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BULB PRODUCTION AND VASE LIFE OF LA HYBRID LILY CV. NASHVILLE UNDER VARIOUS GROWING MEDIA

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ABSTRACT

The present research study examined the effects of various growing conditions on the vase life and bulb production of LA Hybrid Lily cv. Nashville during the academic year 2021–2022 in the greenhouse of the COA at the CAU in Imphal, Manipur. The experiment used a Randomized Block Design with three replications and seven treatment combinations. They were mixed volume by volume (v/v), T_2-soil + farmyard manure (1:1), T_3 soil + peat (1:1), T_4- soil + vermicompost (1:1), T_5- soil + farmyard manure + peat (2:1:1), T_6- soil + peat + vermicompost (2:1:1), T_7- soil + farmyard manure + vermicompost (2:1:1) with control (T_1). Fresh, healthy bulbs of the cultivar were planted in various media mixtures and arranged beneath a shade structure. The research results showed that T_4- soil + vermicompost (1:1) produced the largest bulb diameter (3.29cm), while T_5- soil + farmyard manure + peat (2:1:1) produced the maximum vase life (8.33 days), bulbs per plant (1.4), bulb weight (15.35g), bulblets per plant (4.98), bulblet diameter (1.35cm), and weight of bulblet (1.35g). It will be feasible to conclude that T_5 with soil, farmyard manure, and peat (2:1:1) has the most beneficial effects on the vase life and bulb yield of LA Hybrid Lily cv. Nashville.

Keywords **:** FYM, Peat, Vermicompost, Nashville, Vase life, Bulb & Bulblet Production.

Introduction

The herbaceous flowering plants in the genus 'Lilium' are grown for their bulbous flowers, which are exceedingly beautiful and frequently fragrant. It is a symbol of purity and royalty and is renowned for its aesthetic beauty. It belongs to the Liliaceae family. Lilies are raised for their various symbolic meanings in literature and culture around the world. Lilies come in various hues and varieties used as cut flowers with various symbolic meanings. The Asiatic and Oriental lilies are ideal wedding emblems since they stand for marriage and purity, respectively. According to Thakur *et al*. (2006), in the world of cut flowers, lilium is among the best due to their attractiveness, longevity, and variety (Harivignesh *et al*., 2023).

Most lily species are indigenous to Asia, Europe, and North America in the temperate northern hemisphere and are extensively planted in gardens of tropical, subtropical, and temperate climates. In India, the world-famous Shirui lily (*Lilium mackliniae) is* grown in Manipur state and other *Lilium* species are also found growing naturally in the Nilgiris hills of South India and the Himalayan ranges in the north. Lilies are the flowers recognized to cultivate at an elevation up to 2000 meters from the mean sea level (MSL) and prefer porous, loamy soil with adequate drainage facilities and a pH range of 5.5-6.5. The ideal day and night temperatures for a good flower and bulb yield are 21°C to 25°C and 12°C to 15°C, respectively. As a result, a shade net can be used to block out 75% of the light in the summer and 50% in the winter. They are predominantly used as cut flowers and potted plants in the floral industry. These are also used as border plants and in landscaping. Due to market demands, the area under commercial cultivation has

increased in recent years. In India, it is predominantly grown for cut flower production. Recently, lilies have become popular in the North Eastern states of Manipur, Meghalaya, Arunachal Pradesh, Nagaland and Sikkim.

Lilium is commercially propagated from bulbs (Harivignesh *et al*., 2023). For large-scale disease-free multiplication, the tissue culture approach is used. Bulb divisions and stem bulblets are two frequent means of proliferation. Although cut *Lilium* sells for a good rate, the expense of bulbs is typically a significant portion of *Lilium* production, particularly in regions with poor bulb formation (such as tropical and sub-tropical areas). Every season, the cost of production rises due to the acquisition of new planting material. Most floricultural crops are raised on soil, which is often used by producers. Soil health deteriorates with repeated use, so natural resources cannot be relied on for long-term flower production. Furthermore, root development is stifled in heavy soils with inadequate drainage, making plants more vulnerable to soil-borne illnesses. Suitable growing medium or crop leftovers are essential for high-quality flower production and optimal root system growth (Awang *et al*., 2009). To improve soil quality, employ elements like farmyard manure, vermicompost, and other organic materials like peat. In this view, the current investigation was accepted and undergo to investigate the vase life and bulb production using different growing media of LA hybrid lily cv. Nashville, under protected conditions.

