

Development of Ornamental Seedlings and Cuttings for Hydroponics Using Different Substrates

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Abstract : Hydroponics represents an extraordinary promising technique if used efficiently in arid regions where water resources are extremely scarce where a great portion of the used water should be recycled and saved. Available research publications studying the production of seedlings for such purpose are limited. This research paper focuses on investigating the effect of using various substrate materials on the development of seedlings for ornamental plants. Bermuda grass, Petunia (Compacta Enana Rosa) and Epipremnum aureum are used widely in landscape design. Bermuda is used as a turf grass; Petunia is used as a flowering plant and Epipremnum aureum as an indoor ornamental plant in hydroponics. Three substrate materials were used to germinate and propagate the first two and the cuttings of the third one. Synthetic sponge (Polyurethane sponge), Rockwool and sterilized cotton were used as the substrate material in each case where an experimental water-circulating apparatus was designed and installed to execute the test. An experimental setup of closed hydroponic apparatus was developed to carry out the experiment equipped with water recycling circuit and an aeration mechanism pumping air in reservoir in order to increase oxygen levels in the recycled water. Water pumping was programmed in different regimes to allow better aeration for seeds and cuttings under investigation. Results showed that Bermuda grass germinated in Rockwool reached a germination rate of 70% while it did not exceed 50% when sponge and medically treated cotton were used after 15 days. On the other hand the highest germination rate of Petunia was observed when treated cotton was used where it recorded about 30% while it was 22%, and 7% after 20 days where Rockwool and sponge were utilized respectively. Cuttings propagation of Epipremnum aureum developed the highest number of shoots when treated cotton was used where it gave 10 shoots after 10 days while it gave just 7 shoots when Rockwool and sponge were used as the propagation substrate.

Keywords : hydroponics, germination, seedlings, cuttings

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