

Hygro-Greening Trial Using a Floating Garden for Water Filtration

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INTRODUCTION

In order to clean the surface of bodies of water in urban areas, a new system of hygro-greening was trialled to improve pond and stream amenities in and around urban areas, and also to purify the water by absorbing excess nutrients. In this concept a floating garden was used to clean the water, and also improve the social environment.

MATERIALS AND METHODS

Plant Height Control. On a floating garden, controlling the weight of the plants in order to keep the garden afloat is a serious problem. In order to control the height to which the plants would grow on the floating pad, trials were carried out on tulip bulbs. They were dipped in various PGR solutions (Uniconazole at 25 ppm, 50 ppm, and 100 ppm) overnight. Prior to this treatment, the bulbs had been cold stored for a month at 5C to break dormancy.

After PGR treatment, the bulbs were planted in a floating pad. The dates of flower stalk emergence and flower opening were recorded. The length of flower stalk, the length and width of outer perianth, and the longest leaf were measured.

Water Clean Up. The floating garden pad was placed on the water and irrigated twice each day for 15 min by means of a mini water pump. To re-create the polluted water, the same concentration of Anon's solution was used as found in naturally occurring bodies of water. The initial pH value was 7.2 and the EC value was 5.2 ms/cm, and the concentration of NO₂-N exceeded 0.3 mg liter⁻¹.

Floating garden pads were planted with begonias, azaleas, and gardenias. Their concentration of NO₂-N was measured after 2 and 4 weeks using a convenient measuring kit for NO₂-N (Sibata Co. Ltd.).

RESULTS AND DISCUSSION

Plant Height Control. The stalk length of the tulips was greatly decreased by the PGR treatment. In addition, this treatment also resulted in a delay in flowering time and a decrease in the size of petals and leaves.

Water Quality. The concentration of NO₂-N in the solution decreased in 4 weeks. Plant growth was normal and was not affected by the polluted water.

Therefore, this system of hygro-greening can be recommended as a method of cleaning water by the use of a living (green) filter.