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PHOTOSYNTHETIC AND GROWTH RESPONSES OF Populus CLONES I-214 AND ERIDANO TO ELEVATED Zn CONCENTRATIONS

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In this study the effects of two different toxic levels of Zn were analysed in two poplar clones (Populus x canadiensis euramericana Mönch.- clone I-214 and P. deltoides x maximowiczii – clone Eridano) commonly used in poplar plantations in Italy.
Rooted cuttings were treated for three weeks in hydroponic culture with 0 (control), 1mM and 5mM zinc sulphate. Metal exposure gave rise to different growth responses and biomass production according to the Zn concentration and the clone type. Moreover, gas-exchange parameters (net photosynthesis, stomatal conductance, transpiration and water use efficiency), chlorophyll fluorescence (maximum and effective quantum yield and energy dissipation as heat (NPQ) and total chlorophyll content were particularly affected by the highest Zn concentration. The two clones exhibited different morpho-physiological changes as strategies for the maintenance of suitable photosynthetic activity and water relations. Analysis of the zinc distribution in shoots, roots, young and old leaves in the different treatments put in evidence the absorption and accumulation capability of the studied clones.
Results are discussed on the basis of the possible utilisation of the two poplar clones for the restoration of metal-contaminated sites.