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Research Article

EFFECT OF DIFFERENT LEVELS OF FERTIGATION AND PLANTING SEASON ON GROWTH AND FLOWER PRODUCTION OF *ASIATIC HYBRID* LILIUM CULTIVARS

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Abstract- A field experiment was carried out during three successive seasons at M/s. Balaji Flowers, Devashola Estate, The Nilgiris by the Dept. of Floriculture and Landscaping, Tamil Nadu Agricultural University to evaluate *Asiatic hybrid* lilium cultivars with different levels of fertigation on growth and yield characters. Among the treatments application of @ 8:4:10 g NPK/m^2 along with micronutrient mixtures @ 4 g/m^2 in the cv. Pollyanna during summer season performed best compare to other treatments. Overall plant growth, days taken for bud initiation, flower shoot length and flower yield were found to be superior under F_7 fertigation treatment in summer season over other fertigation levels and seasons. Among the four cultivars, Pollyanna showed improvement in flower shoot length, number of flower buds, diameter of flower and flower yield during summer season. A few other cultivars, *viz*., Navona, Black Out and Tresor also exhibited higher flower yield during all three seasons. Thus, it has been observed that there is no significant difference among three seasons for flower production in Lilium cultivars but fertigation and cultivar played a significant role.

Keywords- Lilium, fertigation, Planting season, Cultivars

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Introduction

The genus Lilium (*Lilium spp.*) Is a herbaceous flowering plant normally growing from bulbs, has 110 species belonged to Liliaceae family. Among the lilies, some groups have been evolved through extensive improvement and referred to as 'coloured lilies' and mostly grown for cut flowers and other popular type is generally grown for garden display in India. Asiatic, Oriental and OT lilies are leading cut flower groups and in the international market, it is dominated by the Netherlands. Fertigation is one such technique of applying nutrients through micro irrigation systems directly at the site of active root zone. Though a new concept in India, it has potential for more accurate and timely crop nutrition leading to increased yields, enhanced quality and early crop maturity. Since not much work has been done in India on standardization of fertigation schedule for Lilium, this research work has been envisaged at The Nilgiris, a suitable hilly zone in South India.

Materials and Methods

Looking towards the importance and scope for cultivation of lilium research was carried out to study the nutritional requirement of the crop under protected conditions at M/s. Balaji Flowers, Devashola Estate, The Nilgiris by Dept. of Floriculture and Landscaping, Tamil Nadu Agricultural University. The mean annual temperature and relative humidity during the study was 12 – 25 degree centigrade and 70 – 90 per cent, respectively. The treatments included ten levels of fertigation, four cultivars of *Asiatic hybrid* Lilium, each raised during three seasons of planting *viz*., summer, rainy and winter, with three replications. The experiment was laid out in a Factorial RBD. Standard package of practice was followed.

The treatments imposed for the experiment are detailed below.

Tr. No.	Fertigation Details	Cultivar	Season
1.	4:2:5 g NPK/ m^2 - F_1	Pollyanna–V_1	Summer– S_1
2.	8:4:10 g NPK/ m^2 – F_2		
3.	12:6:15 g NPK/ m^2 – F_3	Navona –V_2	
4.	16:8:20 g NPK/ m^2 – F_4		Rainy – S_2
5.	4:2:5 g NPK/ m^2 + micronutrient mixtures @ 4 g/ m^2 – F_5	Black Out–V_3	
6.	8:4:10 g NPK/ m^2 + micronutrient mixtures @ 4 g/ m^2 – F_6		
7.	12:6:15 g NPK/ m^2 + micronutrient mixtures @ 4 g/ m^2 – F_7		
8.	16:8:20 g NPK/ m^2 + micronutrient mixtures @ 4 g/ m^2 – F_8	Tresor–V_4	Winter – S_3
9.	8:8:8 g NPK/ m^2+ micronutrient mixtures @ 4 g/ m^2 – F_9		
10.	Soil alone (without fertilizer) – control - F_{10}		

(From F_1 to F_8, 75% of P was given as soil application in the form of SSP)

