***Original Research Article***

**Evaluation of Lilium cultivars for vegetative and propagation traits under temperate conditions of Kashmir**


## ABSTRACT

Morphological characterization of 15 genotypes viz. Navona , Malesco, Litouwen, Black Out, Revenna, Pink Palace, Tiber, Conca-D, Nello, Yellow Diamond, Tresor, Rialto, Courier, Cobra, Pavia genotypes was carried out during year 2018 at Division Of Floriculture and Landscape Architecture SKUAST- K Shalimar with an objective to assess the response to traits of growth and propagation ratio. On the basis of data maximum plant height of 90.70 cm resulted with cultivar black out and minimum 50.60cm with cultivar Navona. number of leaves per plant followed the same trend with maximum 99.87 noticed in cultivar Black out and minimum 62.20 in cultivar Navano. Leaf area per plant ranged from 166.30 $cm^2$ in cultivar Tiber to 443.50 $cm^2$ in Pink Palace.The leaf area index varied between 1.20 and 1.96 in Tiber and Pink Palace cultivars, respectively. Weight of bulb cluster $plant^{-1}$ (g) ranged from 30.81 g in Navona to 72.97 g in Black Out. Variability for weight of subsidiary bulbs per plant varied from 32.65 g in Navona to 80.45 g in Black Out respectively. Highest values for weight of main bulb $plant^{-1}$ (73.65 g) resulted with cultivar Black out and minimum 31.52g in Navona. Weight of subsidiary bulbs $plant^{-1}$ (g) followed the same trend recoding maximum 7.30 g with cultivar Black out and minimum 2.70 g for cultivar Navano. Size of main bulb (cm) ranged between 4.63cm in cultivar Navano to 6.33 cm in cultivar blackout



**Keywords:** Lilium cultivars, Characterisation**,** Vegetative traits, Propagation


## 1. Introduction

Commercial floriculture as an economic venture has been noticed from last few decades. The annual growth rate is around 10% and global trade is estimated around $ 60 billion. Aesthetic taste has increased among the masses and use of flowers

in social functions has an important place. Total global area under bulbous crops has covered around 50000 ha and more area is put under the cultivation keeping in view demand of bulbs in global market. India has around 3 lakh ha under cultivation of commercially viable flower crops. Lilium is one of the important crops in world and comprises of around 100 species, 7 sections. During the last decade Asiatic, Oriental, OT and LA has gained popularity worldwide among the cut flowers and potted flowering plants and more than 10,000 Lilly cultivars have been bred (Masoodi *et al.,* 2018). Crores of bulbs are imported annually in India which costs huge foreign exchange. Kashmir is endowed with highly suitable agro-climate and offers immense scope for bulb production. So in absence of any interstate competition, Kashmir can supply bulbs of tulip to national markets. But which variety can perform best from vegetative to reproductive point of view is always questionable. Thus current study of evaluation engages a scope for delaminating varieties of lilium which can be explored from commercial point of view.

## 2. MATERIAL AND METHODS

### 2.1 Geographical features

Srinagar, the summer capital of Jammu and Kashmir, India is situated between 34º05′ to 34º07′ north latitude and 74º08′ to 74º09′ 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 Morphological parameters of different Lilium cultivars

Studied parameters include plant height (cm), number of leaves plant$^{-1}$, leaf area plant$^{-1}$ (cm$^2$) and leaf area index (LAI); weight of bulb cluster plant$^{-1}$ (g), weight of main bulb plant$^{-1}$ (g), weight of small/subsidiary bulbs plant$^{-1}$ (g) and size of main bulb (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 complete randomized block design with three replications (Gomez and Gomez, 1983).