Materials and Methods

In the greenhouse at the COA at CAU in Imphal, Manipur, during the academic year 2021–2022, an experiment titled "Studies on bulb production and vase life of LA Hybrid lily cv. Nashville under various growing media" was carried out. The experimental area is located at latitude 24.8170^{0}N and longitude 93.9368^{0}E at an elevation of 786 meters above MSL. Imphal's environment is typically moist subtropical with a hot monsoon season and moderate dry winters. June and July are the hottest months with an average temperature of 30^{0}C, while December and January are the coldest ones with an average temperature low of nearly 8^{0}C, which was presented in Appendix I. The average annual rainfall ranges between 1250 mm-2700 mm. The initial soil's physical and chemical properties are analyzed and mentioned in Appendix II. For the current experiment, various combinations of soil, farmyard manure (FYM) (total NPK: 0.5%, 0.2%, and 0.5%), peat (total NPK: 0.65%, 0.30%, and 0.9%), and vermicompost (total NPK: 0.5-1.5%, 0.1-0.3%, 0.15-0.56%) were employed to build different growing media. The experimental design was arranged in RBD (Randomized Block Design) with seven treatment combinations and are replicated thrice, *viz.* T_2-soil + FYM (1:1), T_3-soil + peat (1:1), T_4- soil + vermicompost (1:1), T_5- soil + FYM + peat (2:1:1), T_6-soil + peat + vermicompost (2:1:1), T_7- soil + FYM + vermicompost (2:1:1) with control (T_1).

Results and Discussion

Quality parameter

The data analysis of quality parameters by various growing media in LA hybrid *Lilium* was given in Table 1 and graphically explained in Fig. 1.

Vase life (days)

The effects of the Vase life of *Lilium* by different growing media of LA hybrid cultivar 'Nashville' of *Lilium* is given in Table 1 and graphically shown in Fig. 1. The result shows there was no considerable difference in vase life across treatments, with the media-grown and the control-grown plants.

Plate 1: View during vase life analysis

The cut stems from treatments T_5 and T_7 had the longest shelf life among the different potting media, lasting 8.33 days followed by treatments T_2, T_3 and T_4 had the shortest, 7. 83 days. Furthermore, the bulbs produced in T_1 (control) had a minimum shelf life of 6.83 days. Since all the cut stems from the harvest are stored in distilled water, there is little to no difference between the treatments.

The length of storage life in Lilium depends on the quantity of buds per plant. Therefore, in the current investigation, a proportionately higher number of buds in this treatment can be directly connected with the greatest shelf-life obtained by T_5. Additionally, as shown by the data in T_5, the optimization of several growth and flowering characteristics may have led to the production of high-quality cut stems with more carbohydrates to support a longer shelf life. These findings are consistent with Alami *et al.* (2021) findings in the LA hybrid cv. Nashville and Karaguzel

(2020) findings in the Oriental 'Siberia' and 'Vespucci' lily varieties. Maximum shelf-life was discovered in the medium (sand + soil + FYM) along with vermicompost and cocopeat (2:1:1) in LA hybrid lily cultivars "Batistero" and "Courier," according to Rajera *et al.* (2017).

Bulb parameters

The data analysis of various flowering parameters was significantly influenced by different growing media in LA hybrid Lilium was presented in Tables 1 & 2 and graphically illustrated in Fig. 1 & 2.

It was observed that growing medium made up of soil, FYM, and peat (2: 1: 1) were effective media in terms of bulb and bulblet parameters.

Bulbs produced per plant

The observations on the bulbs produced per plant as influenced by treatments of different growing media have been represented in Table 1 and diagrammatically furnished in Fig. 1.

The results of the study on the bulbs produced per plant showed that plants grown in a mixture of soil, FYM, and peat; 2:1:1 (T_5) recorded the highest number of bulbs (1.4), which was statistically at par with T_6. The bulbs planted under Control (T_1) and T_7 produced the lowest bulbs.

It can be explained by the greater contribution of glucose translocation to the subsurface parts to bulb proliferation in the medium. Krause (1996), who examined certain *Lilium longiflorum* variants propagated from bulb scales, provided evidence in support of our findings. According to the findings, the cultivar accounted for almost every aspect of the reproductive capacity. In addition, Singh (2002) in Asiatic cultivars, Matsuo and Arisumi (1979) in *Lilium longiflorum* cultivars and Oriental lilies (Sharma *et al.*, 2007) supplement our findings.