Results and Discussion

A perusal of results of 20011 -12 and mean data of the experiment [Tables-1–4] revealed that different fertigation levels and growing seasons resulted in significant variation in growth, flowering and yield characters of cultivars under study. Among the ten fertigation levels, fertigation level at F_7 significantly influenced plant height (112.36 cm), number of leaves (91.90), leaf area (846 cm^2), leaf area index (5.64), days taken for the flower bud appearance (33.85) in *cv.* Pollyanna. Incremental doses of fertigation increased biometric growth of the plant. More number of leaves and growth were observed in carnation at higher

levels of nutrients as production of amino acids increase at higher dose [1]. The floral characters of Lilium were also influenced by the fertigation levels and planting season. Data indicated that the flower shoot length (83.81 cm), number of flower buds per stem (7.09), diameter of open flower (17.83 cm), days taken for harvesting (66.87) and flower yield per square meter (60.15) was superior in F_7 over other levels of fertigation. The floral characters yield and quality depend upon supply of nutrients, growth and climate. Higher dose of fertigation (F_7) resulted in the production of better quality of flowers due to increased supply of nutrients, healthy and vigorous plants than all other treatments also recorded similar findings in Anthurium [2-4]. Time of planting also influenced the growth and yield parameters. Planting in summer influenced all the growth and yield parameters. High temperature and humidity were probably responsible for the increased plant height and more number of leaves per plant [5, 6].

Table-1 *Effect of fertigation, variety and season on growth characters of Asiatic hybrid lilium cultivars*

Treatments	Plant height (cm)			No. of leaves/ plant			Leaf Area (cm²)			LAI			Days taken for bud initiation		
Fertigation level	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
F_1	87.24	86.16	84.78	64.95	63.73	62.67	598.0	586.8	577.0	3.99	3.91	3.85	38.79	39.46	40.18
F_2	89.98	88.83	87.16	71.03	69.06	67.24	654.0	635.8	619.1	4.36	4.24	4.13	37.80	38.49	39.27
F_3	93.04	91.91	90.04	74.23	72.39	70.11	683.4	666.4	645.4	4.56	4.44	4.30	37.39	37.97	38.78
F_4	95.80	94.56	92.88	76.40	74.14	72.48	703.3	682.6	667.3	4.69	4.55	4.45	37.08	37.46	38.32
F_5	99.84	97.33	95.36	80.60	78.31	75.37	742.0	720.9	693.9	4.95	4.81	4.63	36.29	36.77	37.63
F_6	102.65	100.83	98.88	85.16	82.17	78.80	784.0	756.5	725.5	5.23	5.04	4.84	35.76	36.42	37.11
F_7	112.36	110.32	108.46	91.90	88.90	85.43	846.0	818.4	786.5	5.64	5.46	5.24	33.85	34.83	35.48
F_8	108.36	104.67	102.80	88.87	85.10	82.11	818.1	783.4	755.9	5.45	5.22	5.04	34.71	35.47	36.73
F_9	88.52	87.04	84.99	69.53	66.77	65.09	640.1	614.7	599.2	4.27	4.10	3.99	38.07	38.67	39.43
F_{10}	71.11	70.04	67.54	56.81	54.44	52.62	523.0	501.2	484.4	3.49	3.34	3.23	39.82	40.54	41.48
S.Ed	**1.30**	**1.27**	**1.25**	**1.04**	**1.01**	**0.97**	**9.57**	**9.26**	**8.95**	**0.06**	**0.06**	**0.06**	**0.50**	**0.51**	**0.52**
C.D (5%)	**2.58**	**2.54**	**2.49**	**2.07**	**2.00**	**1.93**	**19.05**	**18.43**	**17.81**	**0.13**	**0.12**	**0.12**	**1.00**	**1.01**	**1.03**
Variety	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
V_1	108.83	107.80	105.97	86.54	84.03	80.91	796.7	773.6	744.9	5.31	5.16	4.97	36.63	37.48	38.34
V_2	74.80	73.68	71.65	61.72	60.74	59.25	568.3	559.2	545.5	3.79	3.73	3.64	37.74	38.21	38.95
V_3	99.06	97.04	95.46	79.48	75.94	73.55	731.7	699.1	677.2	4.88	4.66	4.51	36.32	37.01	37.94
V_4	96.87	94.14	92.07	76.04	73.30	71.04	700.0	674.8	654.1	4.67	4.50	4.36	37.14	37.74	38.53
S.Ed	**0.82**	**0.81**	**0.79**	**0.66**	**0.64**	**0.61**	**6.05**	**5.85**	**5.66**	**0.04**	**0.04**	**0.04**	**0.31**	**0.32**	**0.33**
C.D (5%)	**1.63**	**1.60**	**1.57**	**1.31**	**1.27**	**1.22**	**12.05**	**11.66**	**11.27**	**0.08**	**0.08**	**0.08**	**0.63**	**0.64**	**0.65**

