



Effect of Scale Position and Medium Type on Bulblet Production of *Hippeastrum* (*Hippeastrum* × *johnsonii*) with Twin Scaling Method

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Introduction: Amaryllis is grown as pot outdoor plant and cut flower. Generally, this ornamental plant propagates by seed, suckers and scale cutting. Propagating by seed is not commercial and often used to produce new varieties. On the other hand, number of bulblets per mother bulb is very low under normal condition. Besides each bulb produces only 2 or 3 bulblets in a growing season and they become mature and produce flower stalk after 2 to 3 years. In some cases bulbs have no capacity to produce bulblet. Therefore, one of the strategies for shortening the growth period of the plant is to improve the traditional methods of plant propagations.

Materials and Methods: This study was done as a factorial experiment in a completely randomized design with 7 replications to evaluate the effects of medium and position of twin scales in mother bulbs on propagation of bulblets, in order to increase the rate of propagation of this ornamental plant. To measure wet and dry weight of explants, 3 replicates were used. For propagation, bulbs were cut radially into 12 equal pieces, so that each piece was contained a part of the basal plate. To evaluate the effects of position of twin scales in mother bulbs, pieces were divided as twin scales and classified in 5 groups, so that the outermost twin scales was grouped in class 1 and the innermost twin scales was grouped in class 5. After that, the scale cuttings were dipped in 0.1 % carbendazim solution for 25 minutes and then surface water were dried using sterilized tissue paper. Media that used in this study were sand, perlite, vermiculite, Peat moss and cocopeat. For removing possible contamination from the media, all media were autoclaved for 30 minutes at 121 °C. Then twin scales cuttings were cultured in vented transparent plastic containers that filled with different media and were kept in a growth chamber at 25 °C and 16 hours lighting. Number of produced bulblet, bulblet diameter, root number, root length, fresh and dry weight of plants and browning rate of scales were recorded at the end of the experiment.

Results and Discussion: The results showed that medium and twin scale position in the mother bulb had a significant effect on the quality produced bulblet. The highest fresh weight of bulblet (1.58 g), bulblet dry weight (0.21 g) and the maximum diameter of the produced bulblet (1.5 cm) were obtained in the outermost twin scales and peat moss medium. Analysis of variance showed that the effect of culture medium on the number and length of produced leaf was significant ($p < 0.01$). Among the different types of substrates, peat moss and cocopeat media produced the highest (1.14) and the lowest (0.12) number of leaf, respectively. Significant differences were observed among media in terms of leaf length and the maximum length of leaves (5.82 cm) in peat moss medium. However, other media did not show significant differences to each other. Type of medium and scale position in the mother bulb had a significant effect on the weight of regenerated plantlets ($p < 0.01$), and the maximum and minimum weight of regenerated plantlet were observed in peat moss medium, twin scale group 1 (3.60 g), cocopeat medium and twin scale group 5 (0.66 g), respectively. There were high significant decrease in the weight of regenerated plantlets in peat moss medium by changing the position of scale from group 2 to 3. Generally, in all media, outermost scales produced larger and more bulky plantlets. Evaluating the effects of scale position and type of medium on root dry weight showed that the interaction of these two factors had significant effect on root dry weight. Outermost twin scales cultured in peat moss medium showed the highest (0.0135 g) root dry weight and innermost twin scale cultured in perlite medium showed the lowest (0.0010 g) value of it. It can be concluded that twin scales prepared from outermost layers of mother bulb had greater areas

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and so had more stored nutrition. Therefore their capacity for producing plantlet was higher in comparison to innermost layers. Based on the results of this study, for obtaining the best quality of produced bulblet, application of the outermost twin scales is recommended.

Keywords: Bulblet diameter, Cuttage, Multiplication rate, Peat moss

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