

Original Research Article

“Growth and Flowering of Asiatic Lily (*Lilium × asiatica*) cv. Litouwen as Affected by GA₃ and NAA Under Naturally Ventilated Polyhouse Conditions of Prayagraj”

ABSTRACT

The present investigation was carried out under a naturally ventilated polyhouse, Department of Horticulture, SHUATS, Prayagraj, Uttar Pradesh. In the month of December 2020 and the observations recorded up to February and March 2021. There were nine treatments comprising of two growth regulators viz., GA₃ (200, 250, 300, and 350 ppm), and NAA (50,100,150, and 200 ppm) along with control. The whole experiment was laid out following in a Randomized Block Design (RBD) with three replications. The results revealed that among the *Lilium* cv. LITOUWEN foliar application of 250 ppm GA₃ significantly increased no. of leaves per plant (66), as recorded data GA₃ @ 250 ppm has enhanced days to bud initiation (25.7 days), no. of bud per plant (2.8) and stem length (43.4cm), GA₃ @ 350 ppm enhanced vase life (7.9 days). Whereas application of NAA @ 100 ppm enhanced no. of bulblets (3.3).

Keyword: Asiatic Lily, Polyhouse, GA₃, NAA

INTRODUCTION

Lilium sp. is cultivated worldwide and is one of the most important generator cut flower, pot plant and garden plant. The genus *Lilium* belongs to the family Liliaceae comprising of around 100 species and more than 9,400 cultivars, which are divided into seven sections (Comber, 1949). Lily is the common English name for flowering plants of the *Lilium* genus and they are extensively being grown in polyhouse as cut flower in global flower trade due to wider choice of growing periods, array of colours and everlasting quality. The cultivars of genus *Lilium* are highly appreciated by the horticulturists for their outstanding range of

colour, fragrance and adaptability to several environmental conditions. *Lilium* can be used for informal planting in grassland or among orchard trees, along crocuses, bluebells and tulip to create flower meadows.

Large and attractive flowers with the capacity to rehydrate after a long distance transportation, have made *Lilium* gain popularity fast in our country. The cultivars are highly appreciated for their outstanding range of colours, fragrance and adaptability to several environmental conditions (Bahr and Compton, 2004). However, nearly all the cut flowers of *Lilium* available in the florists' shop are being acquired from

Bengaluru, Pune and hilly areas of the country like Himachal Pradesh, Uttarakhand and North Eastern regions. However, Asiatic lily varieties / hybrids grown by amateurs in the state of Uttar Pradesh are coming up well and blooming in wide range of colour, size and shape. Although agro-climatic conditions of the State are suitable for this flower crop, yet its commercial cultivation has not attracted the flower growers due to lack of awareness about the crop, quality planting material and knowledge about its production technology.

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MATERIALS AND METHODS

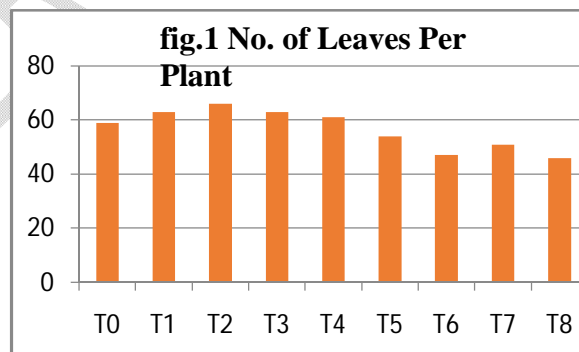
The present investigation was conducted at Horticulture Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during December 2020 to March 2021.

EXPERIMENTAL DESIGN AND TREATMENTS

An experiment was performed by using randomized block design (RBD) with three replications. Also, in this experiment plant sprayed with GA₃ (200, 250, 300, 350 ppm), NAA (50, 100, 150, 200 ppm) with control after planting of liliun bulbs. The observations were recorded with respect at 15 days after planting to know the response of Asiatic lily to different regulators at different concentration.