Table-2 *Effect of fertigation, variety and season on yield characters of Asiatic hybrid lilium cultivars*

Treatments	Flower shoot length (cm)			No. of flower buds/ shoot			Diameter of open flower (cm)			Days taken for harvesting			Flower yield (m^{-2})		
Fertigation level	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
F_1	72.53	70.80	69.65	5.76	5.62	5.56	15.38	13.80	13.63	72.25	73.08	73.90	57.02	56.96	56.65
F_2	74.19	72.78	71.62	6.15	5.90	5.84	15.64	14.09	14.00	71.66	72.51	72.80	57.18	57.11	57.04
F_3	76.03	74.82	73.64	6.30	6.06	5.98	15.93	14.38	14.26	70.85	71.68	72.18	57.45	57.35	57.28
F_4	77.82	76.72	75.69	6.50	6.23	6.18	16.21	14.64	14.50	70.25	70.79	71.52	58.72	58.39	58.18
F_5	79.95	78.34	76.88	6.61	6.33	6.29	16.70	15.29	15.17	69.69	70.32	70.78	58.89	58.80	58.66
F_6	81.12	79.37	78.46	6.70	6.44	6.37	16.97	15.56	15.40	68.78	69.58	70.21	59.02	58.96	58.86
F_7	83.81	83.09	81.69	7.09	6.77	6.70	17.83	16.32	16.18	66.87	68.21	68.76	60.15	60.06	59.93
F_8	82.19	80.96	79.82	6.83	6.57	6.51	17.17	15.75	15.68	67.72	68.87	69.77	59.34	59.31	59.13
F_9	72.95	71.70	70.54	5.94	5.76	5.74	15.72	14.19	14.05	72.10	73.01	73.51	57.09	57.03	56.99
F_{10}	57.81	54.93	52.39	3.65	3.40	3.36	8.04	6.98	6.85	73.81	74.63	75.78	54.15	53.95	53.31
S.Ed	**1.03**	**1.01**	**1.00**	**0.08**	**0.08**	**0.08**	**0.21**	**0.19**	**0.19**	**1.10**	**0.96**	**0.97**	**0.78**	**0.78**	**0.78**
C.D (5%)	**2.06**	**2.02**	**2.00**	**0.17**	**0.16**	**0.16**	**0.42**	**0.39**	**0.38**	**2.05**	**1.91**	**1.93**	**1.55**	**1.55**	**1.54**
Variety	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
V_1	83.76	82.34	80.81	6.50	6.34	6.29	17.20	16.91	16.81	69.38	70.94	71.52	58.05	57.90	57.81
V_2	56.87	55.58	54.59	5.58	5.52	5.51	12.96	11.36	11.24	72.42	72.33	73.12	57.79	57.61	57.20
V_3	82.34	80.40	79.22	6.34	6.19	6.13	16.91	15.16	14.94	68.85	69.38	70.12	57.90	57.86	57.74
V_4	80.40	79.08	77.52	6.19	5.58	5.48	15.16	12.96	12.88	70.94	72.42	72.93	57.86	57.79	57.66
S.Ed	**0.65**	**0.64**	**0.63**	**0.05**	**0.05**	**0.05**	**0.13**	**0.12**	**0.12**	**0.60**	**0.61**	**0.61**	**0.49**	**0.50**	**0.50**
C.D (5%)	**1.30**	**1.28**	**1.26**	**0.11**	**0.10**	**0.10**	**0.27**	**0.24**	**0.24**	**1.20**	**1.21**	**1.22**	**0.98**	**0.98**	**0.98**

Table-3 *Interaction effect among factors on the growth and yield characters of Asiatic hybrid lilium cultivars*