## 3. Results and Discussion

Perusal of data (Table 1) performance of 15 genotypes showed significant variation for all the vegetative parameters. However maximum plant height of 90.70 cm resulted with cultivar black out and minimum 50.60cm with cultivar Navona. Number of leaves per plant followed the same trend with maximum 99.87 noticed in cultivar Black out and minimum 62.20 in cultivar Navano. Leaf area per plant ranged from 166.30 $cm^2$ in cultivar Tiber to 443.50 $cm^2$ in Pink Palace.The leaf area index varied between 1.20 and 1.96 in Tiber and Pink Palace cultivars, respectively. Weight of bulb cluster $plant^{-1}$ (g) ranged from 30.81 g in Navona to 72.97 g in Black Out. Range for weight of subsidiary bulbs per plant varied from 32.65 g in Navona to 80.45 g in Black Out respectively. Highest values for weight of main bulb $plant^{-1}$ (73.65 g) resulted with cultivar Black out and minimum 31.52g in Navona (Table 2). Weight of subsidiary bulbs $plant^{-1}$ (g) followed the same trend recoding maximum 7.30 g with cultivar Black out and minimum 2.70 g for cultivar Navano. Size of main bulb (cm) ranged between 4.63cm in cultivar Navano to 6.33 cm in cultivar Blackout. Vegetative growth is important for propagation ratio. Genetic makeup of a particular cultivar indicates its level of performance in a particular agro climatic. Vegetative growth is important for propagation ratio as nutrient accumulation indicates the quality of subsidiary propagules. Grassotti *et al*. (1990) , Balode (2010) and Masoodi *et al* 2018 reported higher phenotypic variability for plant height in Lilium. 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-efficient of variance showed a low disparity for plant height (cm) and number of leaves per indicating effect of environment on different traits and phenotypic variability could be a reliable measure of genotypic variability. Bhatia *et al*. (2013) reported variability of plant height in tulip genotypes and distinct response for performance under a particular agro climatic conditions. The results are also in line with the findings of Singh and Kumar (2008) in marigold for plant height, Dhiman *et al*. (2015) in Asiatic hybrid lily, Masoodi *et. al.* (2018) in Asiatic, Oriental and LA hybrids. Variability in genotypes is attributed to genetic make-up of the different cultivars and genotypic expression is superimposed by the environmental influence. Co related findings on response of cultivars are in complete agreement with the work of Monika *et al*. (2008) and Masoodi *et al* 2018. High genotypic and phenotypic co-efficient of variation for weight of subsidiary bulb ,number of florets per spike ,weight of bulb cluster per plant and weight of main bulb per plant were observed for number of flowers per stem in China Aster by Ravikumar and Patil (2003) and in French marigold and number of florets per spike in gladiolus (Kispotta *et al.,* 2017). Grassotti *et al*. (1990) and Balode (2010) also

reported higher phenotypic variability for plant height in Lilium. 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-efficient of variance showed a low disparity for plant height (cm), number of leaves per plant and inflorescence diameter (cm) 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; Johnson *et al.,* 1955)

