

Original Research Article

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Appraisal of Asiatic Hybrid Liliium Cultivars under Polyhouse Growing Condition in Semi-Arid Haryana, India

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ABSTRACT

Keywords

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Appraisal of Lilium cultivars namely, Nashville (Yellow), Eyeliner (White) and Hyde Park (Orange) was carried out at Centre for Quality Planting Material, CCS Haryana Agricultural University, Hisar (Haryana) during winter season of 2017-18 to identify the suitable cultivar for successful cultivation and flower production under polyhouse growing conditions. The results reveal that among different cultivars, the cultivar Nashville had the towering plants with maximum leaf number, largest flower with maximum flower diameter (20.81cm) and more number of flowers per plant (4.47).

Introduction

Floriculture or flower farming is a discipline of horticulture concerned with the cultivation of ornamental plants for trade and floristry. India is bestowed with several agro-climatic zones conducive for the production of sensitive and delicate floriculture produce. Lilies (*Lilium* species) are very important ornamental bulbous plants belonging to the family Liliaceae. It is one of the leading cut flowers and ranks fourth among the top cut flowers in the world. It bears beautiful, attractive and bright flowers with shelf life. The genus *Lilium* with 100 species is native to Asia, Europe and Northern America in Northern Hemisphere (McRae, 1998). Asiatic hybrid lily can be multiplied through seeds,

bulb scales, bulb division, stem bulblets and stem bulbils. Stem bulblets and bulb divisions are suitable for its propagation. The number and size of bulb and bulblets depend upon the growth of lily plants. The optimum size of bulb, growing conditions and depth of planting is required for proper development and growth of plants. In LA the main colour is the yellow, followed by orange and pink, both decreased 4.9 and 19.4%. White is the most increased colour, with an increase of 53.1%, while the highest reduction is possible to observe in the gray colour. Regarding Asiatic hybrids, with 44.1%, the orange colour is the most important, followed by yellow. The price of cut flower stems varies among different groups of lilies. The highest prices are for Oriental, with red colour the highest and with pink the lowest price. The red and brown

colours have the highest price in Longiflorum asiatic and Asiatic hybrids, respectively. *Lilium* flower crops in India are on rise with a production of 8000 number per tons of cut flowers (Saxena, 2014).

Among the different types of lily, the Asiatic hybrid lily is very popular and high income generating per unit area. It is widely used in the floral industry as cut flower and potted plant, which are prized higher due to their size, beauty and longevity (Thakur *et al.*, 2005). The popularity of *Lilium* is gaining momentum in the country due to its large and attractive flowers with rehydration capacity after a long transportation. The cultivars of genus *Lilium* with outstanding range of colour, fragrance and adaptability to several environmental conditions are highly appreciated by the horticulturists (Bahr and Compton, 2004). The popularity of these hybrids, especially Asiatic and oriental types is increasing both as cut flower and pot plant (Lian *et al.*, 2003).

Appraisal of cultivars is of immense importance as different cultivars differ in their colour, stems length and number of flowers, which affect the economics of cultivation to a large extent. In Haryana, *Lilium* crop, which increased from 2.0 hectares with a production of 2,40,000 sticks in 2012-13. Presently, area under cultivation is 50.84 hectare with a production of 1,90,37,200 sticks (HDH, 2016). Information on minor cut-flower crops such as *Allium*, *Brodiaea*, and *Anemone* has been published (De Hertogh, 1989) and data are also available concerning yield, planting time, and effects of longevity on yield and flower quality (Armitage, 1987). The successful cultivation of *Lilium* depends on selection of suitable variety. The study of cultivars is very important for standardizing the production technology and its transfer to farmers' field. Study of the performance of commercially important cultivars with varying growth habit,

shape, size and colour of flowers will enable the farmers to make choice according to the market demand