Treatment interaction	Plant height (cm)			No. of leaves/ plant			Leaf Area (cm^2)			LAI			Days taken for bud initiation		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
$F_1 V_1$	104.20	104.31	103.29	74.32	72.38	71.21	684.20	666.40	655.60	4.56	4.44	4.37	38.60	39.24	40.16
$F_1 V_2$	66.21	65.32	64.29	54.12	54.08	53.84	498.30	497.90	495.70	3.32	3.32	3.30	39.40	40.29	41.08
$F_1 V_3$	90.20	89.37	87.20	66.18	65.20	63.48	609.30	600.30	584.40	4.06	4.00	3.90	38.25	38.91	39.26
$F_1 V_4$	88.34	85.65	84.34	65.18	63.27	62.15	600.10	582.50	572.20	4.00	3.88	3.81	38.91	39.40	40.23
$F_2 V_1$	106.08	105.86	104.38	78.62	77.26	75.35	723.80	711.30	693.70	4.83	4.74	4.62	37.43	38.54	39.22
$F_2 V_2$	69.05	68.18	66.49	56.85	55.28	54.20	523.40	508.90	499.00	3.49	3.39	3.33	38.67	38.96	39.68
$F_2 V_3$	93.48	91.13	90.48	75.40	72.86	70.97	694.20	670.80	653.40	4.63	4.47	4.36	37.28	37.80	38.76
$F_2 V_4$	91.30	90.16	87.30	73.26	70.83	68.45	674.50	652.10	630.20	4.50	4.35	4.20	37.80	38.67	39.40
$F_3 V_1$	108.83	107.90	106.81	81.12	79.83	78.29	746.80	735.00	720.80	4.98	4.90	4.81	37.03	37.68	38.81
$F_3 V_2$	74.49	73.52	70.49	62.12	60.80	58.34	571.90	559.80	537.10	3.81	3.73	3.58	37.89	38.69	39.02
$F_3 V_3$	95.27	93.37	92.27	78.83	75.30	73.15	725.70	693.20	673.50	4.84	4.62	4.49	37.03	37.62	38.42
$F_3 V_4$	93.57	92.83	90.57	74.83	73.61	70.64	688.90	677.70	650.30	4.59	4.52	4.34	37.62	37.89	38.87
$F_4 V_1$	110.09	110.37	108.39	83.95	81.27	80.34	772.90	748.20	739.60	5.15	4.99	4.93	36.94	37.28	38.16
$F_4 V_2$	79.24	78.19	75.24	64.08	62.86	61.48	590.00	578.70	566.00	3.93	3.86	3.77	37.46	37.98	38.67
$F_4 V_3$	97.39	96.02	95.39	81.93	78.16	76.71	754.30	719.60	706.20	5.03	4.80	4.71	36.80	37.13	38.02
$F_4 V_4$	96.49	93.65	92.49	75.62	74.27	71.39	696.20	683.80	657.30	4.64	4.56	4.38	37.13	37.46	38.42
$F_5 V_1$	113.32	111.98	110.37	92.08	88.32	85.12	847.70	813.10	783.70	5.65	5.42	5.22	36.10	36.87	37.28
F_5V_2	82.30	81.64	79.30	68.15	67.83	64.79	627.40	624.50	596.50	4.18	4.16	3.98	36.86	37.17	38.02
$F_5 V_3$	103.28	99.47	97.28	84.10	80.75	78.15	774.30	743.40	719.50	5.16	4.96	4.80	36.02	36.19	37.62
$F_5 V_4$	100.47	96.21	94.47	78.06	76.32	73.42	718.70	702.60	675.90	4.79	4.68	4.51	36.19	36.86	37.61
$F_6 V_1$	115.28	114.36	113.20	97.94	94.61	88.20	901.70	871.00	812.00	6.01	5.81	5.41	35.50	36.26	37.01
F_6V_2	84.45	82.38	81.45	70.08	69.60	68.47	645.20	640.80	630.40	4.30	4.27	4.20	36.41	37.13	37.86
$F_6 V_3$	106.49	106.92	104.49	88.28	84.20	80.49	812.70	775.20	741.00	5.42	5.17	4.94	35.26	35.87	36.16
$F_6 V_4$	104.39	99.64	96.39	84.32	80.26	78.04	776.30	738.90	718.50	5.18	4.93	4.79	35.87	36.41	37.42
$F_7 V_1$	123.06	120.63	118.49	105.06	103.70	98.48	967.20	954.70	906.70	6.45	6.36	6.04	33.60	34.94	35.29
F_7V_2	87.01	86.63	84.01	74.68	73.24	71.54	687.50	674.30	658.60	4.58	4.50	4.39	35.24	35.55	36.12
Treatment interaction	**Plant height (cm)**			**No. of leaves/plant**			**Leaf Area (cm^2)**			**LAI**			**Days taken for bud initiation**		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
$F_7 V_3$	120.49	118.74	117.49	95.16	90.32	86.34	876.10	831.50	794.90	5.84	5.54	5.30	32.47	33.60	35.02
$F_7 V_4$	118.86	115.27	113.86	92.68	88.32	85.34	853.30	813.10	785.70	5.69	5.42	5.24	34.08	35.24	35.48
$F_8 V_1$	120.64	117.31	115.38	103.90	98.83	95.64	956.60	909.90	880.50	6.38	6.07	5.87	34.14	35.83	36.71
F_8V_2	85.49	83.51	82.49	72.12	70.80	70.05	664.00	651.80	644.90	4.43	4.35	4.30	35.81	36.16	37.52
$F_8 V_3$	115.02	109.22	108.02	90.28	86.16	82.64	831.20	793.20	760.80	5.54	5.29	5.07	34.02	34.08	35.86
$F_8 V_4$	112.29	108.62	105.29	89.16	84.60	80.09	820.80	778.90	737.30	5.47	5.19	4.92	34.86	35.81	36.82
$F_9 V_1$	105.30	104.80	102.19	78.17	76.86	73.42	719.70	707.60	675.90	4.80	4.72	4.51	37.57	37.92	39.46
F_9V_2	67.48	66.20	64.48	54.92	52.80	51.34	505.60	486.10	472.70	3.37	3.24	3.15	38.77	39.09	39.72
$F_9 V_3$	91.83	89.90	87.83	74.63	70.17	68.46	687.10	646.00	630.30	4.58	4.31	4.20	37.04	38.90	39.02
$F_9 V_4$	89.47	87.27	85.47	70.38	67.26	67.12	648.00	619.20	617.90	4.32	4.13	4.12	38.90	38.77	39.53
$F_{10} V_1$	81.48	80.51	77.19	70.23	67.21	63.05	646.60	618.80	580.50	4.31	4.13	3.87	39.38	40.21	41.32
$F_{10}V_2$	52.29	51.27	48.29	40.12	40.06	38.49	369.40	368.80	354.40	2.46	2.46	2.36	40.86	41.07	41.82
$F_{10}V_3$	77.19	76.28	74.19	60.02	56.26	55.14	552.60	518.00	507.60	3.68	3.45	3.38	39.02	40.01	41.26
$F_{10} V_4$	73.47	72.10	70.47	56.86	54.21	53.79	523.50	499.10	495.20	3.49	3.33	3.30	40.01	40.86	41.53
S.Ed	**2.60**	**2.55**	**2.50**	**2.08**	**2.01**	**1.94**	**19.13**	**18.51**	**17.89**	**0.13**	**0.12**	**0.12**	**1.00**	**1.01**	**1.04**
C.D (5%)	**5.17**	**5.07**	**4.97**	**4.14**	**4.00**	**3.87**	**38.10**	**36.86**	**35.63**	**0.25**	**0.24**	**0.24**	**2.00**	**2.02**	**2.06**

