



Studies on Response of Common Hyacinth (*Hyacinthus orientalis* L.) to Scooping Technique of Propagation on Propagule Formation

**Nasir Hamid Masoodi ^{a*}, Qazi Altaf Hussain ^a, I. T. Nazki ^a, Nelofar ^a
and M. Nayeem Sofi ^b**

^a *Division of Floriculture and Landscape Architecture, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Jammu and Kashmir, India.*

^b *Division of Soil Science, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Jammu and Kashmir, India.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

An investigation on propagation through scooping in different cultivars of Hyacinth viz. Purple Sensation, Yellow Stone, Purple Star, Fondant, Gipsy Queen and Aladdin was carried out in the Division of Floriculture and Landscape Architecture SKUAST K, Shalimar Srinagar during 2019-20 with an objective to study response to scooping technique and propagule ratio. Results depicts minimum days for sectioning after incubation (36.00 days), visible bud formation days (46.50), days to bud development (84.50) resulted with cultivar Yellow stone. Further maximum no of bulbils per bulb(18.90), bulbil diameter(9.95mm), bud length(2.93 cm) and bud weight(0.38 g) after incubation resulted in cultivar yellow stone where as maximum days for sectioning after incubation (47.50 days), visible bud formation days (68.00 days), days to bud development (100.50days) and minimum values for no of bulbils per bulb(13.20), bulbil diameter(8.25mm), bud length(2.33 cm) and bud weight(0.21 g) after incubation resulted in cultivar Gipsy queen. Response of different cultivars to scooping for propagule ratio showed significant variation.

Keywords: *Hyacinth; cultivars; propagation; scooping.*

1. INTRODUCTION

Commercial floriculture is growing at a fast rate with around 10% annual growth rate. Demand of flowers is growing throughout the world which reflects scope for propagation. Temperate bulbous crops are in huge demand not only in temperate zones but also in plains due to breezing flowering beauty. The efforts of bulb production are confined to the people with home lawns or to a few commercial growers who produce these on little larger scales, but the production level is still meager. Hyacinth is an important temperate ornamental bulbous crop is known for its beauty and fragrance. Hyacinth is a common name of around 30 perennial flowering plants and belongs to family Liliaceae. Common Hyacinth (*Hyacinthus orientalis* L.) is the most important from commercial point of view and is originated in Anatolia and was brought to Europe and other continents in the 16th century. The Hyacinth bulb produces a dense, compact spike of flowers, 6-12 inches (15-30 cm) tall. Hyacinths are highly fragrant, bell-shaped flowers with reflexed petals. Term 'bulb' is commonly used to designate, a range of clearly diverse group of storage organs which include true, bulbs, corms, tubers, tuberous roots and stems, rhizomes and pseudo bulbs. The life span of Hyacinth bulbs is 3 to 4 years so it is important to maintain offset production. Propagation ratio of hyacinth is 1:2 on annual basis as far as offsets arising from base edges of bulb are concerned. Every year there is import of bulbs including Hyacinth worth crores from Europe and each bulb of Hyacinth costs Rs 30 to 50 in Indian market. This draws an attention or specialized means of propagation like Scoring and scooping techniques so as to ensure maximum propagules which can help in minimizing the import. But importance of scale position and growth regulators in success of propagation rate is always questionable. Thus the present investigation was carried out to work

out the response of different hyacinth cultivars to scooping and success of propagule formation.

2. MATERIALS AND METHODS

"Studies on response of Common Hyacinth (*Hyacinthus orientalis* L.) to scooping technique of propagation on propagule formation" was carried out in the laboratory of Division of Floriculture and Landscape Architecture SKUAST-K Shalimar during year 2019-21.

2.1 Lifting of Bulbs and Scooping

The bulbs of 12-14 size were uplifted from the field in the month of July. Scooping operation was carried out by wounding the base of bulb in such a way to ensure complete removal of basal plate which was followed by treating bulbs with contact fungicides. If the scooped bulbs are not treated with fungicides then it may lead to 75-90% loss as far as propagule formation is concerned. This procedure aimed to entail the complete removal of the basal plate using a spoon shaped or curved bladed knife.

2.2 Incubation and Observations Recorded

Coca peat was used as source of media and bulbs after scooping were placed on this media with scooped portion facing upwards. Moisture of the media was ensured to keep bulbs viable and were kept at 20-25°C temperature under dark conditions for 3 months. 3 months duration leads to the development of sectioning and propagule formation.

