



Research Article

EVALUATION OF DIFFERENT LILIUM HYBRIDS FOR GROWTH PARAMETERS UNDER OPEN FIELD CONDITIONS AT DIFFERENT ALTITUDES OF KASHMIR VALLEY

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Abstract: The present study was conducted in Kashmir valley at different altitudes for bulb production include Shalimar District Srinagar (1591m amsl), Lamu District Anantnag(2133m amsl), and Kandi Khas District Kupwara (1602m amsl) 4 Asiatic cultivars (Navona, Nello, Daila and Blackout), 3 oriental cultivars (Parrano, Tiber and Conca D) and 2 LA hybrids (Pedround and Yellow diamond) of Liliium were procured and planted in field at different altitudes of Kashmir Valley. The results showed that bulbs grown at Tangmarg Lamu District Anantnag(2133m amsl) had better growth parameters than other altitudes. The liliium hybrid groups behaved differently according to temperature conditions. Asiatic and Oriental hybrids were better adapted to cooler climates. Fresh weight of Asiatic hybrids 'Navona' and 'Nello' were significantly higher at different altitudes. In Oriental hybrids fresh weight and size of harvested bulbs were higher at District Anantnag. Moreover, the results indicated that dry temperate regions of Kashmir valley are suitable for quality cut flower and bulb production of liliium.

Keywords: Liliium Hybrids, Growth Parameters, Open Field Conditions

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Introduction

The genus Liliium belongs to Liliaceae family and comprises more than 80 species [1]. During the last 50 years, more than seven thousand cultivars have been developed. These are classified mainly into three groups: Longiflorum (L), Asiatic (A), and Oriental (O) hybrids that belong to different taxonomic sections. Longiflorum hybrids have trumpet shaped white flowers that are mostly side-facing and have a distinctive fragrance. They show strong growth vigour and year round forcing abilities [9]. Asiatic hybrids are important due to their wide variation in flower colours, shapes, sizes and early flowering. Oriental hybrids have large and attractive flowers with a wide range of white, pink, yellow colours and strong fragrance. In India, bulbs of Liliium sourced from Holland are planted for production of cut flowers throughout the year. Generally, for early sprouting and flowering, liliium bulbs require a cold treatment at 2-7°C for 6-8 weeks. Cold desert areas of Himachal Pradesh particularly in Lahaul - Valley and Kinnaur districts offer a wide variety of soil and climatic conditions that satisfy the different requirements of several hybrids of Liliium. However, the information existing in the state about the production of lily cut flower and bulbs is scarce. The recent expansion of the flower industry in the state and the need for producers to seek alternative or complementary production to their main agricultural activity has generated a growing interest in bulb production. At present, the lily is the most important cut flower crop grown in the country. Due to its importance and potential, several programmes were carried in different parts of the country with the aim of testing flower and bulb production potential of different groups of Liliium hybrids. Bulbs grown in different areas are not necessarily in the same physiological state even if they are harvested at the same apparent external degree of maturity. They may express different growth potentials even if they are subsequently stored and grown under the same conditions. It appears that bulbs produced under different climatic conditions will not be in the same physiological state if they are harvested on the same date.

In lily flower production, the quality of the bulb determines the quality of its flower. the aim of this investigation was to study

Materials and Methods

Study Area

The present study was conducted in the three districts of Kashmir Valley, also known as the Vale of Kashmir. Before planting soil testing was carried out and soil was prepared as per the requirement of Liliium crop. Nano silver was used for soil sterilisation and Nano gel and Nano char were incorporated in soil for soil moisture conservation. Besides this incorporation of well rotten FYM and fertilisers was ensured at the time of soil preparation

Fresh weight

Calculated with the help of digital balance (S.F 400, Capacity 750 g × 0.1 g).