Among the varieties *cv.* Pollyanna (V_1) registered increased plant height (108.83 cm), more number of leaves (86.54), leaf area (86.54 cm^2), leaf area index (5.31) and less number of days for flower bud appearance (36.63) and thus showed its superiority over other three cultivars during the summer season. The growth of the plant is governed by the genetic potential and nutritional supply reported that varietal performance is specific to individual potential of the cultivar and growing conditions [7]. The floral characters of cultivars of present study different significantly with each other. Among them V_1 showed its superiority through the flower shoot length (83.76 cm), number of flower buds per stem (6.50), diameter of open flower (17.20 cm), days taken for harvesting (69.38) and flower yield per square meter (58.05) which was followed by V_3 (Black Out) during summer season planting. The cultivar V_1 has defined ability to express better during summer season. Better performance by V_1 might to be due to induction of dominance in phenotypic characters. The results are in agreement in Anthurium [8, 9].

The interaction of F_7V_1 expressed the best performance in biometric growth over other treatment combinations during summer season of planting. The F_7V_1 combination registered improvement in plant height (123.06 cm), number of leaves (105.06), leaf area (967.20 cm^2), leaf area index (6.45) and days taken for the flower bud appearance (33.60) during summer season planting. This might be due to the availability of sufficient nutrients available to the plants and performing ability of the cultivar. The floral characters of Lilium were also significantly superior F_7V_1 combination, which was observed through increased flower shoot length (90.38 cm), number of flower buds per stem (7.58) and flower yield per square meter (60.28). The treatment combination in experiment I have shown a consistent F7V1 increase in yield of flower stems during all the three seasons. Hence, it has

been observed that there was no difference among three seasons for yield parameters with respect to the best treatment combination. Diameter of open flower and flower yield was on par in F_7V_1 and F_7V_3. It was observed that number of flower buds per stem in varieties had a significant positive effect due to higher doses of fertigation. Thus, the overall effect of F_7V_1 combination was found to be superior over other interactions and similar such results in Anthurium [10].