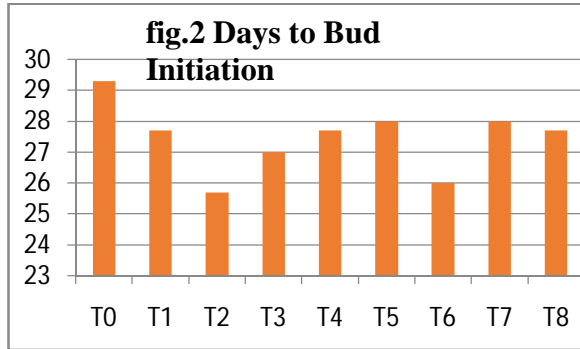
RESULT AND DISCUSSION

No. of leaves per plant :- In no. of leaves per plant treatment differed significantly with respect. It was found that maximum no. of leaves per plant (66) was reached in the T₂ GA₃ 250 ppm. In the year 1990, Pal and Das also reported that GA₃ promoted no. of leaves per plant in Asiatic lily.

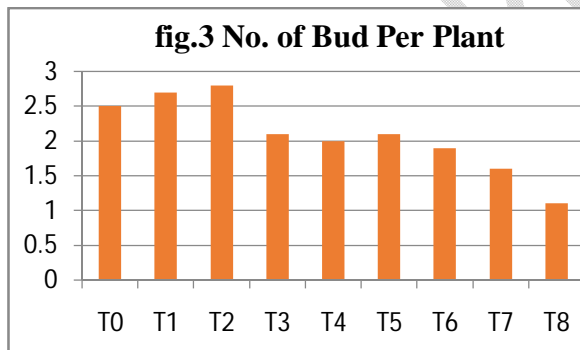


Days to bud initiation(days):- The results presented in Table 1 revealed that growth regulators treatments had significantly with respect to days to bud initiation. It was studied among the different treatment in T₂ GA₃ 250 ppm took lesser days (25.7 days), which were found maximum days (29.3 days) for bud initiation in T₀ Control. The result revealed that foliar application of 250 ppm GA₃ significantly advanced days to bud initiation in Asiatic lily cultivar Litouwen. The reason behind this effect may be due to the stimulation and enhancement of

vegetative growth. The present findings are in consonance with **Singh et al.(2018)**.

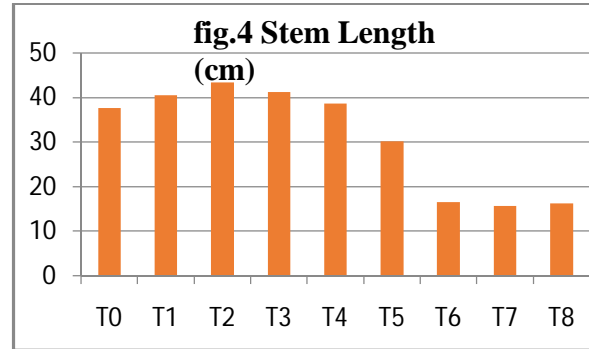


No. of bud per plant :- The effect of different growth regulators showed significant influence on no. of bud per plant. It was spotted that no. of bud per plant was more (2.8) in T₂ GA₃ 250 ppm. Which had fewer bud per plant with NAA 200 ppm T₈. In this study, number of flower buds per plant significantly increased with levels of GA₃ at 250 ppm. However these parameters were recorded maximum in GA₃ 250 ppm treatment, in accordance with the findings of **Khan and Tiwari (2003)** in dahlia.

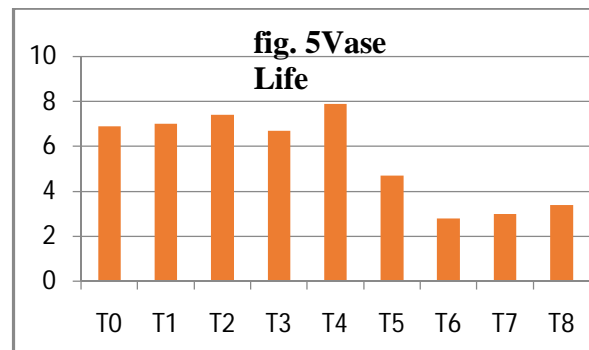


Stem length (cm) :-The data pertaining to stem length exhibited significant difference among the treatments. Longest stem length was observed in T₂ GA₃ 250 ppm (43.4 cm) and Shortest stem length were seen in T₇ NAA 150 ppm (15.7 cm). The results is in agreement with the report of **Padmalatha et al. (2013)** recorded effect of GA₃ on growth and flowering of two gladiolus cultivars

Darshan and Dhiraj and noted maximum spike length with GA₃.

