

Lilium cultivars and Flowering behavior

Abstract

Flowering behavior and flowering response of different *Lilium* genotypes was carried out during year 2018 at Division Of Floriculture and Landscape Architecture SKUAST- K Shalimar. 15 cultivars including Navona , Malesco, Litouwen, Black Out, Revenna, Pink Palace, Tiber, Conca-D, Nello, Yellow Diamond, Tresor, Rialto, Courier, Cobra, and were evaluated on the basis of floral biology and flowering behavior. The outcome of the results revealed those maximum days to bud appearance after planting 44.48 days was recorded with cultivar Tiber where as minimum days 40.55 resulted with cultivar Black Out. Highest values for Bud diameter at maturity 26.59 mm was observed with cultivar Black Out and lowest values 18.87 mm with cultivar Navona. Bud length ranged 5.30 cm to 9.08 cm with cultivars Navona and Black Out, respectively. Number of florets per spike ranged minimum 2.36 to maximum 6.10 with cultivar Navano and Blackout respectively. Similar trend was followed for minimum to maximum values for floret diameter, inflorescence length and inflorescence diameter.

Keywords: *Lilium*, Cultivars, Flowering , Variability

1. Introduction

Lilium are herbaceous plants, most species are native to the temperate northern hemisphere. During the last decade Asiatic, Oriental, OT and LA has gained popularity worldwide among the cut flowers and potted flowering plants (Masoodi *et al.*, 2018). Categorization of types is based on size, fragrance, flowering pattern and duration of flowering. *Lilium* has prime importance in commercial floriculture trade for its multi utility ranging from its use as cut flower, pot plant as well as a unique landscape plant.

Most of the studies regarding the diversity in *Lilium* species are based on the morphological traits. But evaluation on the basis of flowering behavior and quality is one of the important considerations from commercial point of view as it provides us idea of catching events. Besides this for taking up any breeding programme varietal evaluation for flowering and flower behavior is very important. However performance of cultivars varies from one agro climatic zone to other. For commercialization of any cultivar in a

specific zone morphological study plays an important role and this study places importance in this context.

2. MATERIAL AND METHODS

2.1 Geographical features

Srinagar, the summer capital of Jammu and Kashmir, India is situated between 34°05' to 34°07' north latitude and 74°08' N to 74°09'E east longitude at an altitude of about 1587 m above mean sea level. It is flanked on the southeast and northeast by the lofty Himalayan ranges.

2.2: Planting of bulbs was done in the late spring after ensuring that the bulbs have good drainage and sunlight to keep them away from rotting.

2.3 Intercultural operation

Weeding, hoeing, fertiliser and manures were applied as per the recommended schedule for Liliium.

Soil: Well drained sterile medium (preferably leaf mould, cocopeat and FYM in equal parts) with pH 5.5 to 6.5 is ideal. Fumigate the beds with Dazomet @ 30g/m².

Propagation: Liliiums are commercially propagated through bulbs. A six week cold storage period at 2°C to 5°C is needed to break dormancy.

Spacing: 20 x 15 cm, 15 x 15 cm or 15 x 10 cm (plant density varies between 30 and 60/m² depending on cultivar and bulb size)

Irrigation: 6- 8 litres/m²/day during summer and 5 - 6 litres/m²/day during winter **oil:** Well drained sterile medium (preferably leaf mould, cocopeat and FYM in equal parts) with pH 5.5 to 6.5 is ideal. Fumigate the beds with Dazomet @ 30g/m².

Propagation: Liliiums are commercially propagated through bulbs. A six week cold storage period at 2°C to 5°C is needed to break dormancy.

Spacing: 20 x 15 cm, 15 x 15 cm or 15 x 10 cm (plant density varies between 30 and 60/m² depending on cultivar and bulb size)

Irrigation: 6- 8 litres/m²/day during summer and 5 - 6 litres/m²/day during winter

2.4 Parameters of different Lillium cultivars

Studied parameters include days to bud appearance, flower bud diameter and length (cm), inflorescence length and diameter (cm), number of florets per spike and floret diameter (cm)

2.3 Statistical analysis

Statistical analysis of the data collected for different parameters during the present investigation was subjected to analysis of variance for randomized block design with three replications (Gomez and Gomez, 1983).