Diameter of bulb (cm)

Tabulated data has been presented in Table 1 and graphically represented in Fig. 1, which clearly indicates that various growing media significantly affected the bulb diameter of the LA hybrid Lilium cultivar ‘Nashville’.

The T_4 growing medium had the biggest bulb size (3.29 cm) of all the growing media. However, it was discovered that the size was comparable to that of the bulbs obtained in the T_5 (3.27 cm), T_7 (3.24 cm) and T_2 (3.20 cm) experiments. On the other hand, T_1 (Control) had the smallest bulb diameter of 2.59 cm.

The movement of photosynthetic substances from the aerial part of the plant to the underground tubers, which act as sinks, is essential for tuber growth in root crops. It may be attributed to more vegetative growth in the medium. According to Nikrazm *et al.* (2011), cocopeat as a medium increased the diameter of the bulb in Lilium. The greatest bulb size was also recorded by Klasman *et al.* (2002) in Lilium Asiatic (LA) hybrids with soil amended + FYM + peat; (2:1:1) substrates.

Bulb weight (g)

According to the data shown in Table 1 and graphically represented in Fig. 1, the LA hybrid *Lilium* cultivar 'Nashville' varies greatly from one another in terms of the bulb's weight.

The weight of the bulb is significantly affected by different growing substrates. The maximum bulb weight (15.35 g) was found in treatment T_5 and at par with T_3 (14.52 g) & T_7 (14.29 g). The minimum bulb weight (10.94 g) was recorded in T_1 (control). The reason for the increased weight of the bulb in the medium T_5 was the same as described in points 2.1 and 2.2.

Bulblets produced per plant

The bulblets produced per plant as affected by treatments of various growing media is given in Table 2 and Fig. 2.

The results on the bulblets produced per plant clearly showed a significant increase in under T_5 (4.98) which was at par with treatment T_4 (4.13) and T_6 (4.07). While the lowest (3.07) bulblets/plant recorded under control (T_1) treatment.

Increased carbohydrate translocation to the underground sections, which in turn contributes more to bulblet multiplication in the medium, could be the cause of increased bulblet multiplication, diameter, and weight. Rajera *et al.* (2017) reported that a growth medium including sand + soil + FYM (1:1:1) is adequate for bulb/bulblet multiplication in LA hybrid lilies. Dilta *et al.* (2000) reported that most bulblet production was found in cv. Pollyana with 100 ppm NAA or IBA in FYM + soil-rite; (1:1). These results are similar to findings of Manish *et al.* (2000) in *Lilium* cv. ‘Chianti’ and Suh and Lee (1994) in *Lilium* cultivars ‘Casa Blanca’ and ‘Connecticut king’.

Plate 2 : Harvested Bulbs and bulblets

Diameter of bulblet (cm)

Tabulated data has been shown in Table 2 and graphically explained in Fig. 2, which clearly indicates that various growing media significantly affected the diameter of the bulblet in the LA hybrid Lilium cultivar 'Nashville'.

Between the various growing media used, the largest bulblet diameter (1.35 cm) was recorded in T_5 and at par to the bulblet diameter got in T_4 (1.32 cm). Similarly, the lowest diameter of bulblet 1.04 cm was found in T_1 (Control). The reason for the increased bulblet diameter in the medium T_5 was the same as described in point 2.4.

Bulblet weight (g)

The results shown in Table 2 and graphically illustrated in Fig. 2 reveal that the LA hybrid Lilium cultivar 'Nashville' differs proportionately from one another in respect of bulblet weight.

The weight of the bulblet is significantly affected under various growing media conditions. The highest bulblet weight (1.35 g) was found in treatment T_5 containing (soil + FYM + peat; 2:1:1) and at par with T_4 (1.32 g). Whereas, the lowest bulblet weight (0.78 g) was recorded in the bulbs grown in T_1 (control). The reason for the increased weight of the bulblet in the medium T_5 was the same as described in point 2.4.

Conclusion

Based on the responses shown by the crop LA hybrid *Lilium* cv. Nashville to different growing media, the present findings revealed that different growing media, *viz.* farmyard manure, peat, and vermicompost had a positive impact on LA hybrid *Lilium* cv. 'Nashville' in respect of the shelf-life and production of bulbs. The *Lilium* crop produced maximum bulb yield and vase life in the treatment T_5 with soil + FYM + peat (2:1:1; v/v).

