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Research Article

Economic Analysis of Asiatic Lilium Genotypes as Influenced by Planting Dates for Semi-Arid Zone of Western Haryana

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ABSTRACT

Performance of Lilium genotypes depends on planting time, thus, the standardization of planting time is very important to get good quantity, quality and profitability of flowers. The study identified date of planting and analyzed relative profitability of seven hybrid lilium genotypes Cab Dazzle, Richmond, Nello, Tresor, Litouwen, All Choice and Arbatax in Hisar district of Haryana. The investigation represents significant variation in net return and benefit to cost ratio of various treatments as influenced by planting dates based on average data mean. The net return and benefit to cost ratio decreased with the delay in planting. The maximum net return and benefit to cost ratio was received from the genotype Nello (G_3) and Tresor (G_4) planted on 13th October, which was closely followed by the Arbatax (D_7) and All Choice (G_6) planted on 20th October (D_2). This might be due to better growth and development of these genotypes with early planting. The produce of these genotypes also fetched higher price due to their better flower size and colour as well as scarcity of lilium in the market.

Key words: *Net return, Benefit cost ratio, Genotypes and Planting time*

INTRODUCTION

Haryana is the major flower growing state in north India in which *Lilium* is one of the most spectacular and attractive flower crops. Hybrid lilies are exceptionally useful as cut flower and pot plant. They have been long admired and demanded for their aesthetic quality and have often depicted as a symbol of purity and regality. It has high economic importance because of its large flowers, adverse array of colour and wide range of forms, long vase life and capacity to rehydrate after long transportation[8].

Performance of Lilium cultivars depends on planting time, thus, the standardization of planting time is very important to get good growth and quality of flowers. The flowering period may be extended by staggered planting. Evaluation of cultivars is of immense importance as different cultivars differ in their colour, stem length and number of flowers, which affect the economics of cultivation to a large extent. In Haryana, the area under lilium crop in 2012 was 2.0 hectares with a production of 240000 sticks.

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Presently, area under Lilium crop is 50.84 hectares with a production of 19037200 sticks. However, due to inadequate propagation techniques, it is not possible to meet the growing demand of flower industry. Presently, India imports Lilium bulbs worth Rs. 2 crores primarily from Holland due to non-availability of planting material in our country[5]. With the advent of tissue culture techniques, a new era has been dawned in research and development of lily industry. The most important factor, which makes tissue culture technique important, is rapid multiplication as compared to the conventional methods and also to have true to type and resistant plant material[2]. The information concerning yield, planting time and effects of longevity on yield and flower quality of on minor cut-flower crops such as *Allium*, Brodiaea and Anemone is available in the literature but not available on lilium. Relatively little work has been done in Haryana on the economics of field and polyhouse production of hybrid lilium cut flowers. However, many resources provide budgets for outdoor production of vegetables, and these can be valuable references. The present investigation was therefore carried out with the thrust to optimize a cost-effective dose of fertilizers, irrigation, Application of fungicides which will enhance the growth and flowering of lilium grown in naturally ventilated polyhouse conditions.

MATERIAL AND METHODS

The present investigation was carried out at the farmer field in village Bugana of district Hisar, which is located 164 km to the west of New Delhi. It is a semi-arid zone of Western Haryana and situated at 29.09°N latitude, 75.43°E longitude and an altitude of 215 meters above mean sea level during the year 2016-17 and 2017-18. The experimental material comprised of seven lilium genotypes *viz.*, Cab Dazzle, Richmond, Nello, Tresor, Litouwen, All Choice and Arbatax, five different planting times at weekly interval *i.e.* October 13 to November 10. The genotypes were sown as Factorial Randomized Block Design (FRBD) with thirty five treatments and three replications. The treatments were:

Table 1: Experimental treatments details

Sr.No.	Genotypes	Colour	Symbol
1.	Cab Dazzle	Yellow	G_1
2.	Richmond	White	G_2
3.	Nello	Red	G_3
4.	Tresor	Orange	G_4
5.	Litouwen	White	G_5
6.	All Choice	Off White	G_6
7.	Arbatax	Pink	G_7
Planting dates			
1.	13th October		D_1
2.	20th October		D_2
3.	27th October		D_3
4.	3rd November		D_4
5.	10th November		D_5

