Paraheliotropism can protect water-stressed bean (Phaseolus vulgaris L.) plants against photoinhibition

Pastenes, Claudio

Porter, Victor

Baginsky, Cecilia

Norton, Peter

González, Javiera

In order to estimate the importance of leaf movements on photosynthesis in well-watered and water-stressed field grown bean cultivars (Arroz Tuscola (AT), Orfeo INIA (OI), Bayos Titan (BT), and Hallados Dorado (HD)), CO2 assimilation, leaf temperature, and capacity for the maximum quantum yield recovery, measured as Fv/Fm, were assessed. Leaf water potential was lower in water-stressed compared to control plants throughout the day. Water status determined a decrease in the CO2 assimilation and stomatal conductance as light intensity and temperature increased up to maximal intensities at midday. Both parameters were lower in stressed compared to control plants. Even though high light intensity and water-stress induced stomatal closure is regarded as a photoinhibitory condition, the recovery of variable to maximal fluorescence (Fv/Fm) after 30 min of darkness was nearly constant in both water regimes. In fact, higher values were observed in OI and AT when under stress. Photochemical and