

Submitted Abstract

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Abstract

The effects of climate change in the Australian alps are already apparent, with warming temperatures and declining snowfalls. While severe soil moisture deficits can occur during the drier summer months, periods of drought are expected to increase in frequency and severity, as are summer heatwaves. These increasing extreme climate events are of particular concern as it is the extremes, not averages, that determine species distributions. There is no knowledge of heat tolerances amongst Australian alpine plants. Further, the co-occurrence of stress factors (such as heat and drought) is frequently observed in nature, but they are infrequently studied. Indeed, how alpine plants respond to simultaneous abiotic stressors is largely unknown - a major concern, given future climate predictions for the Australian alps. Our objective was to determine the independent and interactive effects of drought and heatwave exposure on thermal tolerance thresholds and recovery within a common Australian alpine grass species. We found that both heat stress exposure and water deficits had an additive effect in driving acclimation of heat tolerance, and that water deficits improved freezing tolerance. Rapid growth following heat and drought treatments indicate a high capacity for acclimation to and recovery from combined abiotic extremes.