3. Results and Discussion

Perusal of data (Table 1)(Fig.1) shows cultivar specific response for days to bud initiation after planting, bud length and bud diameter. However maximum days to bud appearance after planting 44.48 days was recorded with cultivar Tiber where as minimum days 40.55 resulted with cultivar Black Out. Highest values for Bud diameter at maturity 26.59 mm was observed with cultivar Black Out and lowest values 18.87 mm with cultivar Navona. Bud length ranged 5.30 cm to 9.08 cm with cultivars Navona and Black Out, respectively. Number of florets per spike ranged minimum 2.36 to maximum 7.10 with cultivar Navano and Blackout respectively. Further maximum values for floret diameter (19.94mm), inflorescence length(21.09cm), inflorescence diameter (2.77cm) were noticed with cultivar Black out and minimum floret diameter (9.00mm), inflorescence length (14.78cm) and inflorescence diameter (1.78 cm) resulted with cultivar Navano (Table 2)(Fig. 2). Photoperiodic induction is followed almost automatically by differentiation leading to the blooming of plants. An increase in the number of inductive cycles results in early flowering of the plant where as continuous inductive cycles promote early flowering as discontinuous inductive cycles. The transmission of stimulus indicates that it is in the form of some chemical and this flower-inducing chemical known as florigen. This hormone is a material substance which can be translocated from leaves to the apical tips situated at other parts of the plants. Florigen is formed in adult leaves, transported into shoot axis and from there distributed in all directions. Therefore it also reaches the vegetative apex of the shoot, where it activates flowering genes. This indicates that variability in genotypes is attributed to genetic make-up of the different cultivars which may sprout at the same time but ultimately genotypic expression is superimposed by the environmental influence. Liliun cultivars might have responded for bud initiation to complete spike formation and quality of spike may be the combined influence of genotype and environment. Monika *et al.* 2008 , Masoodi *et al* 2018 and

Masoodi *et al* 2022 reported response of genotypic and phenotypic co-efficient of variation for floral traits. Co related findings were reported by Ravikumar and Patil (2003) in French marigold and number of florets per spike in gladiolus Grassotti *et al.* (1990) and Balode (2010) also reported higher phenotypic variability for plant height in Liliium. Singh and Sen (2000) suggested that if the phenotypic coefficient of variation is greater than the genotypic co-efficient of variation, the apparent variation is not only due to genotypes, but also due to influence of environment. The estimates of phenotypic and genotypic co-efficients of variance showed a low disparity for plant height, number of leaves and inflorescence diameter indicating the least effect of environment on different traits and phenotypic variability could be a reliable measure of genotypic variability. Similar results were also reported by Misra and Saini (1990) in gladiolus. Bhatia *et al.* (2013) have also reported low PCV and GCV for days to flowering in tulip. Genotypic co-efficient of variation helps in the measurement of genetic diversity in the qualitative and quantitative characters. The estimation of heritability has a greater role to play in determining the effectiveness of selection provided it is considered in conjunction with the predicated genetic advance Panse and Sukhatme, 1985. Bhatia *et al.* (2013) also observed similar results for spike length and plant height in tulip.

Conclusion:

Studied parameters include days to bud appearance, flower bud diameter and length (cm), inflorescence length and diameter (cm), number of florets per spike and floret diameter (cm). The outcome of the results revealed those maximum days to bud appearance after planting 44.48 days was recorded with cultivar Tiber where as minimum days 40.55 resulted with cultivar Black Out. Highest values for Bud diameter at maturity 26.59 mm was observed with cultivar Black Out and lowest values 18.87 mm with cultivar Navona. Bud length ranged 5.30 cm to 9.08 cm with cultivars Navona and Black Out, respectively. Number of florets per spike ranged minimum 2.36 to maximum 6.10 with cultivar Navano and Blackout respectively. Similar trend was followed for minimum to maximum values for floret diameter, inflorescence length and inflorescence diameter.

Competing Interest:

I declare that I don't have known competing financial interests or personal relationships to influence the work reported in this paper.

Authors Contribution

Author have made a substantial contribution to the concept or design of the article; or the acquisition, analysis, or interpretation of data for the article;

Acknowledgement

The authors are thankful to ICAR for financial support through Extramural Project “**Production and forcing of bulbs in Lilium**”

Reference

- Balode, A. 2010. Phenotypic analysis of hybrids and their parents in liliun species. Breeding, Annual 16th International Scientific Conference Proceedings. Research for Rural Development 1: 65-70.
- Bhatia, R., Dhiman, M. R., Chander, P. and Dey, S. S. 2013. Genetic variability and character association in tulip (*Tulipa gesneriana*) for various quantitative traits. *Indian Journal of Agricultural Sciences* 83 (7): 773-780.
- Gómez, K. and Gómez, A. (1983) Statistical Procedures for Agricultural Research. 2nd Edition, John Wiley & Sons, Hoboken, 630 p.
- Grassotti A., Torrini F., Mercuri A., and Schiva T., 1990, Genetic improvement of liliun in Italy. *Acta Horticulture* 266: 339-347.
- Masoodi N.H. and Nayeem S.M. 2018. Evaluation Of Different Liliun Hybrids Under Climatic Conditions Of Kashmir Valley. *Agri Res & Tech :Open Access J.* 12 (8): 2581-8627
- Masoodi N.H. and Nayeem S.M. 2022. Morphological characterization of Tulip cultivars at 1587m above Mean sea level under Kashmir Himalayas. *International Journal of environment and climate chnagTech :Open Access J.* 17 (1): 556008..
- Misra, R. L. and Saini, H. C. 1990. Correlation and path-coefficient studies in gladiolus. *Indian Journal of Horticulture* 47 (1): 127-132.
- Monika, Singla, Sehrawat, S. K., Gupta, A. K., Suresh, K. and Dahiya, D. S. 2008. Studies on phenotypic correlation coefficient in gladiolus cultivars. *Haryana Journal of Horticultural Sciences* 3(1-2): 82-84.
- Panse, V. G. and Sukhatme, P. V. 1985. Statistical methods for agricultural workers. *Indian Council of Agricultural Research, New Delhi* 152-156.
- Ravikumar, H. and Patil, V. S. 2003. Evaluation of China aster [*Callestephus chinensis* (L.) Ness genotypes under transitional zone of north Karnataka. *Indian Society of Ornamental Horticulture* 12-14.
- Singh, D., and Sen, N. L. 2000. Genetic variability, heritability and genetic advance in marigold. *Journal of Ornamental Horticulture* 3(2): 75-78.