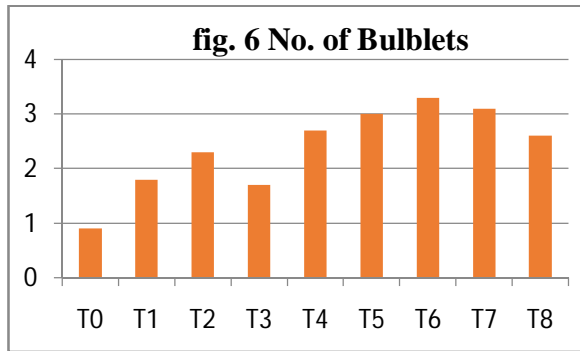


Vase life of flower :-As mentioned in Table 1 plants treated with GA₃ @ 350 ppm T₄ had longer vase life (7.9 days) whereas, the shorter vase life (2.8 days) was recorded in T₆ (NAA @ 100 ppm) among all the treatments. The findings are in agreement with similarly, **Kumar and Gupta (2014)** recorded significantly higher vase life with pre-soaking and foliar spray of GA₃ on gladiolus cv. Jessica. And **Jadhav et al. (2015)** reported that pre-harvest foliar spray of GA₃ on gladiolus cv. American Beauty was significant in enhancing the vase life.



No. of bulblets :-As mentioned in Table 1 among the different growth regulator treatments, number of bulblets increased significantly with T₆ (NAA @ 100 ppm, 3.2) whereas, fewer bulblets were reported in T₀ (Control, 0.9).The findings are in agreement with those of NAA accelerates the growth of the plant, stem cell and manufacturing root cells. Similarly, when NAA was used by

Simmonds and Cumming (1976), in *Lilium longiflorum* cultivars.



UNDER PEER REVIEW

Treatment No.	Treatment	No. leaves per plant	Days to bud initiation (days)	No. of bud per Plant	Stem length (cm)	Vase Life	No. of bulblets
T ₀	Control	59	29.3	2.5	37.7	6.9	0.9
T ₁	GA ₃ @200 ppm	63	27.7	2.7	40.5	7	1.8
T ₂	GA ₃ @250 ppm	66	25.7	2.8	43.4	7.4	2.3
T ₃	GA ₃ @300 ppm	63	27	2.1	41.2	6.7	1.7
T ₄	GA ₃ @350 ppm	61	27.7	2.0	38.6	7.9	2.7
T ₅	NAA@50 ppm	54	28	2.1	30.2	4.7	3.0
T ₆	NAA@100ppm	47	26	1.9	16.5	2.8	3.3
T ₇	NAA@150ppm	51	28	1.6	15.7	3	3.1
T ₈	NAA@200ppm	46	27.7	1.1	16.3	3.4	2.6
S.Ed. (±)		2.74	0.75	0.45	3.06	0.67	0.66
C.D. at 5%		5.86	1.62	0.96	6.50	1.42	1.41

Table.1 The influence of GA₃ and NAA on No. of leaves per plant, Days to bud initiation(days), No. of bud per plant, Stem length (cm), Vase life, No. of Bulblets.

CONCLUSION

From the present investigation It is concluded that among the different growth regulators treatments GA₃ @ 250 ppm gave significant results for No. of leaves per plant, days to bud initiation, no. of bud per plant, stem length, while

GA₃@350ppm gave better vase life of flower in Asiatic lily cultivar Litouwen. And NAA @ 100 ppm gives significant result in no. of bulblets. Hence, GA₃ @ 250 ppm can be recommended for plant growth and flowering of Asiatic lily cv. Litouwen. And NAA @ 100ppm for bulblets formation.

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