

Title: The alleviating effect of elevated CO₂ on heat stress susceptibility of two wheat (*Triticum aestivum* L.) cultivars

Session: Plant response and adaptation to abiotic stress

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This study analysed the alleviating effect of elevated CO₂ on stress-induced decreases in photosynthesis and changes in carbohydrate metabolism in two wheat cultivars (*Triticum aestivum* L.) of different origin. The plants were grown in ambient (400 µl l⁻¹) and elevated (800 µl l⁻¹) CO₂ with a day/night temperature of 15/10 °C. At the growth stages of tillering, booting and anthesis, the plants were subjected to heat stress of 40 °C for three continuous days. Photosynthetic parameters, maximum quantum efficiency of photosystem II (PSII) photochemistry (F_v/F_m) and contents of pigments and carbohydrates in leaves were analysed before and during the stress treatments as well as after one day of recovery. Heat stress reduced P_N and F_v/F_m in both wheat cultivars, but plants grown in elevated CO₂ maintained higher P_N and F_v/F_m in comparison to plants grown in ambient CO₂. Heat stress reduced leaf chlorophyll contents and increased leaf sucrose contents in both cultivars grown at ambient and elevated CO₂. The content of hexoses in the leaves increased mainly in the tolerant cultivar in response to the combination of elevated CO₂ and heat stress. The results show that heat stress tolerance in wheat is related to cultivar origin, the phenological stage of the plants and can be alleviated by elevated CO₂. This confirms the complex interrelation between environmental factors and genotypic traits that influence crop performance under various climatic stresses.