The corms were planted at spacing of 30 × 20 cm square and standard package were followed to raise the crop. The profitability of lilium genotypes was examined on the basis of cost of cultivation, gross return, net return and benefit cost analysis. The cost of cultivation of crops was worked out by taking into consideration the variable and fixed cost, and accordingly the returns over variable and total cost was estimated by using the expressions:

1. Total variable cost = Working capital + Interest on total working capital @ 9% on ½ yearly basis

2. Fixed cost (FC) = Depreciation on fixed assets @ 10% + Interest on fixed capital investment @ 10%

3. Total cost = Fixed cost + Variable cost

A. Gross return = Monetary return on flower yield (Rs. ha^{-1})

Gross return (GR) = Total production × Price per unit

B. Net return: To find out the most profitable treatment, economics of different treatments was worked out in terms of net returns by considering the cost of cultivation and gross returns per hectare.

Net return = Gross return – total cost of cultivation (Rs. ha^{-1})

Benefit to cost ratio: Treatment wise benefit to cost ratio (B: C) was calculated to ascertain economic viability using the following formula:

$$\text{Benefit cost ratio} = \frac{\text{Gross return (Rs. ha}^{-1}\text{)}}{\text{Cost of production per treatment (Rs. ha}^{-1}\text{)}}$$

RESULTS AND DISCUSSION

The cost of lilium cultivation was non-significant due to planting dates, genotypes and their interactions based on average data mean, meaning that the cost of cultivation was similar for all the treatments (Rs. 9,02,747). Similarly Arun *et al.*[1], estimated the cost of cultivation of Marigold flowers in Kannauj district of Uttar Pradesh. The overall cost of cultivation of marigold flower was estimated as Rs. 73, 650 per hectare. Ripu *et al.*[8], estimated the cost of cultivation of marigold flowers in Rajasthan (Jaipur). The result revealed that the overall cost of cultivation of marigold flower was estimated to be Rs. 1, 21, 792 and Rs. 48, 141 per hectare.

The average data on gross return as influenced by varying planting dates and genotypes are presented in Table 2 (a). The data reveal that a marked variation in gross return by lilium was recorded due to planting dates. It showed decreasing trend with the delay in planting. The maximum gross return (Rs. 13,77,294.29 and 12,28,007.14) was recorded with the crop planted on 13th October (D_1) and 20th October (D_2) planting. Whereas the minimum gross return (Rs. 9,92,037.14) was recorded on 10th November (D_5) planting. The results are in agreement with the report of Bhosale *et al.*[4], in gerbera cut flowers, Leah and Sharma[6]. in lilium, anthurium, gerbera and orchid group of flowers. It is apparent from the data that the genotypes exhibited a significant variation in gross return. The maximum gross return (Rs. 12,94,464) with all genotypes like that Nello (G_3) and Tresor (G_4) remained significantly superior to other genotypes with respect to gross return. Further, it was observed that genotype Cab Dazzle (G_1) recorded the minimum gross return (Rs. 8,62,976).

Table 2(a): Appraisal of planting dates, genotypes and their interaction on gross return and net return per acre

Planting Dates / Genotypes	Gross Return (Rs)					
	Average data					
	13th October	**20th October**	**27th October**	**3rd November**	**10th November**	**Mean**
Cab Dazzle	1011300	960735	825895	775330	741620	**862976**
Richmond	1011300	960735	859605	825895	792185	**889944**
Nello	1550660	1449530	1247270	1129285	1095575	**1294464**
Tresor	1550660	1449530	1247270	1129285	1095575	**1294464**
Litouwen	1449530	1247270	1179850	1045010	1045010	**1193334**