Leaf area (cm²)

The leaf area (LA) plant⁻¹ was taken at 50, 75, 90 and 105 DAP with the help of non-portable LA meter (L.A 211, Systronics). The leaves were removed from the stem at the pre-designated time. The LA meter was calibrated before use and was set between the ranges of 0 and 100. The leaves were carefully placed on the stage and were covered with the glass plate, and the recordings were noted down. The sum of LA of all the leaves was taken to get the total LA plant⁻¹. LA index (LAI) was calculated with following equation

$$LAI = LA \div \text{Ground area}$$

Relative Growth rate

RGR is calculated using the following equation [2]:

$$RGR = (\ln W_2 - \ln W_1) / (t_2 - t_1)$$

Where,

ln = natural logarithm

t₁ = time one (e.g. in days)

t₂ = time two (e.g. in days)

w₁ = Size at time one

w₂ = Size at time two

Number of bulbs

Weight of bulbs (g)

Calculated with the help of digital balance (S.F 400,Capacity 750 g × 0.1 g).

Weight of scales

Calculated with the help of digital balance (S.F 400,Capacity 750 g × 0.1 g).

Size of bulbs

Calculated with the help of digital calliper

Results and Discussion

The data pertaining to the growth parameters presented at different altitudes of Kashmir Himalayas. It is evident from the data that there is significant difference among different hybrid varieties of liliun. Asiatic hybrid (Blackout), in oriental (Conca D) and LA (Yellow diamond) recorded significantly maximum plant height (88.1, 84.5 and 77.2 cm), (85.1, 80.4 and 74.3 cm) and (83.1, 78.4 and 72.2 cm), Spike length (73.1, 69.5 and 62.2 cm), (70.1, 65.4 and 59.3) and (68.1, 63.4 and 57.2 cm), Spike Diameter (1.5, 1.5 and 1.5 cm), (1.4, 1.3 and 1.2 cm) and (1.3, 1.2, 1.0 cm), fresh weight (28.5, 26.5 and 24.4 gm), (26.8, 23.4 and 20.2), and (20.0, 20.2 and 20.2), leaf area (4.30, 4.16 and 4.22), (4.26, 3.68 and 4.10) and leaf area index (0.72, 0.69 and 0.70), (0.57, 0.62 and 0.68) and (0.77, 0.63 and 0.68) at Larnuand, Kupwara and Srinagar among all the hybrid lilies. The hybrids also showed significant variation for flower parameters at different locations presented. Bud length (cm) (9.0, 8.3 and 9.5), (8.5, 8.2 and 7.9) and (5.8, 5.8 and 7.6), Number of flowers per plant (6.1, 8.0 and 8.0), (3.0, 3.0 and 3.0) and (3.0, 3.0 and 3.0), flower diameter (cm) (20.0, 18.3 and 16.9), (19.2, 17.8 and 17.7) and (16.2, 19.4 and 12.0), inflorescence length (cm) (20.1, 18.5 and 18.2), (19.2, 17.8 and 17.7) and (19.0, 17.4 and 17.3), flowering duration (days) (132.9, 133.0 and 116.8), (124.1, 130.5 and 113.1) and (123.6, 123.8 and 112.0). In Larnu, Kupwara and Srinagar, Asiatic hybrid (Blackout), oriental hybrid (Conca D) and L.A. hybrid (Yellow diamond) shows best results.

Conclusion

In general, the forcing time for all the hybrids studied was longer than that reported by the bulb supplier companies. This may be occurred because at the beginning of the cycle the night temperatures were lower than those suggested by the International Flower Bulb Centre i.e. 12- 130C and lower temperature lengthen the growing season. Asiatic hybrids usually have a shorter growing period than other hybrids and require lower minimum temperatures than oriental and LA-hybrids. Temperature is the main primary factor controlling lily growth and development both in field and in the greenhouse.

Application of research: Study of impact of climatic conditions

Research Category: Floriculture

Abbreviations: O: Oriental, A: Asiatic and L:Longiflorum

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Author Contributions: All authors equally contributed

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Study area / Sample Collection: Three districts of Kashmir Valley

Cultivar / Variety name: Lilium

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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