Estimation of the sensitivity to photoinhibition in Striga hermonthica-infected sorghum

ABSTRACT

Sensitivity to photoinhibition was assessed in sorghum infected with the angiosperm root parasite Striga hermonthica and in uninfected sorghum plants, at four times during the development of the host-parasite association. Photoinhibition was induced by exposing either leaf discs or intact leaves to a photosynthetic photon flux density of 2000 ε mol m-2 s-1 for 4 h. The Inhibition of apparent quantum yield (ū a) and photosynthesis in high light (A1500) were assessed in leaf discs using an oxygen electrode and the recovery of these from photoinhibition was followed in intact leaves using an infra-red gas analyser. From soon after attachment of the parasite, infected sorghum plants had a lower A1500. During the period when Striga induced a lowering of A1500, ū a was more sensitive to photoinhibition in Striga-infected plants. However, at the same time, the high-light-induced inhibition of A1500 was similar in Striga-infected and uninfected plants. Recovery of both ū a and A1500 was incomplete after 6 h and the time-course of recovery was similar in Striga-infected and uninfected plants. The results indicate that Striga-infected plants were more sensitive to photoinhibition and that photoinhibition was primarily due to damage to electron transport/photophosphorylation and not disablement of the recovery processes.

Keyword: Parasitic plants; Photoinhibition; Quantum yield; Recovery from photoinhibition