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EFFECT OF PLANTING TIME ON GROWTH OF LA HYBRID LILY (*LILIUM SPP.*) VARIETIES UNDER POLYHOUSE CONDITION

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ABSTRACT

Assessing different cultivars for a specific region is a crucial step to identify suitable varieties that can thrive in the local climate. While a variety may exhibit distinct traits in a particular area, its performance and ability to maintain those characteristics may vary when cultivated in different locations. Additionally, the timing of planting also plays a vital role in determining crop production outcomes. Therefore, standardization of planting time is very important to get a good growth and excellent quality of cut flowers. By using staggered planting, the flowering period may also be extended for fetching a good price during different occasions. Therefore, the present investigation was conducted at Agri-tourism Centre, CCSHAU, Hisar (Haryana) during 2021-2022 to study the effect of planting time on growth and flowering of LA hybrid lily varieties under greenhouse. The investigation comprised four LA hybrid lily varieties along with four planting time (1st fortnight of October, 2nd fortnight of October, 1st fortnight of November and 2nd fortnight of November) and observations were recorded for various vegetative parameters. Out of the four-planting time, the varieties planted during 1st fortnight of October performed better resulting in terms of maximum plant height, number of leaves, leaf length, leaf width etc. Among the varieties, Litouween performed overall best with respect to highest sprouting, plant height, leaf length, leaf width, stem length stem diameter etc.

Keywords: Standardization, Staggered planting, Planting time, Varieties etc.

Introduction

The most popular ornamental bulbous flower and the most significant cut flower on the global market are lilies. Lily is a representation of purity and authority. The family Liliaceae involves more than 80 species worldwide with significant variation in flower shapes, sizes, colors, fragrances, plant architecture and bulb morphologies (Grassotti and Gimelli, 2011). *Lilium* ranks fourth among top ten cut flowers of the world next to rose, chrysanthemum and tulip. In floral industry Oriental lilies, Asiatic hybrids and LA hybrids are widely used as cut flowers as well as potted plants. *Lilium* as cut flower is highly demanded in international flower trade due to its attractive flower shape, wide diversity of flower color, long post-harvest shelf life and having long multi-flowering stalk (Lucidos *et al.*, 2013).

Lilium is generally classified on the basis of their origin, form and position of flower. The quality of lily relies on flower color, stickiness, diameter, and volume, which influences the buyer's purchasing decision. LA-hybrids were introduced in 1992 through cross between Longiflorum lilies (*Lilium longiflorum*) and Asiatic hybrids. In the floral industry, Oriental and LA hybrid lilies are frequently used as potted plants and cut blooms. Compared to Asian hybrids, LA hybrids are becoming more and more common. In comparison to Oriental lilies, LA hybrids typically have larger flowers that are more upward facing and concentrated at the top.

The right kind of poly house is necessary to grow lilies for cut flowers; it must be able to maintain a stable polyhouse environment under extremely variable conditions. In polyhouses or shade net houses, lilies are grown. The ideal daytime and night time temperatures for a decent yield are 21–25°C and 12–15 °C, respectively. Fluctuation in temperature affects the length and quality of flower resulting in flower drop and poor development of bulbs. Slightly warmer nights are required by oriental hybrids. *Lilium* grows well under a low to medium light intensity 2000–3000-foot candles.

With the increasing demand for cut flowers, there is a growing need to ensure year-round availability and high-quality blooms. One effective method for achieving this is through the cultivation of flowers in polyhouses, which provide a protected environment. This approach proves particularly beneficial for small and medium farms as it allows for continuous flower production. However, the successful cultivation of lily cultivars is highly dependent on the appropriate planting time. Therefore, it is crucial to standardize the planting time to ensure optimal growth and exceptional quality of cut flowers. Additionally, evaluating different cultivars is essential as they exhibit variations in flower color, quantity, and stem length, which directly impact the economic viability of cultivation. While there is existing literature on planting time, yield, and the effects of longevity on flower quality and yield for minor cut-flower crops like Allium, Brodiaea, and Anemone, comparable

information on *Lilium* is relatively limited (De Hertogh, 1989; Armitage, 1987).