2.3 Design and Observations Recorded

Experimental data was analyzed statistically adopting the technique of analysis of variance ANOVA for CRD. Observations were recorded after incubation on days for sectioning, visible



Scoring Scooping

bud formation days, days to bud development, no of bulbils per bulb, bulbil diameter, bud length and bud weight after incubation. The level of significance of treatment mean square at 5% probability was tested against F calculated value.

3. RESULTS AND DISCUSSION

As evident from the results of the investigation minimum days for sectioning after incubation (36.00 days), visible bud formation days (46.50), days to bud development (84.50) resulted with cultivar Yellow stone. Further maximum no of bulbils per bulb(18.90), bulbbil diameter(9.95mm), bud length (2.93 cm) and bud weight(0.38g) after incubation resulted in cultivar yellow stone where as maximum days for sectioning after incubation (47.50 days), visible bud formation days (68.00 days), days to bud development (100.50days) and minimum values for no of bulbils per bulb(13.20), bulbil diameter(8.25mm), bud length(2.33 cm) and bud weight(0.21 g) after incubation resulted in cultivar Gipsy queen. Most of the differences among the treatments for almost all recorded parameters were statistically significant (Table 1). Suh, Jeuno Keun and Lee Jong Suk [1] while working on propagation of *Lilium* reported that genetic response in changes of hormones are closely related to the degree of dormant bulblet formation. Park, Nou Bog [2] reported different response of bulblet formation after incubation by 'Stargazer', *L. longiflorum*, 'Gelria' and *L. lancifolium* species in scales experimentation. Masoodi et al. [3] while working on *Lilium* found rapid multiplication rate of *Lilium* through scaling

and use of media in combination with scales treated with plant growth regulators. Masoodi et al. [4] while working on chipping of daffodils reported even and individual chips of same specie respond different to growth regulators. Alkeyma. H.Y while working on the vegetative propogation of daffodils observed that double scaling method is artificial propogation method which can easily be performed by commercial bulb-flower [5]. Farzad Nazan, while working on Propagation of endemic and endangered *Sternbergia lutea* with a high ornamental value by bulb chipping and plant growth regulators and observed blub chipping method can overcome low natural multiplication rate and growth regulatoirs improve regeneration percentage and quality of bulblets and also positivie effect on bulb chips and propagules [6]. Flint G. J. and P.G. Anderson While working Narcissus propagation by chipping and also effect of a range of plant growth regulators on bulbil yield and length and observed that concentration of plant growth regulators affected bulbil regeneration and also resulted in an increase in number of bulbs [7]. Hartma et al 2002 shows plant propogation principles and practices and also pivotal role of plant propagation in the evolution of plant propogation in human society [8]. Hassey G. while working on Totipotency in tissue explants and callus of some members of the Iridaceae, Amaryllidaceae, Liliacea and provide evidence that monocotyledons are amenable in in vitro culture and regeneration [9]. The above findings are in close association with the current study.

