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## Varietal evaluation of Asiatic liliium hybrid on growth and bulblet production during scale propagation

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**Abstract**

An experiment was carried out for evaluation of five Asiatic hybrid lily varieties viz., New Wave (V1), Orange Matrix (V2), Alaska (V3), Nov Cento (V4) and Monte Negro (V) during scale propagation in form of a pot culture experiment in the terrace garden of the Department of Floriculture and Landscape, OUAT, Bhubaneswar. For this purpose scales were detached from bulb of five different *Lilium* varieties. The results of the study related to growth and bulblet production variety New Wave (V<sub>1</sub>) recorded maximum number of leaves scale<sup>-1</sup>, number of roots scale<sup>-1</sup>. Besides, it also recorded maximum circumference and weight of individual bulblets as well as weight of total number of bulblets scale<sup>-1</sup>. On the other hand variety Orange Matrix (V2) recorded maximum number of bulblets scale<sup>-1</sup>. Maximum sprouting percentage of scales and maximum length of roots were observed with variety Alaska (V3). Its performance with respect to circumference and weight of individual bulblets and weight of total number of bulblets scale<sup>-1</sup> was next to variety New Wave (V1). Performance of variety Nov Cento (V4) was next to Orange Matrix (V2) with respect to number of bulblets produced scale<sup>-1</sup>. Among the five varieties under study performance of variety Monte Negro (V5) was very poor with respect to all the parameters related to growth and bulblets production. From the results of the investigation, it could be interferred that New Wave (V<sub>1</sub>) is the most suitable variety with respect to growth and bulblets production of *Lilium* during scale propagation.

**Keywords:** Asiatic hybrid lily, bulb scale, growth, bulblets production

**Introduction**

Lilies are one of the major bulbous plants that are grown to produce cut flowers and potted plants. It is a species of great economic importance in production and commercialization of cut flower in the International market (Jimenez *et al.*, 2012) [2]. The lily bulb is composed of scales which are the modified leaves that store food reserves and are subject to dormancy factors. The scales are attached to the basal plate which is a compressed stem with the shoot apex (Rees 1972; Roh 1996) [7, 8]. The most rapid method of lily propagation is adventitious bulblets formation on bulb scales (Iapichino, 1994) [1]. During scaling, the nutrient reserves stored in the scale leaves move through the basal plate to the shoot apex to produce leaves and development as the plant begins to grow and induction of bulblets and also of dormancy is broken by bulb vernalization treatment (Uemoto *et al* 1983) [9]. Bulblet formation was also influenced by the position of the scales in the bulb (Matsuo, 1972) [4]. However careful consideration to scale position on the mother bulb must be given to achieve satisfactory results with respect to growth and bulblets production of *Lilium* during scale propagation. Therefore our objective were to evaluated possibility of scale bulblet production in different Asiatic hybrid lily varieties during scale propagation at Bhubaneswar condition.

**Materials and Methods**

The present experiment was carried out in form of a pot culture trial in the terrace garden of the Department of Floriculture and Landscaping located in the premises of the college of Agriculture, OUAT, Bhubaneswar during 2013-2014. Bulbs of Asiatic *Lilium* hybrids cv. New Wave, Orange Matrix, Alaska, Nov Cento and Monte Negro harvested in the second week of February 2013 were kept in moist media in perforated poly bags in refrigerator at 4°C temperature for vernalization. The weight and diameter of bulbs ranged from 49.0 to 64.5 g and 14.84 to 16.04 cm respectively. The outer most layers of scales that were withered or injured were removed. Scales were detached manually from each bulb of Asiatic hybrid lilies. At the time of detaching the scale from mother bulb care was taken to see that a small portion

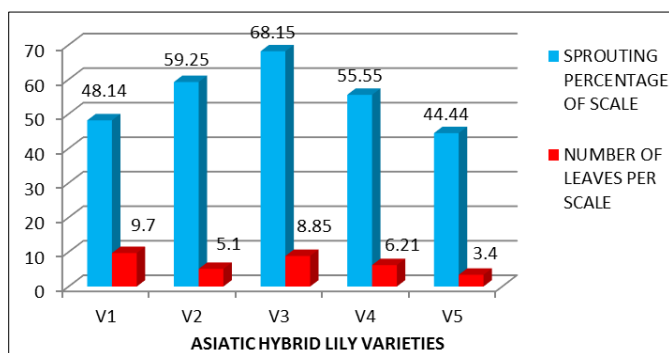
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of basal plate also remained attached with each scale. Six healthy and uniform sized scales under each of five Asiatic hybrid lily varieties were planted in each pot containing media composition of soil: FYM: sand in 2:1:1 ratio (V/V) at a depth of 5 cm on 19 November 2013 during afternoon hours. The bulblets were harvested after seven months and data recorded on different attributes were subjected to statistical analysis using factorial complete randomized design and having 3 number of replication and 15 number of treatment combination.