The present finding clearly illustrated the impact of various growing media compositions (farmyard manure, vermicompost and peat) and it is concluded that among the treatments, T_5 (soil + FYM + peat; 2:1:1) was the best suited for production of bulbs as well as vase life when compared with other treatments.

Table 1 : Impact of various growing media on quality and bulb parameters of LA hybrid cv. Nashville

Treatments	Shelf-life	Bulbs produced /plant	Diameter of bulb (cm)	Bulb weight (g)
T_1-Control	6.83	1.00	2.59	10.94
T_2-Soil + FYM (1:1)	7.83	1.13	3.20	14.15
T_3-Soil + Peat (1:1)	7.83	1.07	3.14	15.35
T_4-Soil + VC (1:1)	7.83	1.07	3.29	14.31
T_5-Soil + FYM + Peat (2:1:1)	8.33	1.40	3.27	14.52
T_6-Soil + Peat + VC (2:1:1)	7.17	1.20	3.08	11.98
T_7-Soil + FYM + VC (2:1:1)	8.33	1.00	3.24	14.29
S. Ed. (±)	0.53	0.07	0.18	0.95
C.D. 5%	NS	0.14	0.38	2.07
C.V. %	8.40	7.09	6.90	8.52

*NS-Non-significant

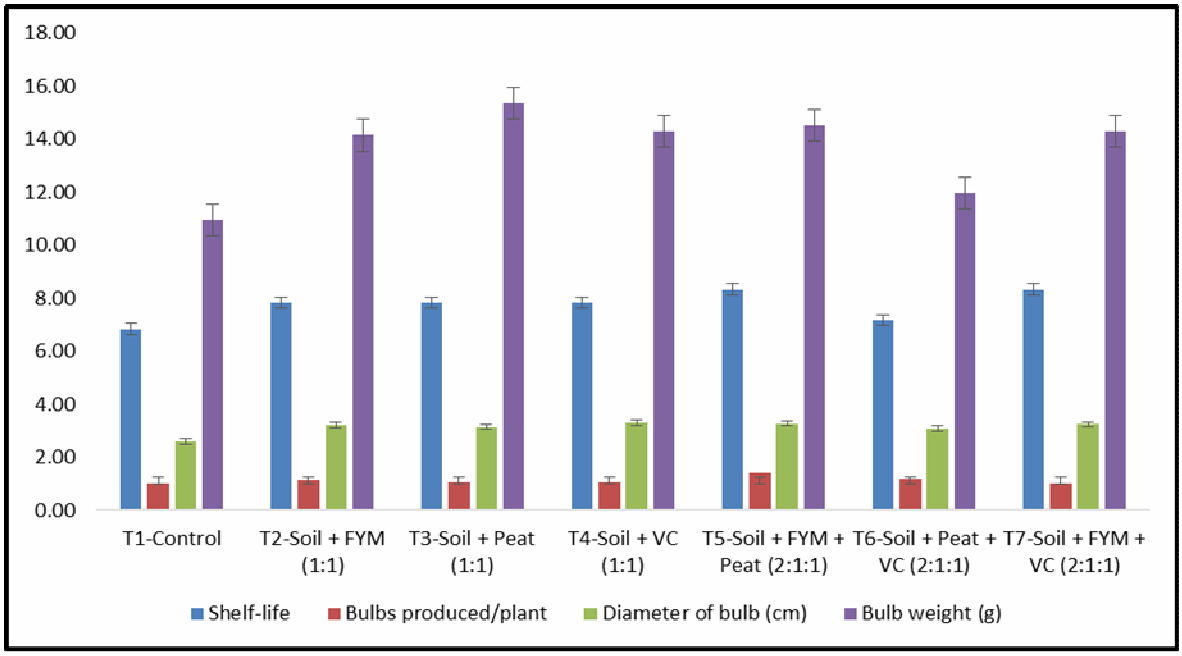

Fig. 1 : Impact of various growing media on vegetative parameters of LA hybrid cv. Nashville

Table 2 : Impact of various growing media on vegetative parameters of LA hybrid cv. Nashville