Material and Method

The experiment was conducted at Hisar research farm, the CCS HAU Agri-Tourism Center (Haryana). LA Hybrid lily cultivars Pavia, Litouween, Arbuifeira, Parrano were selected for investigation under greenhouse condition. The bulbs of lily for conducting the present investigation were procured from the Progreen Biotech., Private Limited, New Delhi. The well treated bulbs of four varieties were planted

on raised beds under greenhouse condition under three different planting time i.e. First fortnight of October, Second fortnight of October and First fortnight of November, Second fortnight of November. All required cultural operations were carried out on a regular basis. Five plants were selected at random and tagged for each replication and treatment in order to record observations. By using a completely randomized block design, the data collected for the various parameters were statistically analyzed to determine which treatment showed significant variance at the 5% level of significance.



Pavia



Litouween



Arborifera



Parrano

Fig. 1 : Different varieties of LA hybrid Lily

Result and Discussion

The days taken for sprouting of bulb were significantly influenced by the time of planting irrespective of varieties. The minimum days taken for sprouting (5.92 days) was recorded under crop planted on first fortnight of October (Table 1), which remained significantly superior to other

planting time, this is because the bulb planted on first fortnight of October could get optimum soil temperature that was essentially required for bulb sprouting. However, the maximum days taken for sprouting (8.39 days) was observed under crop planted on second fortnight of November due to decrease in soil temperature. The results of the current study

are similar with those found by Akpinar and Bulut (2011), who observed comparable findings in *Gladiolus*.

Depending on the variety and planting time, the plant height varies significantly. Among the various planting time, the maximum height of plant (102.36 cm) was recorded under crop planted on first fortnight of October, while minimum plant height (75.98cm) was recorded under crop planted on second fortnight of November (Table 2). Thus, this result indicated that plant height decreases with the decrease in temperature. According to Joshna *et al.* (2015), Sharma *et al.* (2018), and Swaroop *et al.* (2018), the results of this study are comparable with those results. However, among the varieties, Litouween had the tallest plants (97.06 cm), while Pavia had the shortest plants (83.38 cm). The diverse genetic make- up of the numerous LA hybrid lily varieties accounts for the variation in plant height. Alkurdi *et al.* (2015) reported similar outcomes.

The number of leaves per plant differs significantly with respect to time of planting and varieties. The maximum number of leaves were found in Litouween (68.24 cm), which was statistically at par with Parrano (66.78 cm) and Arbuifeira (66.32 cm). This shows that number of leaves depends upon genetic constitution of different LA hybrid lily varieties. These findings are very similar to those of the studies by Sharma *et al.* (2018) and Kumar *et al.* (2018). (Table 3).

Among the various varieties the Litouween had the maximum leaf length (96.70mm), which is closely followed by Arbuifeira (92.28mm). The minimum leaf length was recorded in Pavia (76.40mm) (Table 4). The difference in leaf length of different varieties can be due to their genetic makeup. Kumar *et al.* (2018) reported similar outcomes as well. The crop planted in the first fortnight of October had the longest leaves (114.71 mm), whereas the crop planted in

the second fortnight of November had the shortest leaves (71.06 mm). In general, crops that were planted earlier than those that were planted later had leaves that were the longest possible. This may be because the earlier crops were exposed to more long days than the delayed planting crops. Additionally, it has been noted by Chourasia *et al.* (2015) and Barik and Mohanty (2015).

Among the various varieties the maximum leaf width was recorded in Pavia (25.10mm), which is followed by Arbuifeira (20.52 mm). The minimum leaf width was recorded in Litouween (17.66 mm). The genetic differences among the varieties could account for the variation in leaf width. These results concur with those of Kumar *et al.*, (2018). The crop planted during the first fortnight of October had the widest leaves (27.16 mm), whereas the crop planted during the second fortnight of November had the narrowest leaves (15.30 mm). The data on leaf width showed a declining tendency with delaying in planting time. In general, crops that were planted earlier than those that were planted later produced leaves with the greatest widths, which may be because the earlier planted were subjected to more long days than the delayed planting. Additionally, it was reported by Chourasia *et al.*, 2015; Barik and Mohanty, 2015 (Table 5).