**Table 1: Response of lilium genotypes to vegetative parameters**

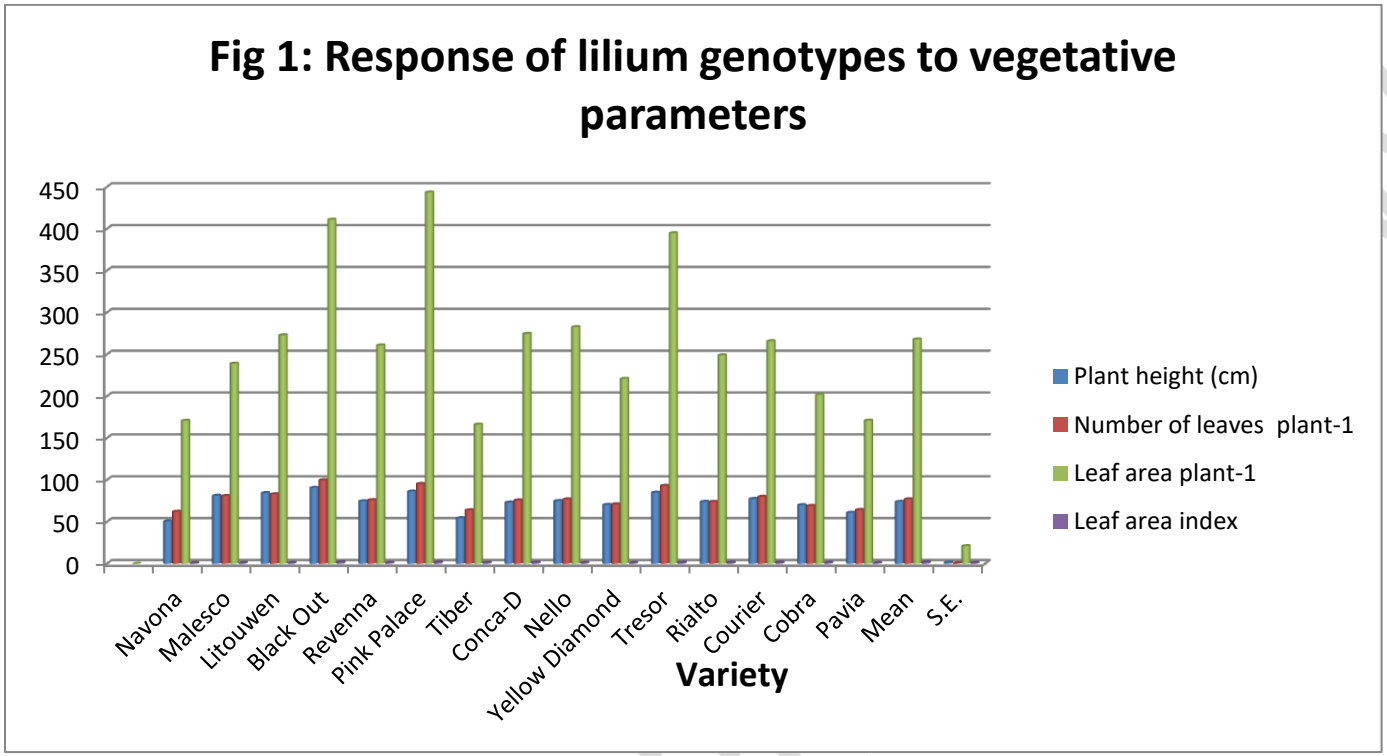
| Variety | Plant height (cm) | Number of leaves plant$^{-1}$ | Leaf area plant$^{-1}$ (cm$^2$) | Leaf area index |
|---|---|---|---|---|
| Navona | 50.60 | 62.20 | 170.88 | 1.00 |
| Malesco | 81.30 | 80.96 | 239.09 | 1.01 |
| Litouwen | 84.50 | 83.10 | 273.00 | 0.98 |
| Black Out | 90.70 | 99.87 | 411.00 | 1.96 |
| Revenna | 74.70 | 76.01 | 260.88 | 1.10 |
| Pink Palace | 86.34 | 95.45 | 443.50 | 1.96 |
| Tiber | 54.50 | 63.96 | 166.30 | 1.20 |
| Conca-D | 73.20 | 75.76 | 274.60 | 1.50 |
| Nello | 75.01 | 76.96 | 282.74 | 0.96 |

