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Identification of the adaptable chili (*Capsicum annuum* L.) varieties for a high-temperature level under *in vitro* condition

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Chili (*Capsicum annuum* L.) is one of the most significant cash crops grown in the Kalpitiya peninsula where high temperature is one of the major constraints. Extensive irrigation is practiced to overcome this problem. And overutilization of groundwater creates several social and economic problems. Cultivation of the chili varieties tolerant to higher temperature levels is a potential approach to minimize the problem. Thus, four commercial varieties (Galkiriyagama, MICH HY2, Vijaya F1, Lanka hot) were screened for adaptability to a high-temperature level under *in vitro* conditions. The temperature-stress during the hot hours in Kalpitiya region was given by exposing the plants to a high-temperature level (34 °C) for 8 h, followed by 28 °C for 16 h representing the cool hours. The average optimal temperature for chili *i.e.* 28 °C was used as the control and provided throughout the day. Two factor factorial in a Completely Randomized Design was used with 25 seedlings per treatment. After 30 days, the number of leaves and roots, and the length of shoots and roots were recorded. Analysis revealed that the major factors were significant while the interaction effect was not significant. The temperature levels significantly affected all the parameters ($p<0.0001$) where a reduction was observed at 34 °C except in shoot length that gave a comparable performance. A significant difference was observed among the varieties for all the parameters ($p<0.05$) except for the shoot length. The effect of temperature on the parameters of each variety indicated their potential for adapting to higher temperature levels. In MICH HY2 and Vijaya F1, all the growth parameters were comparable at the tested temperature levels except the root length ($p<0.05$) where a reduction was observed. Lanka hot showed a significant difference only in the number of roots ($p<0.0001$). A significant reduction was observed in all the parameters of the variety Galkiriyagama ($p<0.05$) except the root length. Based on the results MICH HY2, Lanka hot and Vijaya F1 showed the tolerance to the tested temperature level.

Keywords: Adaptability, *Capsicum annuum* L., *in vitro,* temperature stress, tolerance

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