorded as maximum in T6 (58.67 cm) and minimum was recorded in T1 (19.83 cm). Among cultivar maximum stem length was observed in Colares (43.33 cm) followed by Pavia (33.33 cm). Whereas, interaction between treatment and cultivar maximum stem length was recorded in T4 and T6 (65.00 cm) and minimum stem length was recorded with T1 (17.33 cm) in cultivar Pavia.

Table 9. Pooled data on effect of growing media composition on the number of flowers per plant



The data presented in the table 8 reveals that maximum number of flowers per plant was observed in T4 and T5 (4.50) and minimum was observed in T2 (3.5). Among cultivars Pavia recorded maximum number of flowers per plant than Colares (3.89). Interaction between treatment and cultivar maximum number of flowering per plant was observed in T6 (5.00) in cultivars Colares and minimum was observed in T2 (2.76). From the study, it could be concluded that media containing control+ leaf mould + coco peat (1:1:1v/v), observed to be the best media for growth, flowering and bulb production of Lilium. Superior flowering traits might be due to better growing conditions and good physico-chemical properties of media containing, soil, sand, FYM, as control, coco peat and leaf mould. These finding are close conformity with the result obtained by Grassotti *et al*. (2003) in Lilium, Awang *et al*. (2009) in *Celosia cristata*, Kale *et al*. (2009) in gerbera, Tehranifar *et al*. (2011) in Lilium and Khalaj *et al*. (2011) in gerbera. The results of this study confirmed that vegetative and flowering traits, attributes of both the cultivars Colares and Pavia were found to be better in media containing leaf mould + control mould and followed by control+ leaf mould+cocopeat.

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