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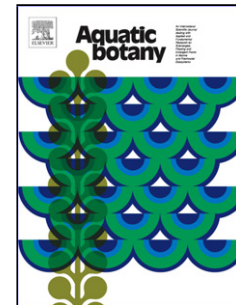
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Historical biogeography of river-weeds (Podostemaceae)

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Highlights ►

•The origin of Podostemaceae in America is suggested by a Maximum Likelihood analysis. ► •Comparative morphology suggests that the family appeared in Asia. ► •A few uni- or bidirectional intercontinental dispersals of each subfamily shaped the biogeography of the continents. ► •Dispersal subsequent to diversification has probably led to paraphyletic taxa in the region. ► ►

Abstract

Podostemaceae are unusual aquatic angiosperms growing as haptophytes in extreme habitats, i.e., rapids and waterfalls. They originated with an ecological shift from terrestrial life, followed by dispersal and diversification. It has been argued that the Tristichoideae originated on the Gondwana and diversified on the drifting continents. We aimed to test this hypothesis, focusing on the place of origin and the frequency and direction of dispersal. We used a Maximum Likelihood (ML) analysis of phylogenetic relationships and comparative morphology for Podostemaceae. The results of the ML analysis showed that the family originated and then diverged to subfamilies Podostemoideae and Weddellinoideae in America, while the Tristichoideae most likely originated in Asia. Comparison with the sister family Hypericaceae indicated that Tristichoideae exhibit plesiomorphic states for all the morphological characters but pollen aperture, whereas Podostemoideae have apomorphic states. Under the island

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