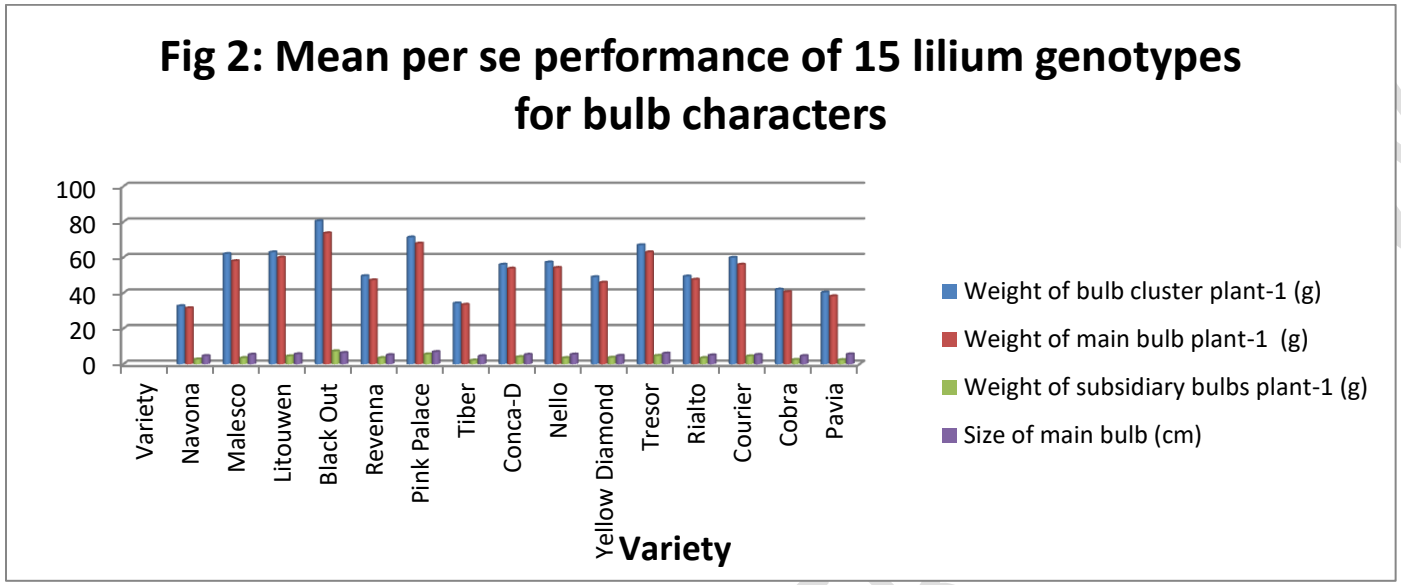
| | | | | |
|---|---|---|---|---|
| Yellow Diamond | 70.35 | 71.10 | 220.96 | 0.99 |
| Tresor | 84.96 | 93.09 | 394.96 | 1.50 |
| Rialto | 74.10 | 73.96 | 249.10 | 1.46 |
| Courier | 77.48 | 80.06 | 265.93 | 1.50 |
| Cobra | 70.10 | 69.13 | 201.96 | 1.30 |
| Pavia | 60.96 | 64.26 | 170.96 | 0.96 |
| Mean | 74.01 | 77.11 | 268.00 | 1.96 |
| S.E. | 1.50 | 0.73 | 21.10 | 1.10 |
| **C.D ($p \leq 0.05$)** | **2.45** | **2.12** | **59.20** | **0.20** |

**Table 2: Mean per se performance of 15 lilium genotypes for bulb characters**

| Variety | Weight of bulb cluster plant$^{-1}$ (g) | Weight of main bulb plant$^{-1}$ (g) | Weight of subsidiary bulbs plant$^{-1}$ (g) | Size of main bulb (cm) |
|---|---|---|---|---|
| Navona | 32.65 | 31.52 | 2.70 | 4.63 |
| Malesco | 61.99 | 58.00 | 3.45 | 5.36 |
| Litouwen | 62.96 | 59.96 | 4.47 | 5.64 |
| Black Out | 80.45 | 73.65 | 7.30 | 6.33 |
| Revenna | 49.55 | 47.22 | 3.45 | 5.10 |
| Pink Palace | 71.33 | 67.88 | 5.55 | 6.87 |
| Tiber | 34.22 | 33.44 | 2.09 | 4.53 |

| | | | | |
|---|---|---|---|---|
| Conca-D | 56.01 | 53.80 | 3.99 | 5.33 |
| Nello | 57.25 | 54.20 | 3.45 | 5.45 |
| Yellow Diamond | 48.99 | 45.87 | 3.67 | 4.74 |
| Tresor | 66.94 | 62.96 | 4.70 | 6.00 |
| Rialto | 49.33 | 47.55 | 3.45 | 4.96 |
| Courier | 59.89 | 56.01 | 4.45 | 5.25 |
| Cobra | 41.99 | 40.55 | 2.45 | 4.63 |
| Pavia | 40.33 | 38.24 | 2.33 | 5.55 |
| **C.D (p≤0.05)** | **2.55** | **2.52** | **0.96** | **0.33** |



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