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AZOLLA: DISTRIBUTION OF N₂ FIXATION AND PHOTOSYNTHESIS

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Distribution of the N₂ Fixation and Photosynthetic Activities in the *Azolla-Anabaena* Symbiosis

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Abstract

Photosynthetic and nitrogenase activities of *Azolla filiculoides*, *A. caroliniana* and *A. pinnata* var. *imbricata* were monitored by the photoacoustic and acetylene reduction techniques respectively, comparing different segments of the *Azolla* fronds. Both activities were very low in the apical parts, indicating that these processes are still not fully developed in them. The photosynthetic oxygen evolution quantum yield and photochemical energy storage were significantly higher in the middle segments compared to the lower segments. In contrast, specific N₂ fixation activity was much higher in the lower segments than in the middle segments, while the heterocysts abundance was similar. These results demonstrate an unequal distribution of the two major metabolic processes along the stem axis of the *Azolla* plant, and are consistent with the idea that part of the photosynthates synthesized in the middle segments may be translocated to support the high N₂ fixing activity in the lower segment.