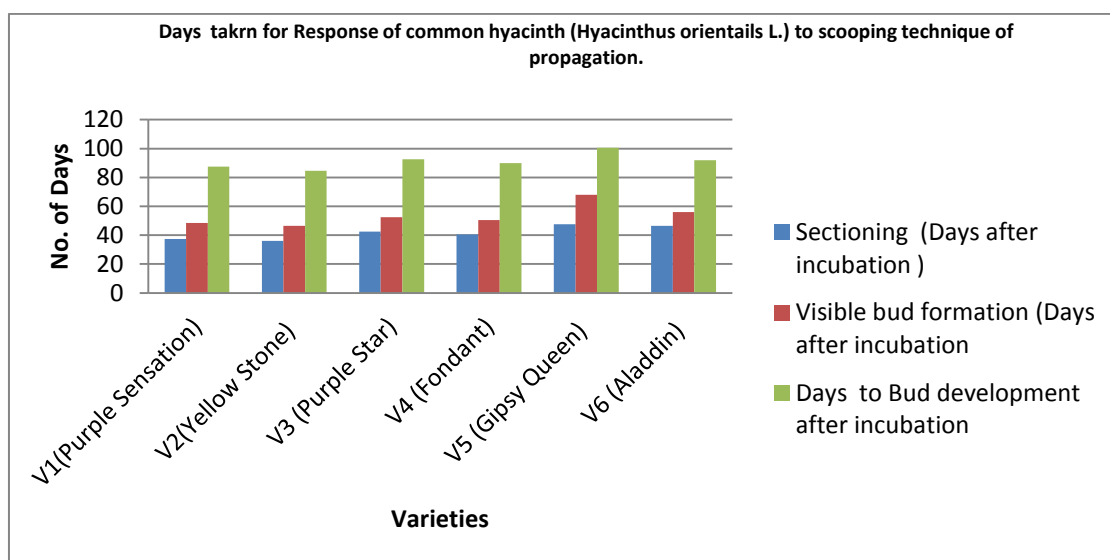


Fig. 1. Days Taken for Response of common hyacinth (*Hyacinthus orientails L.*) to scooping technique of propagation

Table 1. Response of common hyacinth (*Hyacinthus orientalis* L.) to scooping technique of propagation

Cultivars	Sectioning (Days after incubation)	Visible bud formation (Days after incubation)	Days to Bud development after incubation	No. of bulbils Per bulb	Bulbil diameter (mm) at maturity	Bud length (cm)	Bud wt. (g)
V ₁ (Purple Sensation)	37.50	48.50	87.50	18.05	9.85	2.18	0.31
V ₂ (Yellow Stone)	36.00	46.50	84.50	18.90	9.95	2.93	0.38
V ₃ (Purple Star)	42.50	52.50	92.50	15.15	8.55	2.73	0.28
V ₄ (Fondant)	40.50	50.50	90.00	16.62	8.65	2.76	0.26
V ₅ (Gipsy Queen)	47.50	68.00	100.50	13.20	8.25	2.33	0.21
V ₆ (Aladdin)	46.50	56.00	92.00	15.04	8.45	2.42	0.26
CD p≤0.05	1.44	1.98	2.93	0.62	0.15	0.25	0.02

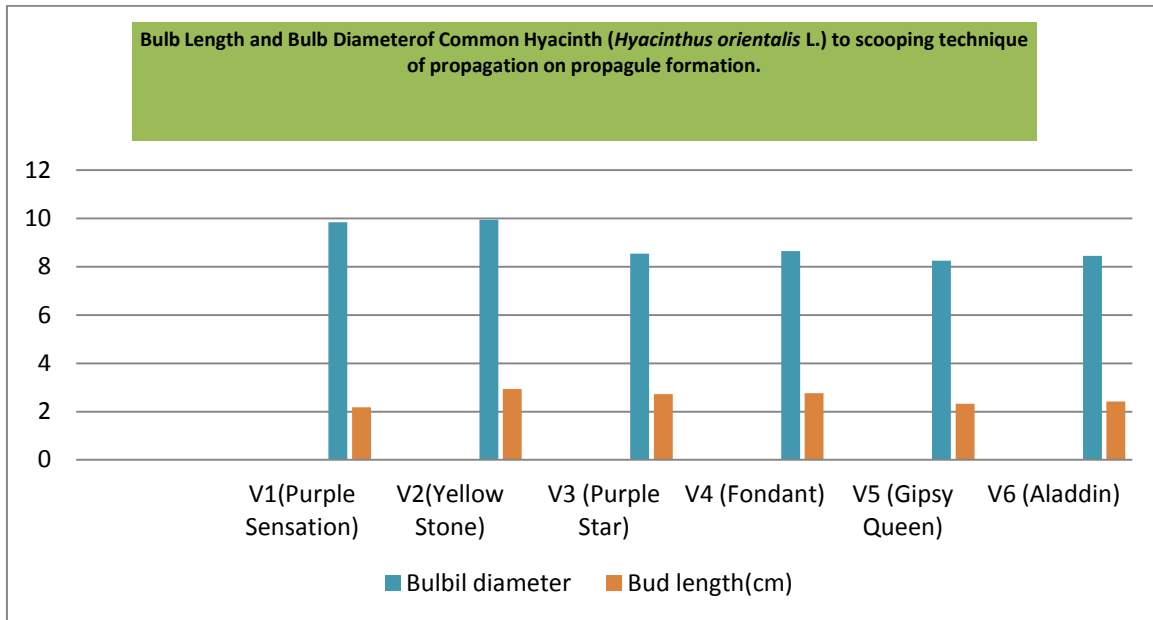


Fig. 2. Bulb Lenth and Diameter of common hyacinth (*Hyacinthus orientails* L.) in response to scooping technique of propagation