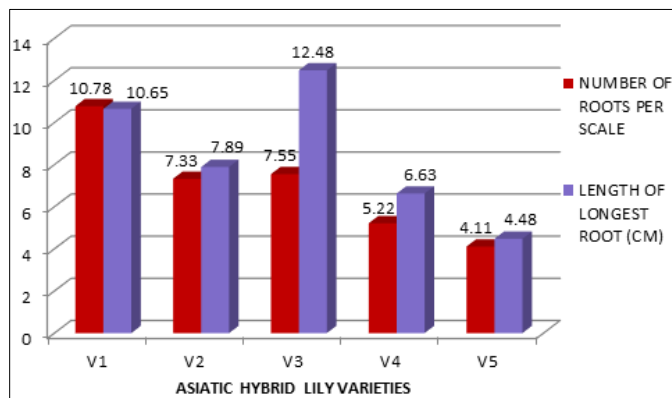
### Results and Discussion

Study of data presented in Graph 1 revealed that the maximum sprouting of scales (68.15%) was recorded in V3 (Alaska) which differed significantly from other varieties. It was followed by V2 i.e. Orange Matrix (59.25%). While the minimum was recorded with V5 i.e. Monte Negro (44.44%). Variation in sprouting percentage among varieties as observed in the present study might be due to the variation in their genetic potential and also due to the variety × environment interaction. It was evident from Graph-1 that maximum number of leaves scale<sup>-1</sup> (9.70) was recorded in V1 (New Wave) which differed significantly from other varieties, and it was closely followed by V3 i.e. Alaska (8.85). While the minimum was recorded with V5 i.e. Monte Negro (3.40). It indicated that reserve carbohydrate available in the scale of different varieties had played a key role in producing higher and lower number of leaves scale<sup>-1</sup>.



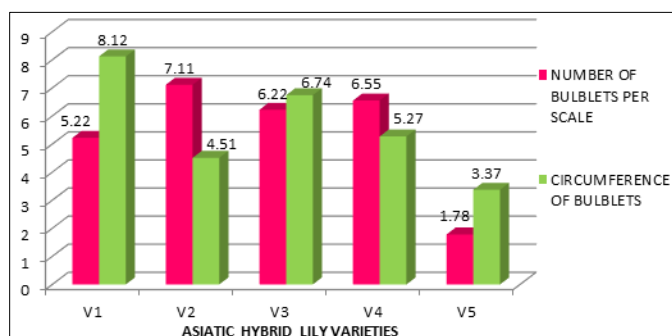
**Graph 1:** Varietal performance of hybrid lily on sprouting and number of leaves per scale

Perusal of data presented in Graph-2 showed that maximum number of roots scale<sup>-1</sup> (10.78) was recorded in variety New Wave (V1) which differed significantly from other varieties, and it was followed by V3 i.e. Alaska (7.55). On the other hand, the minimum was recorded with V5 i.e. Monte Negro (4.11). However, maximum root length (12.48cm) was recorded in variety V3 i.e. Alaska which differed significantly from other varieties and it was followed by V1 i.e. New Wave (10.65cm). On the other hand, the minimum was recorded with V5 i.e. Monte Negro (4.48cm). It indicated that greater weight of scales with higher carbohydrate reserve in V1 (New Wave) and V3 (Alaska) might have produced more number of roots while very low weight of scale with less reserve of carbohydrate in V5 (Monte Negro) might have produced minimum number of roots per scale.



**Graph 2:** Varietal performance of hybrid lily on root character

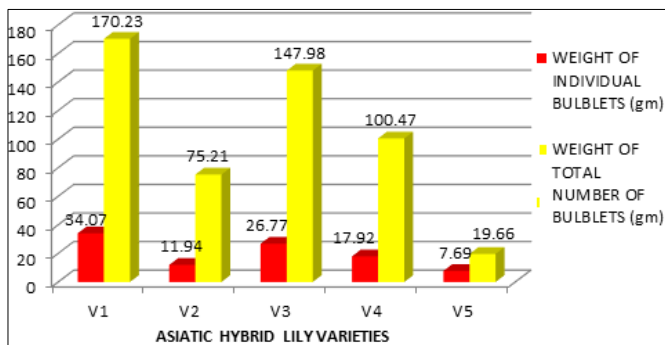
Study of data presented in Graph-3 revealed maximum number of bulblets scale<sup>-1</sup> (7.11) was recorded in variety Orange Matrix (V2) which was statistically at par with variety V4 i.e. Nov Cento (6.55). On the other hand, the minimum was recorded with V5 i.e. Monte Negro (1.78). Similar variation in bulblet production due to *Lilium* variety/species had also been observed by Iapichino *et al.*, (1994) [1] who, reported that regardless of scale position there were great differences among the species and hybrid under evaluation indicating that genetic variation might have an important role in bulblet differentiation from scales.



