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Title: Another forking sundew: Biogeography of the *Drosera binata* Labill. (Droseraceae) species complex in Australia and New Zealand

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Abstract

Drosera binata Labill. (Droseraceae) are widely distributed flypaper trap carnivorous plants, occurring in temperate and subtropical environments in Australia and New Zealand. Across its distribution, *D. binata* displays highly variable leaf morphology, with four morphotypes ('T-form', var. *dichotoma*, var. *multifida* and var. *multifida* f. *extrema*) that are considered indicative of evolutionary affinities.

To resolve the relationships between morphs, population and singleton sampling was conducted for all morphs across the full extent of the distribution. Next generation sequencing was conducted using a target enrichment hybrid capture method with a custom bait set (OzBaits). Sequence data recovered from numerous chloroplast and nuclear loci was processed with the CAPTUS pipeline and analysed using IQ-TREE.

Three well supported clades were found; a polymorphic 'southern' clade that extends across south and south-eastern Australia, extending to New Zealand; a closely affiliated polymorphic 'eastern' clade, occurring in New South Wales and south-eastern Queensland; and a geographically isolated, morphologically stable Western Australian 'T-form' clade that is highly divergent from all other populations. Multiple morphs occur within the 'southern' and 'eastern' clades, with populations showing strong geographic patterns regardless of differences in leaf morphology and growth habit. The results of these analyses challenge the proposed morphological classification of the species based on lamina morphology.

All populations, except those in South Australia, feature high levels of within- and between-population variation; the potential origin of South Australian polymorphic but genetically homogenous populations are discussed. Close affiliations between 'southern' *D. binata* populations in south-east Australia and in New Zealand are considered evidence of at least one long distance dispersal event from Australia to New Zealand. The conservation and taxonomic issues raised by this study are discussed in detail, with a focus on the highly divergent Western Australian clade, dispersal, morphology and population diversity.

Key words

Carnivorous plants, *Drosera binata*, nuclear and plastid sequences, phylogeography, population genetics, section Phycopsis