WARMING EFFECTS IN PHOTOPROTECTION AND PHOTO-OXIDATIVE STRESS MARKERS IN THE TWO UNIQUE ANTARCTIC VASCULAR PLANTS

EFECTOS DEL CALENTAMIENTO EN LOS MARCADORES DE FOTOPROTECCIÓN Y ESTRÉS FOTOOXIDATIVO EN LAS DOS ÚNICAS PLANTAS VASCULARES ANTÁRTICAS

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The Antarctic Peninsula has experienced a rapid warming in the last decades. How antarctic vascular plants (Deschampsia antarctica and Colobanthus quitensis) are responding to this accelerated warming is important to predict their success in the future warming scenario. Since redox status imbalance could be trigger under rises temperatures, we experimentally warmed a patch of Antarctic tundra using open top chambers (OTC) and evaluated its effects in a set of photoprotection and oxidative stress markers in plants growing in OTC compared to Open Areas (OA) in a natural population of the Maritime Antarctic during the growing season. In both conditions plants were able to acclimate and showed absence of photoinhibition. D. antarctica plants decreased lipid membrane damage and abscisic acid contents, as well as xanthophylls and anthocyanins in OTC compared to OA, as well as C. quitensis plants reduced photoprotective molecules levels in OTC. Since both species showed an absence of oxidative damage and decreased protective mechanisms under rises temperatures, it is suggested that Antarctic vascular species are currently activating acclimation mechanisms to the prevailing warming effects and will be able to prevent, at least to some extent, photoinhibition to the photosynthetic apparatus under a climate change scenario.

INTERACTIVE EFFECTS OF TEMPERATURE, ELEVATED CO2 AND WATER DEFICIT ON PHYSIOLOGICAL COMPONENTS OF SUNFLOWER

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The increase in atmospheric CO2 concentration and climate change generate uncertainties on its effects on sunflower (Helianthus annuus L.) plants. To evaluate these effects, two cultivars (Aguará 04 and Aguará 06) were grown in a growth chamber in two environmental conditions: CO2 - 350 µmoL moL-1/temperature - 21ºC/18ºC (day/night) and CO2 - 800 µmoL moL-1/temperature - 31ºC/28ºC (day/night). The photoperiod was 14 hours and the plants received two amounts of water: control [70% of field capacity (FC)] and water deficit (20% of FC), the latter starting when the fourth leaf was fully expanded. The photosynthetic rate (A), internal CO2 (Ci), stomatal conductance (gs), transpiration rate (Trmmol), and dark respiration (DR) were determined on the sixth leaf with the portable photosynthesis analyzer (LI 6400XT, LI-COR). SPAD index and shoot dry weight (SDW) were also evaluated. In the condition of high CO2 and temperature, there was an increase in A, Ci, gs, Trmmol and DR, not observed for the SDW, both in the water deficit and control, whereas the SPAD index was higher in plants under water deficit independent of the environmental conditions.

FLUORESCENCE AND CHLOROPHYLL INDEX IN IRRIGATED RICE PLANTS CULTIVATED UNDER HIGH CO2

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The increase of atmospheric CO_2 has caused changes in plants physiology such as alterations in functional status of thylakoid membranes and nutritional condition. The objective of this work was to evaluate the maximum quantum efficiency of FSII (Fv/Fm), chlorophyll index and nitrogen balance in irrigated rice plants grown in open top chambers under two concentrations of CO_2: 400 ppm (CO_2 environment) and 700 ppm (high