**Graph 3:** Varietal performance of hybrid lily on bulblets number & circumference

It was also revealed from Graph -3 that maximum circumference of the bulblets (8.12cm) was recorded in variety V1 i.e. New Wave which differed significantly from other varieties and it was followed by V3 i.e. Alaska (6.74cm). On the other hand, the minimum was recorded with V5 i.e. Monte Negro (3.37cm). Similar varietal difference with respect to bulblet size was also been reported by (Iapichino *et al.*, 1994) [1] who concluded that bulblets differentiated of *L. regale* scales had the greatest size bulblets.

Study of data presented in Graph-4 revealed that maximum weight (34.07g) was recorded in variety New Wave (V1) which differed significantly from other varieties and it was followed by V3 i.e. Alaska (26.77g). On the other hand, the minimum was recorded with V5 i.e. Monte Negro (7.69g). Differences in scale weight of *Lilium* have been reported among the scales of a bulb and between scales from bulbs of different size (Magnani *et al.*, 1990) [3]. Larger scales produce more bulblets of greater weight than smaller ones (Matsuo *et al.*, 1987; Matsuo and van Tyul, 1986) [6, 5].



**Graph 4:** Varietal performance of hybrid liliom on weight of bulblets

Perusal of data presented in Graph-4 also showed that the maximum weight of total number of bulblets per scale (170.23g) was recorded in variety V1 i.e. New Wave it was followed by V3 i.e. Alaska (147.98g). However, the minimum was recorded with V5 i.e. Monte Negro (19.66g). Variation in number of bulblets per scale and weight of individual bulblet under different varieties was the contributing factor for such difference in total weight of bulblets per scale as observed among various treatment combinations.

### Conclusion

Based on the results of the study it was demonstrated that the development of bulblets of plant during scale propagation were greatly affected by genetic and environmental interaction. Under Bhubaneswar condition with proper management practices the “New Wave” (V1) cultivar showed better result in term of bulblets formation, as well as evidenced maximum weight & circumference of bulblets, whereas, the performance of variety Alaska (V3) next to New Wave (V1) with respect to these parameters. However, the Orange matrix (V2) had significantly more number of bulblets per scale. So it can be concluded that these cultivars showed better response to scale propagation in term of bulblets formation as compared to other cultivars.

### References

1. Iapichino G, Amico RU, Sciortino A. Effeect of scale position on the mother bulb on invivo multiplication of bulblets from bulb scale of different *Lilium* sps. And hybrids, *Adv. Hortic. Sci.* 1994; 8(4):195-199.
2. Jimenez S, Plaza, BM, Segura ML, Contreras JI, Lao, TM. Peat substrate reuse in *Lilium* “Haveltia” crop. *Commun. Soil Sci. & Plant Analysis.* 2012; 43:243-250.
3. Magnani G, Malorgio F, Mori B. Osservazioni ricerche sulla moltiplicazione da scaglie del *Lilium*. *Culture protette.* 1990; 3:61-68
4. Matsuo E. Studies on the Easter lily (*Lillium longiflorum*) of Serkaku Retto (*Pinnacle islands*). 1. Comparative study on growth, *JPN. Soc. Hortic. Sci.* 1972; 41:383-392.
5. Matsuo E, Van Tyul JM. Early scale propagation results in forcible bulbs of Easter lily, *Horticulture Science.* 1986; 21:1006-1007.
6. Matsuo E, Nonaka A, Arisumi k. Some factors influencing the type of leaf development (plant type) of scale bulblets of Easter lily, *Lilium longiflorum*. *Bul. Fac. Agr., kagoshima university, Japan,* 1987.
7. Rees AR. *The Growth of Bulbs: Applied Aspects of the Physiology of Ornamental Bulbous Crop Plants.* 2nd ed. London: Academic Press, 1972, 65.

8. Roh SM. New production technology of *Lilium* – a review on propagation and forcing *Acta Hort.* 1996; 414:219-228.
9. Uemoto SH, Okubo, Choi ST. Relationships between bulb formation and dormancy in respect to the endogenous plant hormone levels. *Acta Horticulturae.* 1983; 134:101-108.