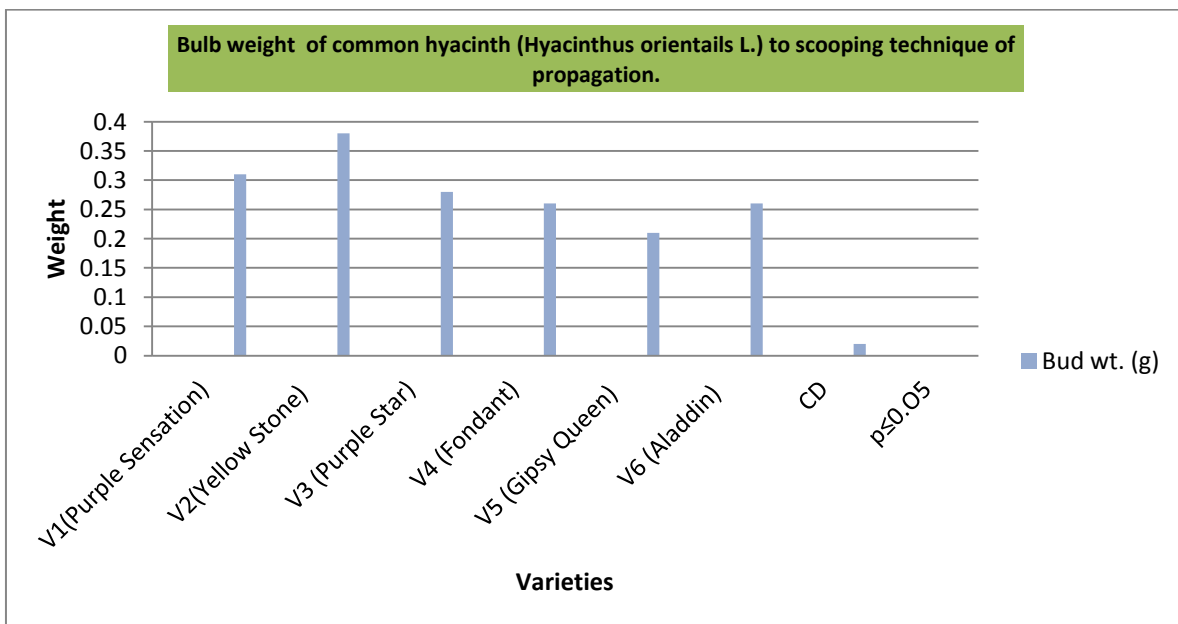


Fig. 3. Bulb weight of common hyacinth (*Hyacinthus orientails* L.) in response to scooping technique of propagation

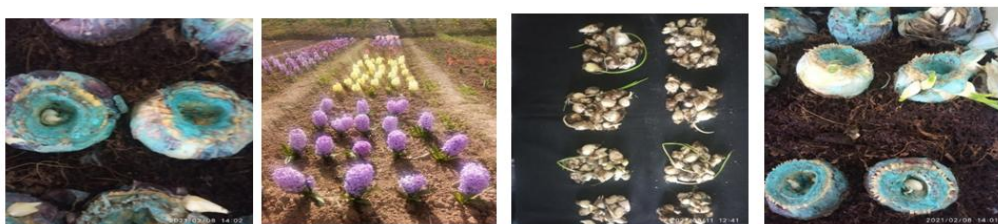


Fig. 4. Experimental view

4. CONCLUSION

Coca peat was used as source of media and bulbs after scooping were placed on this media with scooped portion facing upwards. Moisture of the media was ensured to keep bulbs viable and were kept at 20-25°C temperature under dark conditions for 3 months. 3 months duration leads to the development of sectioning and propagule formation. and other Observations were recorded after incubation on days for sectioning, visible bud formation days, days to bud development, no of bulbils per bulb, bulbil diameter, bud length and bud weight after incubation. The level of significance of treatment mean square at 5% probability was tested against F calculated value. Study conducted on the response of Hyacinth cultivars to scooping concluded that yellow stone resulted with maximum success ratio among Hyacinth cultivars. Scooping method proved efficient in propagation of hyacinth which can help in better returns.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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