Variety	Number of days to bud appearance	Bud diameter (mm)	Bud length (cm)
Navona	45.49	18.87	5.30
Malesco	36.70	22.49	8.59
Litouwen	36.13	22.54	8.38
Black Out	40.55	26.59	8.08
Revenna	41.77	22.24	8.05
Pink Palace	42.34	23.92	8.68
Tiber	44.48	19.59	8.98
Conca-D	40.40	22.09	8.04
Nello	39.06	22.16	8.03
Yellow Diamond	40.26	22.13	5.76
Tresor	44.26	22.39	7.50
Rialto	42.86	22.08	6.36
Courier	42.73	22.12	8.01
Cobra	43.26	20.57	5.65
Pavia	44.27	20.58	5.43
C.D (p≤0.05)	1.23	1.55	0.98

Table 1: Lilium genotypes response to bud appearance and qualitative parameters of flowering

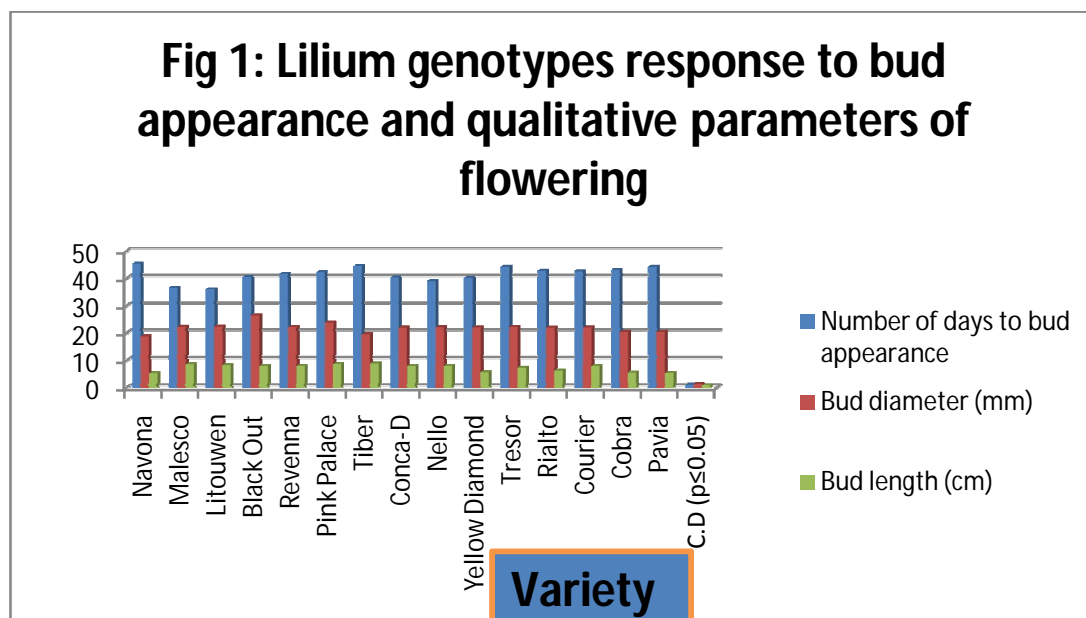


Table 2: Performance Lilium cultivars for quality attributes of flowering

Variety	Number of florets per spike	Floret diameter (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)
Navona	2.36	9.00	14.78	1.78
Malesco	4.36	15.67	18.09	2.65
Litouwen	4.55	16.66	20.77	2.00
Black Out	7.10	19.94	21.09	2.77
Revenna	3.66	13.21	17.33	2.05
Pink Palace	5.90	16.27	17.05	1.96
Tiber	2.30	9.10	18.00	1.52
Conca-D	3.96	14.99	18.54	1.96
Nello	4.00	15.32	17.28	1.96
Yellow Diamond	3.88	12.55	17.19	2.13
Tresor	5.98	15.88	18.50	1.96
Rialto	3.99	12.80	17.66	2.33
Courier	4.99	15.67	17.44	2.70
Cobra	2.44	13.00	15.77	1.98
Pavia	2.77	11.33	17.67	1.55
C.D (p≤0.05)	0.51	1.77	1.55	0.30

Fig.2 Performance Lilium cultivars for quality attributes of flowering