All Choice	1516950	1247270	1213560	1078720	1078720	**1227044**
Arbatax	1550660	1280980	1247270	1078720	1095575	**1250641**
Mean	**1377294.29**	**1228007.14**	**1117245.71**	**1008892.14**	**992037.14**	-
	Net return (Rs)					
Cab Dazzle	108553	57988	-76853	-127418	-161128	**-39771.60**
Richmond	108553	57988	-43143	-76853	-110563	**-12803.60**
Nello	647913	546783	344523	226538	192828	**391717**
Tresor	647913	546783	344523	226538	192828	**391717**
Litouwen	546783	344523	277103	142263	142263	**290587**
All Choice	614203	344523	310813	175973	175973	**324297**
Arbatax	647913	378233	344523	175973	192828	**347894**
Mean	**474547.29**	**325260.14**	**214498.43**	**106144.86**	**89289.86**	-

The average data tabulated in the Table 2 (b) are shown that the maximum net return (Rs. 4,74,547.29) was found with the crop planted on 13th October (D_1) planting, whereas, the minimum net return (Rs. 89,289.86) was recorded on 10th November (D_5) planting based on average data mean. Similarly the average net income was estimated Rs 70,137 and Rs 54,749 and Rs. 48,141 per hectare by Makadia *et al.*[7], and Arun *et al.*[1], All genotypes exhibited a significant variation in net return. The maximum net return the were recorded with genotypes Nello (G_3) and Tresor (G_4), remained significantly superior to other genotypes with respect to net return (Rs. 3,91,717) by lilium based on average data mean, however, lilium genotype Cab Dazzle (G_1) was recorded minimum net return (Rs. 39,771.60). The results are in agreement with the report of Bhosale *et al.*[4], in gerbera cut

Table 2(b): Appraisal of planting dates, genotypes and their interaction on gross return and net return per acre

Planting Dates / Genotypes	Gross Return (Rs)											
	2016-17						2017-18					
	13th October	20th October	27th October	3rd November	10th November	Mean	13th October	20th October	27th October	3rd November	10th November	Mean
Cab Dazzle	842750	809040	741620	674200	674200	**748362**	1179850	1112430	910170	876460	809040	**977590**
Richmond	842750	842750	809040	775330	775330	**809040**	1179850	1078720	910170	876460	809040	**970848**
Nello	1348400	1213560	1213560	1011300	1011300	**1159624**	1752920	1685500	1280980	1247270	1179850	**1429304**
Tresor	1348400	1213560	1213560	1011300	1011300	**1159624**	1752920	1685500	1280980	1247270	1179850	**1429304**
Litouwen	1348400	1146140	1146140	943880	943880	**1105688**	1550660	1348400	1213560	1146140	1146140	**1280980**
All Choice	1348400	1146140	1146140	1011300	1011300	**1132656**	1685500	1348400	1280980	1146140	1146140	**1321432**
Arbatax	1348400	1213560	1213560	1011300	1011300	**1159624**	1752920	1348400	1280980	1146140	1179850	**1341658**
Mean	**1203928.57**	**1083535.71**	**1069088.57**	**919801.43**	**919801.43**	-	**1550660**	**1372478.57**	**1165402.86**	**1097982.86**	**1064272.86**	-
	Net return (Rs)											
Cab Dazzle	-339076	-372786	-440206	-507626	-507626	**-433464**	556181	488761	286501	252791	185371	**353921**
Richmond	-339076	-339076	-372786	-406496	-406496	**-372786**	556181	455051	286501	252791	185371	**347179**
Nello	166574	31734	31734	-170526	-170526	**-22202**	1129251	1061831	657311	623601	556181	**805635**
Tresor	166574	31734	31734	-170526	-170526	**-22202**	1129251	1061831	657311	623601	556181	**805635**
Litouwen	166574	-35686	-35686	-237946	-237946	**-76138**	926991	724731	589891	522471	522471	**657311**
All Choice	166574	-35686	-35686	-170526	-170526	**-49170**	1061831	724731	657311	522471	522471	**697763**
Arbatax	166574	31734	31734	-170526	-170526	**-22202**	1129251	724731	657311	522471	556181	**717989**
Mean	**22102.57**	**-98290.29**	**-112737.43**	**-262024.57**	**-262024.57**	-	**926991**	**748809.57**	**541733.86**	**474313.86**	**440603.86**	-

flowers, Leah and Sharma[6] in lilium, anthurium, gerbera and orchid group of flowers.

