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Phylogenetic Relationships of Haplolepideous Mosses (Dicranidae) Inferred from *rps4* Gene Sequences

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Abstract

The haplolepideous mosses (Dicranidae) constitute a large group of ecologically and morphologically diverse species recognised primarily by having peristome teeth with a single row of cells on the dorsal surface. The reduction of sporophytes in numerous moss lineages renders circumscription of the Dicranidae problematic. Delimitation of genera and higher taxa within it has also been difficult. We analyse chloroplast-encoded *rps4* gene sequences for 129 mosses, including representatives of nearly all the haplolepideous families and subfamilies, using parsimony, likelihood and Bayesian criteria. The data set includes 59 new sequences generated for this study. With the exception of *Bryobartramia*, which falls within the Encalyptaceae, the Dicranidae are resolved in all analyses as a monophyletic group including the extremely reduced Archidiales and Ephemeraceae. The monotypic *Catoscopium*, usually assigned to the Bryidae is consistently resolved as sister to Dicranidae, and this lineage has a high posterior probability under the Bayesian criterion. Within the Dicranidae, a core clade is resolved that comprises most of the species sampled, and all analyses identify a proto-haplolepideous grade of taxa previously placed in various haplolepideous families. The data provide considerable resolution of relationships within the core Dicranidae, yielding a number of well-supported clades. These correspond only roughly to taxa that are currently recognised, and most families and orders of Dicranidae apparently are non-monophyletic under their current circumscriptions.

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