

# Photochemical and Antioxidant Responses in the Leaves of *Xerophyta viscosa* Baker and *Digitaria sanguinalis* L. under Water Deficit

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In this study, photochemical and antioxidant responses of the monocotyledonous resurrection plant *Xerophyta viscosa* Baker and the crab grass *Digitaria sanguinalis* L. under water deficit were investigated as a function of time. Water deficit was imposed by withholding irrigation for 21 d. Gas exchange and chlorophyll a fluorescence analyses indicated that the dehydration treatment caused photoinhibition in both species. The reduction in the photosynthesis rate in both species during water deficit probably contributed to the decline in the photochemical efficiency of PSII and electron transport rate. However, the stomatal conductance of both species did not change during treatment whereas the intercellular CO<sub>2</sub> pressure increased after 10 d of water deficit treatment. These observations could be related to non-stomatal limitations. The increasing net transpiration rate of both species may have contributed to leaf cooling because of water limitations. Prolonged water deficit resulted in photosynthetic pigment chlorophyll (a + b) and carotenoids content loss in only *D. sanguinalis*. Both species especially *D. sanguinalis* had increased the level of anthocyanin after 15 d of treatment, possibly to prevent the damaging effect of photooxidation. The total SOD activity of *D. sanguinalis* was significantly different from *X. viscosa* during the treatment. The total peroxidase activity in *D. sanguinalis* was significantly higher than in *X. viscosa*. *X. viscosa* acclimated to water deficit with no ultimate apparent oxidative damage due to endogenous protective mechanisms of resurrection. In case of *D. sanguinalis*, water deficit induced considerable stress and possibly caused some oxidative damage, despite the upregulation of protection mechanisms.

*Key words:* *Xerophyta viscosa*, *Digitaria sanguinalis*, Water Deficit