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Chilling-induced physiological, anatomical and biochemical responses in the leaves of *Miscanthus* × *giganteus* and maize (*Zea mays* L.).

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Abstract

Miscanthus × *giganteus* and *Zea mays*, closely-related C₄ grasses, originated from warm climates react differently to low temperature. To investigate the response to cold (12-14°C) in these species, the photosynthetic and anatomical parameters as well as biochemical properties of the cell wall were studied. The research was performed using *M. giganteus* (MG) and two *Z. mays* lines differentiated for chilling-sensitivity: chilling-tolerant (Zm-T) and chilling-sensitive (Zm-S). The chilled plants of Zm-S line demonstrated strong inhibition of net CO₂ assimilation and a clear decrease in F_v'/F_m' , F_v/F_m and ϕ_{PSII} , while in MG and Zm-T plants these parameters were almost unchanged. The anatomical studies revealed that MG plants had thinner leaves, epidermis and mesophyll cell layer as well as thicker cell walls in the comparison to both maize lines. Cold led to an increase in leaf thickness and mesophyll cell layer thickness in the Zm-T

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