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**Effect of temperature on early development of in vitro raised *Beta vulgaris* varieties**

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**Abstract**

*Beta vulgaris* is one of the major vegetable crops cultivated in Kalpitiya, one of the significant vegetable-growing regions in Sri Lanka. High daytime temperatures basically above 30°C reduce the productivity of the crop. Farmers tend to cool down the cropping land-using irrigation systems by over-utilizing the groundwater, that causes the intrusion of seawater into the groundwater table in the peninsula. In this context, the selection and recommendation of beet cultivars that can tolerate higher temperatures could be a long-term solution to continue cultivation with limited water utilization. The present study was conducted to screen three commercially grown beet varieties (Maravilla Andina, Royal Red, and Red Ace) under *in vitro* conditions using two temperature levels, 34 °C for 8 h followed by 28 °C for 16 h provided in a growth chamber and the seedlings maintained at 28 °C continuously (control). Murashige and Skoog medium was used as basal medium. The factorial experiment was arranged in a Completely Randomized Design with 30 replicates. All the cultures were maintained at 2500-3000 lux light intensity and 16 h photoperiod. After 45 days, the number of leaves, number of fibrous lateral roots, shoot dry weight and total root dry weight were recorded as growth parameters. The data were subjected to analysis of variance. The temperature level has a significant effect on seedling growth ( $p < 0.05$ ), except for root dry weight and varieties showed significant differences except for shoot dry weight ( $p < 0.05$ ). Among the varieties, Maravilla Andina showed significantly higher growth performance under higher temperature level for shoot and root dry weight ( $p < 0.05$ ) where the other two parameters had a significant reduction. All the parameters were significantly reduced in Royal red. The same happened in Red ace except for number of roots where a comparable performance was observed. Based on the results Maravilla andina has more potential for tolerating higher temperature levels. However, further studies are required for making a recommendation for the farmers.

**Keywords:** *Beta vulgaris*, *In vitro* screening, Kalpitiya, Temperature stress

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