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***In vitro* screening of beet (*Beta vulgaris* L.) germplasm for water stress induced by Polyethylene Glycol**

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Abstract

Kalpitiya is a key area for vegetable production and beet is one of the dominant crops cultivated there. Low soil water retention due to the permeable sandy soil and evaporation due to high temperature and windy condition are major constraints for crop cultivation that is surmounted by excessive irrigation using groundwater. The introduction of beet varieties which are tolerant to low water availability could be a long-term solution. Three commercial beet varieties; Red Atlas, Chariot, and Maravilla Andina were screened for adaptability to low water availability by adding Polyethylene glycol 6000 (PEG 6000) into the *in vitro* culture medium. In the two-factor factorial experiment, varieties were tested with four PEG levels: 0, 20, 40, and 60 g/L. The Completely Randomized Design was used with 30 replicated seedlings. Seedling growth parameters including the number of leaves, the number of roots, shoot dry weight, and root dry weight were recorded 30 days after sub-culturing and the Analysis of Variance was performed to analyze the data. The results revealed that the early vegetative growth of plants was significantly impacted by artificially induced water stress levels in the beet varieties where an interaction effect was observed in some parameters. The number of leaves was significantly reduced with the increased stress in all three varieties. The number of roots was increased in the variety Chariot at the 60 g/L PEG level whereas Maravilla Andina and Red Atlas showed a comparable number among the different levels. The shoot dry weight was comparable in the tested PEG levels in Chariot and Maravilla Andina. In Red Atlas and Chariot, the root dry weight was decreased and in Maravilla Andina, the parameter was comparable at all four levels. Maravilla Andina resulted in comparable performance among the different water stress levels for the number of roots, shoot dry weight and root dry weight whereas the other two varieties showed a decrease in two parameters. Therefore, Maravilla Andina can be identified as the potential variety for adapting to the stress condition occurs due to low water availability. However, further experimentation is required for identifying the most adaptable variety.

Keywords: Beet, *In Vitro*, Kalpitiya, Polyethylene Glycol, Water Stress

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