The response of four winter wheat (*Triticum aestivum* L.) varieties to field water deficit: leaf anti-oxidative protection and proteolytic activity

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Introduction: Drought is one of the most significant factors that limit plant productivity. Oxidative stress is a secondary event in many unfavorable environmental conditions. Intracellular proteases have a role in the metabolism reorganisation and nutrient remobilization under stress. In order to understand the relative significance of oxidative stress and proteolysis in the yield reduction under drought, four varieties of *Triticum aestivum* L. with different field drought resistance were examined.

Methods: A two-year field experiment was conducted. Analyses were performed on the uppermost leaf of control plants and plants under water deficit at the stages most critical for yield reduction under drought (from jointing till milk ripeness). Leaf water deficit and electrolyte leakage, malondyaldehyde level, activities and isoenzymes of superoxide dismutase, catalase and peroxidase, leaf protein content and proteolytic activity were studied. Yield components were analyzed.

Results: A general trend of increasing the membrane instability and accumulation of lipid hydro peroxides was observed with some differences among varieties, especially under drought. The anti-oxidative enzyme activities were progressively enhanced, as well as the azocaseinolytic activities. The leaf protein content decreased under drought at the last phase. Differences among varieties were observed in the parameters under study. They were compared to yield components` reduction under water deprivation.

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Activity of some antioxidative enzymes and the level of H_2O_2 in *Viola tricolor* L. plants originating from sites contaminated with heavy metals

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The ability of plants occuring during spontaneous succession on heavy metal rich soils to adapt to extreme conditions requires their fast changing. Thus Polish zinc-lead spoil heaps in the Olkusz area are among exellent sites to examine microevolutionary processes (Bone and Farres 2001). *Viola tricolor* L. is commonly spread all over the Polish heaps (Dobrzańska 1955). This plant belong to the family *Violaceae* which includes numerous ecological group of plant species called metallophytes. *Viola tricolor* from Bolesław heap is expected to be zinc accumulator (Siuta 2006, unpubl.). The interesting problem being undertaken recently is the cellular mechanisms which allow hyperaccumulators of heavy metals to handle with extreme metal concentration in their tissues (Wang *et al*. 2004).

Leaves and roots from, altogether four populations of *Viola tricolor* were analyzed; three from contaminated soils and one from uncontaminated one. Spectrophotometric measurement of H_2O_2 content, POD, APX, CAT activity and native electrophoresis on polyacrylamide gels of SOD, CAT were performed. The advantage of these studies