

Heat and drought stress can alter the physiology of Maratheftiko local Cyprian grapevine variety

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Abstract

The impact of Climate Change (CC) in grapevines is of great concern and several international and indigenous cultivars are examined for their adaptation to CC. In the present study we examined the short-term effects of light and moderate drought stress (DS) as well as heat stress (HS) on physiological and biochemical attributes of Maratheftiko cuttings (local red cultivar). Leaf photosynthetic rate was decreased with DS and HS after 8 and 20 d. The leaf stomatal conductance was decreased in case of DS after 8 d, while no differences could be found due to the heat stress. Total phenols and flavonoids content and antioxidant capacity (FRAP and ABTS) were increased and seemed to be dependent on the relevant DS, HS and the period of stress exposure. No main differences could be found in chlorophyll fluorescence. Leaf K content increased because of the DS at 4 d but decreased at HS after 20 d. Nitrogen did not differ among treatment and phosphorous was mainly affected by the HS. Leaf hydrogen peroxide and lipid peroxidation increased after 8 d of DS, and this resulted in the increase of antioxidant enzymes activity. Overall, Maratheftiko performance against environmental stresses is mainly related to the short-term DS than HS.

Keywords: climate change; drought stress; heat stress; enzymes activity; antioxidants