Materials and Methods

The experiment was conducted at Centre for Quality Planting Material, CCS Haryana Agricultural University, Hisar (Haryana) during winter season of 2017-18 to study the appraisal of asiatic hybrid *lilium* for cut flower production. The experimental site was located in semi-arid zone of western Haryana at an altitude of 215 meters above mean sea level, latitude 29.09°N and longitude 75.43°E. The maximum temperature remained around 45°C during summer months of May to June and average annual rainfall of the region about 450 mm received during July to September. The three cultivars namely, Nashville, Eyeliner and Hyde Park were laid out in randomized block design (RBD) and replicated thrice. The bulbs were planted in the last week November at row to row and bulb to bulb spacing of 30×20 cm under polyhouse conditions. The cultural operations were followed throughout the experiment as per the package of practices to grow a healthy crop. The data recorded on various growth and flowering parameters were analysed statistically with the help of window based computer package OPSTAT. The calculated value of 't' was compared with 't' table value with n-2 degrees of freedom at 5% level of significance, where, n referred to number of pairs of observations.

Results and Discussion

The data given in Table 1 revealed that the maximum plant height (123.73cm) was recorded in Nashville and followed by the cultivars Eyeliner (112.87cm). However, lowest plant height was associated with cultivar Hyde Park (104.60cm). The significant variation with respect to plant height among the *Lilium* cultivars were

noticed by Barik and Mohanty (2015), Sindhu and Singh (2012) under northern plains. Cultivar Nashville revealed that maximum (99.60cm) stem length which was followed by Eyeliner and Hyde Park (87.40, 83.27cm) respectively which was significantly differ from each other.

The minimum days to sprouting observed in cultivars Nashville (6.6days) followed by cultivar Eyeliner (7.4days) and maximum days taken to sprouting in Hyde Park (8.2days). Percent sprouting of bulbs observed (100%) in all cultivars which was none significantly differed to each other. Various cultivars none significantly difference for sprouting has been also reported by Sindhu *et al.*, (2012), Barik and Mohanty (2015).

Cultivar Eyeliner recorded maximum number of leaves (65.07) per plant followed by cultivar Nashville which recorded (62.33) leaves per plant respectively. On other hand the minimum (54.00) leavers per plant was recorded in Hyde Park. Leaves length also reported maximum in cultivars Nashville (14.57cm) followed by Eyeliner (9.29cm) which was at par with Hyde Park (8.45cm). Width of leaves was maximum (2.36cm) in Nashville which was significantly differed from other it was followed by Eyeliner (2.10cm) respectively. The minimum leaves width (1.45cm) was recorded in Hyde Park. The maximum basal stem diameter reported in

cultivar Nashville (11.25mm) followed by Eyeliner (8.16mm) and minimum basal stem diameter was recorded in cultivar Hyde Park (6.49mm) the data presented in (Table 2). Similarly variation in vegetative traits of *lilium* has been reported by Singh *et al.*, (2015), Barik and Mohanty (2015) and Deka *et al.*, (2010). Differences in vegetative characters of different cultivars of *lilium* may be due to varied growth rates and their genetic potential resulted in variation in phenotypic expression. Kim *et al.*, (2013) and Pandey *et al.*, (2008) reported similar result of vegetative growth in Asiatic hybrid lily.

Lilium cultivars various significantly differ for quality and flowering traits presented in (Fig1). Days to emergence of bud and days to colour change of first bud were advanced in cultivars Hyde Park (33.40 and 73.07days) which was at par with Eyeliner (34.93 and 77.20days), whereas, delayed emergence of bud and colour change of first bud was observed in cultivar Nashville (37.93 and 85.47). Minimum days to open first flower was observed in cultivars Hyde Park (93.73days), which was remained at par with Eyeliner (103.53days). However, maximum days to open of first flower were reported in Nashville (106.40days). Similar variation among the cultivar traits was also reported by Kumar *et al.*, (2011), Sindhu and Singh (2012) in *Lilium*.