Treatments	Bulblets produced/plant	Diameter of bulblet (cm)	Bulblet weight (g)
T_1-Control	3.07	1.04	0.78
T_2-Soil + FYM (1:1)	3.31	1.23	1.08
T_3-Soil + Peat (1:1)	3.87	1.21	1.15
T_4-Soil + VC (1:1)	4.13	1.32	1.32
T_5-Soil + FYM + Peat (2:1:1)	4.98	1.35	1.35
T_6-Soil + Peat + VC (2:1:1)	4.07	1.17	0.87
T_7-Soil + FYM + VC (2:1:1)	3.30	1.11	1.24
S. Ed. (±)	0.26	0.75	0.05
C.D.5%	0.57	0.16	0.11
C.V. %	8.38	7.59	5.79

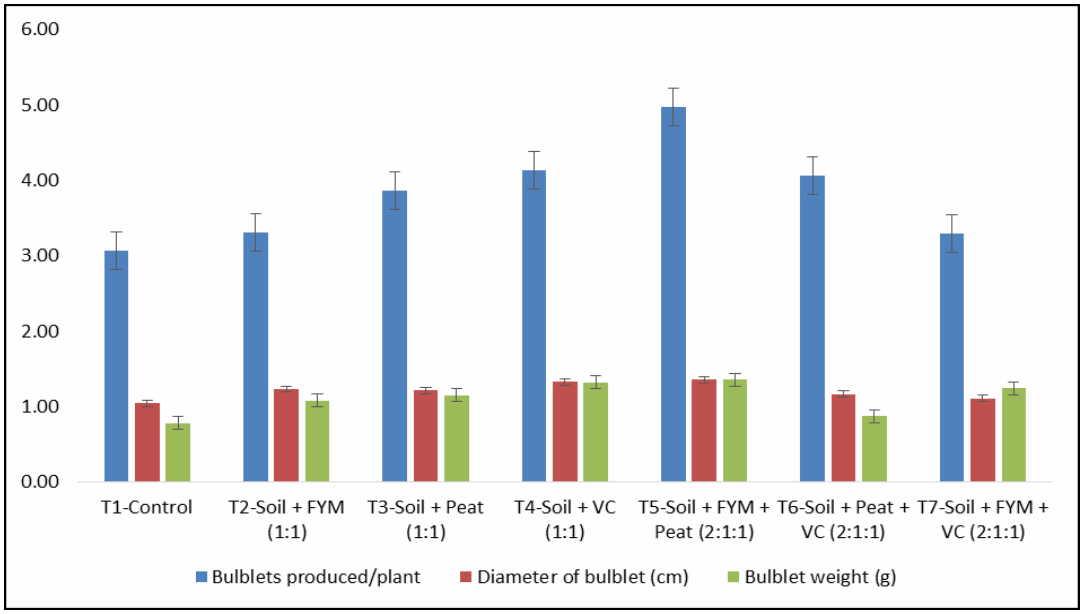

Fig. 2 : Impact of various growing media on vegetative parameters of LA hybrid cv. Nashville

Appendix I : Monthly meteorological observation during the experimental period

Months		Temperature (°C)		Relative Humidity (%)		Wind Speed	Rainfall	Sunshine
		Max.	Min.	700h	1300h	(km/hr)	(mm)	(hours)
2021	December	22.5	10	91.4	53.5	0	0	6.7
2022	January	21	7.9	91.9	57.8	1.7	1	6.1
	February	22.2	7.3	87.3	37.2	6.1	1.7	7.8
	March	29.4	13.7	79.7	37.4	6.1	1.8	6.8
	April	28.5	18.2	80.9	54.9	6	4.7	5.3

Source: ICAR Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal

Appendix II: Initial soil status (Physical and chemical properties) of experimental soil

Sl. No.	Soil properties	Values	Interpre-tation	Method of analysis
1	**Soil pH**	6.5	**Acidic**	Systonic glass electrode pH Meter (Jackson, 1973)
2	**Soil texture**			
A.	Sand (%)	38.4	**Loam**	Bouyoucos Hydrometer method (Bouyoucos,1951)
B.	Silt (%)	36		
C.	Clay (%)	25.6		
3	**Organic Carbon (%)**	1.17	**High**	Walkley and Blacks rapid titration method (Walkley and Black, 1934)
4	**Available N (Kg/ha)**	213.24	**Low**	Alkaline Potassium Permanganate method (Subbaiah and Asija, 1956)
5	**Available P_2O_5 (Kg/ha)**	23.86	**Medium**	Bray and Kurtz's method (Bray and Kurtz, 1945)
6	**Available K_2O (Kg/ha)**	177.53	**Medium**	Flame photometer method (Jackson, 1973)

References

Alami, E., Karimi, M. and Chalavi, V. (2021). Investigation of compost and vermicompost of water hyacinth as growing media for lily (*Longiflorum*× Asiatic). *International Journal of Horticultural Science and Technology*, **8**(3), 251-260.

