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Clone-dependent germination and post-dormancy growth of ABA-induced turions in Spirodela polyrhiza

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Turions, the vegetative dormant organs, are vital for some duckweed species, enabling their survival under harsh conditions. We studied the turion germination and then sprouting of four Spirodela polyrhiza clones. Turions were collected from 7-day old growth cultures treated by 0.5 μM abscisic acid (ABA) in Steinberg medium. Germination tests were performed under continuous light for 7 days, immediately after harvesting the turions or after cold storage in darkness. The growth and photosynthetic activity of turion-derived fronds was compared with those developed in non-ABA treatment, culture-derived fronds. Germination capacity of turions was clone-specific. Immediately after harvesting, turions of UD0402 and UD0408 germinated readily at 81.2% and 73.3%, whereas those of UD0401 and UD0407 germinated poorly at 8.7% and 0.0%, respectively. The cold storage influenced differently the turion germination: increased largely in UD0401, moderately in UD0407 while decreased in UD0402 and UD0408.Turion-derived fronds of UD0401, UD0402, and UD0407 showed greater frond area, and lower LMA and LDMC than the culture-derived fronds, suggesting reserve-supported area expansion in the former ones, rather than increasing dry-matter accumulation. However, there were no differences in these traits between the two frond types of UD0408. Independently of turion storage duration, the turion-derived fronds showed mostly comparable physiological traits to culture-derived fronds. Consistently, the chlorophyll fluorescence results showed that, turion-derived fronds reached similar levels of photosynthetic activity. Overall, the results show that exogenous 0.5 μM ABA was able to trigger turions formation of all studied clones, but the germination success depended on the clone and the storage duration.

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Keywords

S.polyrhiza; ABA; turion-storage; germination; post-dormancy.

References

(Ley et al. 1997) (Oláh et al. 2021) (Appenroth and Ziegler, 2008)

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