Title: The alleviating effect of elevated CO_2 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 CO_2 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}) CO_2 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 CO_2 maintained higher P_N and F_v/F_m in comparison to plants grown in ambient CO_2. Heat stress reduced leaf chlorophyll contents and increased leaf sucrose contents in both cultivars grown at ambient and elevated CO_2. The content of hexoses in the leaves increased mainly in the tolerant cultivar in response to the combination of elevated CO_2 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 CO_2. This confirms the complex interrelation between environmental factors and genotypic traits that influence crop performance under various climatic stresses.