There was a significant variation in benefit to cost ratio was recorded to all treatments as influenced by planting dates, Table 3 (a&b). The benefit to cost ratio decreased with the delay in planting. The maximum benefit to cost ratio (1.53) was recorded for the crop planted on 13th October (D_1) closely followed by the benefit to cost Sharma *et al.*[10], ratio (1.36) for the crop planted on 20th October (D_2) based on average data mean, whereas, the minimum benefit to cost ratio (1.10) was recorded for the crop planted on 10th November (D_5) based on average data mean. obtained highest benefit cost ratio of 3.29, from August planted crop followed by September planting 2.60.

Table 3(a): Appraisal of planting dates, genotypes and their interaction on benefit to cost ratio per acre

Planting Dates / Genotypes	Benefit to Cost ratio					
	Average data					
	13th October	**20th October**	**27th October**	**3rd November**	**10th November**	**Mean**
Cab Dazzle	1.12	1.06	0.91	0.86	0.82	**0.95**
Richmond	1.12	1.06	0.95	0.91	0.88	**0.98**
Nello	1.72	1.61	1.38	1.25	1.21	**1.43**
Tresor	1.72	1.61	1.38	1.25	1.21	**1.43**
Litouwen	1.61	1.38	1.31	1.16	1.16	**1.32**
All Choice	1.68	1.38	1.34	1.19	1.19	**1.36**
Arbatax	1.72	1.42	1.38	1.19	1.21	**1.38**
Mean	**1.53**	**1.36**	**1.24**	**1.12**	**1.10**	-

A perusal of data reveals that the genotypes exhibited a significant variation in benefit to cost ratio of lilium based on average data mean. The maximum benefit to cost ratio was recorded with genotype Nello (G_3) and Tresor (1.43), which was closely followed by the genotype Arbatax (1.38) and All Choice (1.36) with respect to benefit to cost ratio of lilium based on average data mean, however, the lilium genotype Cab Dazzle (G_1) recorded the minimum benefit to cost ratio (0.95). The overall benefit-cost ratio was 4.97:1. Found by Leah and Sharma[6] in lilium, anthurium, gerbera and orchid.

Table 3 (b) Appraisal of planting dates, genotypes and their interaction on benefit to cost ratio per acre

Planting Dates / Genotypes	Benefit to Cost ratio											
	2016-17						2017-18					
	13th October	**20th October**	**27th October**	**3rd November**	**10th November**	**Mean**	**13th October**	**20th October**	**27th October**	**3rd November**	**10th November**	**Mean**
Cab Dazzle	0.71	0.68	0.63	0.57	0.57	**0.63**	1.89	1.78	1.46	1.41	1.30	**1.57**
Richmond	0.71	0.71	0.68	0.66	0.66	**0.68**	1.89	1.73	1.46	1.41	1.30	**1.56**
Nello	1.14	1.03	1.03	0.86	0.86	**0.98**	2.81	2.70	2.05	2.00	1.89	**2.29**
Tresor	1.14	1.03	1.03	0.86	0.86	**0.98**	2.81	2.70	2.05	2.00	1.89	**2.29**
Litouwen	1.14	0.97	0.97	0.80	0.80	**0.94**	2.49	2.16	1.95	1.84	1.84	**2.06**
All Choice	1.14	0.97	0.97	0.86	0.86	**0.96**	2.70	2.16	2.05	1.84	1.84	**2.12**
Arbatax	1.14	1.03	1.03	0.86	0.86	**0.98**	2.81	2.16	2.05	1.84	1.89	**2.15**
Mean	**1.02**	**0.92**	**0.91**	**0.78**	**0.78**	-	**2.49**	**2.20**	**1.87**	**1.76**	**1.71**	-

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