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Chrysanthemum morphology, photosynthetic efficiency and antioxidant capacity are differentially modified by light quality

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Abstract

The effect of light quality on leaf morphology, photosynthetic efficiency and antioxidant capacity of leaves that fully developed under a specific spectrum was investigated in *Chrysanthemum* cv. Four light treatments were applied at 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$ and a photoperiod of 14 hours using light-emitting diodes, which were 100% red (R), 100% blue (B), 75% red with 25% blue (RB) and white (W), respectively. Intraspecific variation was investigated by studying the response of eight cultivars. Overall, red light significantly decreased the leaf area while the thinnest leaves were observed for W. Chlorophyll content and Chl a/b ratio was highest for W and lowest under R. B and RB resulted in the highest maximum quantum yield (F_v/F_m) and quantum efficiency (Φ_{PSII}). A negative correlation between heat dissipation (NPQ) and Φ_{PSII} was found. Blue light induced the highest hydrogen peroxide content, which is a proxy for total ROS generation, followed by W and RB while low contents were found under R. The antioxidative response was not always correlated with hydrogen content and differed depending on the light quality treatment. Blue light enhanced the proline levels, while carotenoids, total flavonoid and phenolic compounds were higher under W. Intraspecific variation in the responses were observed for

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