Table-4 *Interaction effect among factors on the growth and yield characters of Asiatic hybrid lilium cultivars*

Treatment interaction	Flower shoot length (cm)			No. of flower buds/ shoot			Diameter of open flower (cm)			Days taken for harvesting			Flower yield (m^{-2})		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
F_1V_1	81.20	80.39	78.62	5.98	5.92	5.86	17.03	16.96	16.90	71.51	72.37	73.16	57.11	57.01	56.86
F_1V_2	50.39	48.29	47.86	5.42	5.40	5.32	12.96	10.71	10.60	74.04	74.38	75.30	56.96	56.85	56.08
F_1V_3	80.39	78.15	77.02	5.92	5.72	5.66	16.96	14.56	14.20	71.06	71.51	71.86	57.01	57.00	56.86
F_1V_4	78.15	76.35	75.08	5.72	5.42	5.40	14.56	12.96	12.80	72.37	74.04	75.26	57.00	56.96	56.80
F_2V_1	82.97	82.67	80.16	6.56	6.40	6.28	17.28	17.23	17.16	70.64	71.69	72.08	57.29	57.20	57.14
F_2V_2	51.48	50.67	50.08	5.61	5.56	5.50	13.16	11.08	11.01	73.94	73.76	74.08	57.05	57.01	56.96
F_2V_3	82.67	79.64	78.61	6.40	6.04	6.01	17.23	14.90	14.72	70.37	70.64	71.02	57.20	57.16	57.05
F_2V_4	79.64	78.12	77.61	6.04	5.61	5.58	14.90	13.16	13.10	71.69	73.94	74.01	57.16	57.05	57.01
F_3V_1	84.43	83.15	81.22	6.70	6.52	6.41	17.42	17.42	17.35	69.78	70.80	71.17	57.59	57.45	57.40
F_3V_2	56.39	55.34	54.32	5.69	5.75	5.68	13.42	11.21	11.16	73.48	72.64	73.61	57.35	57.20	57.06
F_3V_3	83.15	80.15	80.01	6.52	6.28	6.20	17.42	15.45	15.16	69.35	69.78	70.72	57.45	57.40	57.36
F_3V_4	80.15	80.62	79.02	6.28	5.69	5.61	15.45	13.42	13.36	70.80	73.48	73.20	57.40	57.35	57.30
F_4V_1	85.39	84.47	82.86	6.84	6.70	6.63	17.74	17.68	17.49	69.18	70.64	71.06	58.82	58.72	58.60
F_4V_2	59.24	58.64	57.63	5.87	5.76	5.82	13.60	11.46	11.38	72.18	71.16	72.64	58.64	57.48	57.20
F_4V_3	84.47	82.18	81.66	6.70	6.59	6.57	17.68	15.82	15.60	69.01	69.18	70.26	58.72	58.70	58.61
F_4V_4	82.18	81.57	80.62	6.59	5.87	5.70	15.82	13.60	13.52	70.64	72.18	72.12	58.70	58.64	58.32
F_5V_1	87.38	85.81	84.01	6.95	6.81	6.79	18.40	18.23	18.16	68.97	69.79	70.63	58.97	58.91	58.82
F_5V_2	61.94	60.39	59.28	5.92	5.81	5.91	13.81	12.78	12.64	71.64	70.89	71.06	58.80	58.61	58.42
F_5V_3	85.81	84.68	83.01	6.81	6.76	6.69	18.23	16.34	16.10	68.35	68.97	69.52	58.91	58.86	58.72
F_5V_4	84.68	82.46	81.20	6.76	5.92	5.78	16.34	13.81	13.76	69.79	71.64	71.90	58.86	58.80	58.68
F_6V_1	88.83	86.12	85.76	7.03	6.89	6.82	18.52	18.40	18.32	67.89	69.48	70.12	59.06	59.06	59.01
F_6V_2	63.58	61.26	60.20	6.04	5.99	6.01	14.08	12.86	12.72	70.45	70.49	71.01	58.96	58.79	58.61
F_6V_3	86.12	85.96	84.72	6.89	6.85	6.78	18.40	16.88	16.56	67.29	67.89	69.01	59.06	59.01	59.00
F_6V_4	85.96	84.15	83.16	6.85	6.04	5.86	16.88	14.08	14.01	69.48	70.45	70.68	59.01	58.96	58.82
F_7V_1	90.38	88.58	87.26	7.58	7.21	7.13	19.36	19.26	19.12	65.14	68.57	69.06	60.28	60.15	60.06