Pavia (21.94 cm²) recorded the maximum leaf area, followed by Arbuifeira (19.32cm²). Litouween has the smallest leaf area was observed (17.09 cm²). The crop planted in the second fortnight of November (11.63 cm²) had the lowest leaf area while the crop planted in the first fortnight of October (28.08 cm²) had the highest leaf area. In general, crops that were planted earlier than those that were planted later had leaves that were the largest possible. This may be because the earlier crops were exposed to more long days than the latter crops. Additionally, it has been noted by Chourasia *et al.*, 2015. (Table 6)

Table 1 : Effect of planting time on days taken to bulb sprouting in different varieties of LA hybrid lily

Time of Planting	Days to bulb sprouting				
	Varieties				
	Pavia	Litouween	Arbuifeira	Parrano	Mean
12 Oct.	6.57	5.40	5.30	6.40	5.92
27 Oct.	7.20	6.43	6.40	6.70	6.68
10 Nov.	8.24	7.47	7.27	7.48	7.62
23 Nov.	8.41	8.39	8.37	8.40	8.39
Mean	7.61	6.92	6.84	7.25	
CD at 5%	Planting Time (T) =0.23 Varieties (V) =0.25T × V =0.45				

Table 2 : Effect of planting time on plant height (cm)of different varietiesof LA hybrid lily

Time of planting	Plant height (cm)				
	Varieties				
	Pavia	Litouween	Arbuifeira	Parrano	Mean
12 Oct.	101.28	103.28	101.44	102.09	102.36
27 Oct.	98.16	100.54	99.76	98.69	99.29
10 Nov.	75.36	98.69	87.91	84.12	86.52
23 Nov.	68.98	85.88	78.47	70.57	75.98
Mean	85.95	97.06	91.90	88.47	
CD at 5%	T=2.35 V=2.35 T × V = 4.69				

Table 3 : Effect of planting time on number of leaves per plant of different varieties of LA hybrid lily

Time of Planting	Number of leaves per plant				
	Varieties				
	Pavia	Litouween	Arbuifeira	Parrano	Mean
12 Oct.	69.94	73.48	72.70	70.83	71.74
27 Oct.	62.64	70.47	68.64	65.39	66.79
10 Nov.	61.50	66.42	65.64	63.96	64.38
23 Nov.	54.28	62.60	58.31	54.92	57.53
Mean	62.09	68.24	66.32	66.78	
CD at 5%	T=2.63		V=2.61	T × V = NS	

Table 4 : Effect of planting time on leaf length (mm) of different varieties of LA hybrid lily

Time of Planting	Leaf length (mm)				
	Varieties				
	Pavia	Litouween	Arbuifeira	Parrano	Mean
12 Oct.	110.46	124.67	112.53	111.17	114.71
27 Oct.	77.63	96.67	94.04	89.03	89.34
10 Nov.	61.20	86.50	85.99	84.43	79.53
23 Nov.	56.30	78.97	76.57	72.40	71.06
Mean	76.40	96.70	92.28	89.26	
CD at 5%	T= 3.08		V=3.09	T × V = 6.15	

Table 5 : Effect of planting time on leaf width (mm) of different varieties of LA hybrid lily

Time of Planting	Leaf width (cm)				
	Varieties				
	Pavia	Litouween	Arbuifeira	Parrano	Mean
12 Oct.	36.30	23.60	24.76	23.96	27.16
27 Oct.	24.73	20.60	23.70	21.23	22.57
10 Nov.	19.57	13.77	18.43	17.70	17.37
23 Nov.	19.80	12.67	15.20	13.53	15.30
Mean	25.10	17.66	20.52	19.11	
CD at 5%	T=0.77		V=0.74	T × V = 1.54	

Table 6: Effect of planting time on leaf area (cm²) of different varieties of LA hybrid lily

Treatments	Leaf area (cm ²)				
	Varieties				
	Pavia	Litoween	Arborifera	Parrano	Mean
12 Oct.	30.37	27.10	27.53	27.33	28.08
27 Oct.	23.83	19.07	22.03	20.80	21.43
10 Nov.	19.73	11.90	15.73	14.60	15.49
23 Nov.	13.83	10.27	12.00	10.43	11.63
Mean	21.94	17.09	19.32	18.29	
CD at 5%	T=0.91		V=0.93	T × V = 1.81	

Conclusion

On the basis of current investigation, it can be concluded that out of four planting time, the LA hybrid lily planted on First fortnight of October performed better resulting in terms of maximum plant height, number of leaves, leaf length, leaf width and minimum days of bulb sprouting. Among the varieties, Litouween performed overall best with respect to highest percentage of bulb sprouting, plant height, leaf length and leaf width.

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