Table.1 Performance of *lilium* cultivars for vegetative characters

Cultivar	Days to sprouting	Percent sprouting	Plant height (cm)	Stem length (cm)
Nashville	6.6	100	123.73	99.60
Eyeliner	7.4	100	112.87	87.40
Hyde Park	8.2	100	104.60	83.27
CD _{0.05}	0.5	N/A	6.25	5.52

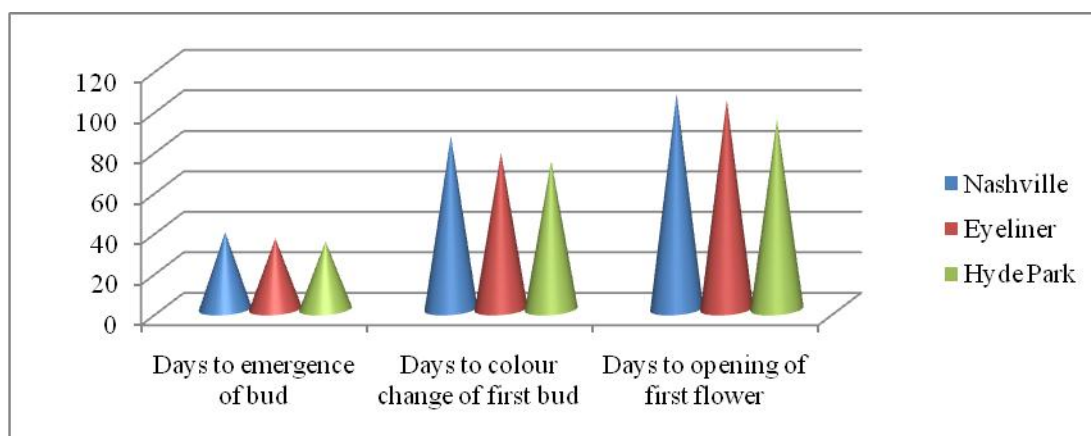
Table.2 Appraisal of liliium cultivars for their performance of vegetative characters

Cultivar	Stem diameter (mm)	No. of leaves per plant	Leaves length (cm)	Leaves width (cm)
Nashville	11.25	62.33	14.57	2.36
Eyelineer	8.16	65.07	9.29	2.10
Hyde Park	6.49	54.00	8.45	1.45
CD _{0.05}	0.16	4.14	1.22	0.10

Table.3 Performance of liliium cultivars for flowering characters

Cultivar	No. of flowers per plant	Flower bud length (cm)	Flower bud diameter (mm)	Flower diameter (cm)
Nashville	4.47	10.37	34.20	20.81
Eyelineer	3.27	9.88	31.97	19.48
Hyde Park	2.87	9.57	26.57	18.79
CD _{0.05}	0.54	0.58	2.34	1.10

Fig.1 Appraisal of liliium cultivars for their performance of flowering characters



Data pertaining to cultivars Nashville showed maximum flower diameter, flower bud diameter (20.81cm, 34.20mm) followed by Eyelineer (19.48cm, 31.97mm) and lowest flower diameter, flower bud diameter was observed in cultivar Hyde Park (18.79cm, 26.57mm). Flower bud length of the *Lilium* flower crop was observed maximum in cultivar Nashville (10.37cm) which was at par Eyelineer (9.88cm), while, minimum flower bud length observed in cultivar Hyde Park (9.57cm). Maximum number of flower per

plant is an important parameter of *Lilium* crops are always preferred which fetch maximum price in market. In present study significant variation in number of flower was observed due to different cultivars tried. The maximum number of flower per plant reported that in cultivars Nashville (4.47) followed by cultivar Eyelineer (3.27) and lowest number of flower per plant observed by cultivar Hyde Park (2.87) the data presented in table 3. Similar trend of flower character has been observed by Barik and

Mohanty (2015), Negi *et al.*, (2014), Deka *et al.*, (2010), Srinivas (2002) in *lilium* cultivar. Wide variation in flower traits due to cultivars has also been reported by Dhiman (2003) and Singh *et al.*, (2016). Pandey *et al.*, (2012) reported the same variation in gladiolus.

Based on the overall results, appraisal of different cultivars of *lilium*, cultivar Nashville showed better performance for vegetative, flowering and quality characters under polyhouse growing condition of western Haryana, Hisar district and recommended for its commercial cultivation.

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