Awang, Y., Shaharom, A.S., Mohamad, R.B. and Selamat, A. (2009). Chemical and physical characteristics of cocopeat-based media mixtures and their effects on the growth and development of *Celosia cristata*. *American Journal of Agricultural and Biological Sciences*, **4**(1), 63-71.

Bouyoucos, G.J. (1927). The hydrometer as a new and rapid method for determining the colloidal content of soils. *Soil Science*, **23**(4), 319-331.

Bray, R.H. and Kurtz, L.T. (1945). Determination of total, organic and available forms of phosphorus in soil. *Soil Science,* **59**, 39-45.

Dilta, B.S., Pathania, N.S. and Sehgal, O.P. (2000). Studies on scale propagation of hybrid lilies. *Journal of Ornamental Horticulture* (New Series), **3**(1), 62-63.

Harivignesh, G., Moirangthem, A., Punabati, H., Singh, U.C., Singh, G.N. Devi., N.S. and Singh, Y.D. (2023). Studies on Vegetative Growth and Flower Production of LA Hybrid Lily cv. Nashville Under Different Growing Media. P, 1-6

Jackson, M.L. (1973). Soil Chemical Analysis. Prentice Hall of India Pvt. Ltd., New Delhi, pp. 38-82.

Karagüzel, O. (2020). Effects of different growing media on the cut flower performances of oriental two *Lilium* varieties. *International Journal of Agricultural and Biological Engineering*, **13**(5), 85-92.

Klasman, R., Moreira, D. and Benedetto, A.D. (2002). Cultivation of Asiatic hybrids of Lilium sp in three different substrates. *Revista de la Facultad de Agronomia (Universidad de Buenos aires)*, **22**(1), 79-83.

Krause, J. (1996). Reproductive ability of some *Lilium longiflorum* varieties propagated from bulb scales. *Prace-z–Zakresu-Nauk-Rolniczych*, **81**, 267-273.

Manish, K., Grewal, H.S. and Arora, J.S. (2000). Effect of media on propagation of *Lilium*. *Journal of Ornamental Horticulture* (New Series), **3**(1),58-59.

Matsuo, E. and Arisumi K. (1979). Varietal differences in the development of the scale bulblet in the easter lily. *Memories of the Faculty of Agriculture, Kagoshima University*, **15**, 79-85.

Nikrazm, R., Ajirlou, S.A., Khaligy, A. and Tabatabaei, S.J. (2011). Effects of different media on vegetative growth of two *Lilium* cultivars in soilless culture. *Journal of Science and Technology of Greenhouse Culture*, **2**(6), 1-9.

Rajera, S. and Sharma, P. (2017). Effect of different growing media on bulb production of LA hybrid lily. *Chemical Science Review and Lett*ers, **6**, 1382-1387.

Sharma, P., Sharma, Y.D., Dhiman, S.R. and Gupta, Y.C. (2007). Effect of growth regulators and growing media on propagation of Oriental lily hybrids through scaling. *Journal of Ornamental Horticulture*, **10**(3), 148-152.

Singh, A. (2002). Effect of position, plant growth regulators and growing media on bulblet production of lilium hybrids. Ph. D. Thesis, Dr. YS Parmar University of Horticulture and Forestry, Nauni, Solan (HP), India.

Subbaiah, B.V. and Asija, G.L. (1956). A rapid procedure for estimation of available nitrogen in soils. *Current Science*, **25**, 259-260.

Suh, J. and Lee, J. (1994). Bulblet formation and dormancy induction as influenced by temperature, growing media and light quality during scaling propagation of *Lilium* species. In International Symposium on the Genus *Lilium,* **414**, pp.251-256.

Thakur, R., Sood, A., Nagar, P.K., Pandey, S., Sobti, R.C. and Ahuja, P.S. (2006). Regulation of growth of *Lilium* plantlets in liquid medium by application of paclobutrazol or ancymidol, for its amenability in a bioreactor system, growth parameters. *Plant Cell Reports.*, **25**(5), 382-391.

Walkley, A. and Black, I.A. (1934). An experiment of the Degtjareff method of determining soil organic matter and a proposed modification of the chromic acid titration method. *Soil Science*, **37**, 29-38.