F_7V_2	68.38	68.58	67.26	6.37	6.31	6.32	14.86	13.29	13.06	69.46	69.67	70.08	60.05	59.95	59.60
Treatment interaction	**Flower shoot length (cm)**			**No. of flower buds/ Shoot**			**Diameter of open flower (cm)**			**Days taken for harvesting**			**Flower yield (m^{-2})**		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
F_7V_3	88.58	87.89	86.02	7.21	7.18	7.06	19.26	17.85	17.72	64.29	65.14	66.26	60.15	60.10	60.06
F_7V_4	87.89	87.29	86.20	7.18	6.37	6.30	17.85	14.86	14.80	68.57	69.46	69.62	60.10	60.05	60.01
F_8V_1	89.04	86.67	86.16	7.12	7.06	7.01	18.73	18.68	18.58	66.48	68.90	69.82	59.59	59.34	59.19
F_8V_2	66.38	64.67	63.82	6.14	6.08	6.08	14.20	13.06	12.96	70.09	70.01	70.86	59.14	59.47	59.12
F_8V_3	86.67	86.66	85.28	7.06	7.01	6.92	18.68	17.05	17.01	65.39	66.48	67.92	59.34	59.28	59.12
F_8V_4	86.66	85.84	84.01	7.01	6.14	6.01	17.05	14.20	14.16	68.90	70.09	70.46	59.28	59.14	59.08
F_9V_1	81.58	81.24	80.06	6.24	6.03	6.16	17.10	17.08	17.01	71.02	72.89	72.86	57.17	57.08	57.01
F_9V_2	50.58	49.34	48.26	5.56	5.50	5.48	13.06	10.96	10.84	74.01	74.12	74.86	57.04	56.93	56.91
F_9V_3	81.24	78.40	77.64	6.03	5.94	5.89	17.08	15.64	15.36	70.48	71.02	71.52	57.08	57.06	57.02
F_9V_4	78.40	77.81	76.20	5.94	5.56	5.43	15.64	13.06	13.00	72.89	74.01	74.80	57.06	57.04	57.01
$F_{10}V_1$	66.38	64.29	62.02	4.03	3.84	3.82	10.38	8.20	8.05	73.18	74.27	75.20	54.65	54.05	54.01
$F_{10}V_2$	40.30	38.58	37.21	3.14	3.05	3.01	6.48	6.16	6.01	74.86	76.19	77.66	53.89	53.85	52.06
$F_{10}V_3$	64.29	60.27	58.22	3.84	3.57	3.49	8.20	7.08	7.01	72.93	73.18	73.06	54.05	54.01	53.61
$F_{10}V_4$	60.27	56.56	52.10	3.57	3.14	3.10	7.08	6.48	6.32	74.27	74.86	77.20	54.01	53.89	53.56
S.Ed	**2.07**	**2.03**	**2.00**	**0.17**	**0.16**	**0.16**	**0.43**	**0.39**	**0.38**	**2.01**	**1.92**	**1.94**	**1.56**	**1.56**	**1.55**
C.D (5%)	**4.12**	**4.04**	**4.00**	**0.33**	**0.32**	**0.32**	**0.85**	**0.77**	**0.77**	**4.08**	**3.83**	**3.86**	**3.11**	**3.10**	**3.09**

Conclusion

The overall plant growth and flower production was found to be superior when applied with a fertigation dose of 12:6:15 g NPK/ m^2 + micronutrient mixtures @ 4 g/ m^2 compared to other treatments during all three seasons of planting. Cultivar 'Pollyanna' exhibited improved flower stem length, number of flower buds and diameter of open flower among the cultivars, The other cultivars *viz*., Navona, Black Out and Tresor were found to be on par with each other in its performance during all three seasons. Thus, it has been observed that there was no difference among the seasons for flower production in Lilium cultivars, but fertigation and cultivar played a significant role.

Conflict of Interest: None declared

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