

**Molecular Systematics of the *Lomandra* Labill. Complex  
(Asparagales: Laxmanniaceae)**

**by**

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not succeeding is better than never attempting

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## Abstract

The “*Lomandra* complex” (or *Lomandra* grouping) is an informally recognised grade resulting from the subdivision of the Laxmanniaceae into two groups (Conran, 1998); the ‘*Lomandra* complex’ (*Acanthocarpus*, *Chamaexeros*, *Lomandra*, *Romnalda* and *Xerolirion*), and the remainder as the Arthropodoids (*Arthropodium*, *Chamaescilla*, *Cordyline*, *Eustrephus*, *Laxmannia*, *Murchisonia*, *Sowerbaea*, *Thysanotus* and *Trichopetalum*). Laxmanniaceae are an Australia-centred, tropical to temperate family of 14 genera with around 180 species from Australasia, SE Asia, the Mascarenes, New Caledonia, New Guinea, New Zealand, North and South America and the Pacific Islands. There have been no detailed phylogenetic studies in Laxmanniaceae and the relationships within and between the genera is poorly understood.

This study utilised molecular data from chloroplast *trnL-F* and nuclear ribosomal ITS2 regions analysed with maximum parsimony and bayesian inference methods to reconstruct the phylogeny of the genera of the ‘*Lomandra* complex’, using species of *Arthropodium*, *Eustrephus*, *Laxmannia* and *Thysanotus* as outgroups. The molecular phylogeny shows that *Lomandra* forms four primary clades; with members from the classical anatomy, inflorescence-defined section and series distributed amongst these, typically in large islands. The monotypic genus *Xerolirion* resides deeply within *Lomandra*, raising questions about the appropriateness of this genus. Additionally, the other genera of the *Lomandra* complex (*Acanthocarpus*, *Chamaexeros* and *Romnalda*) form a clade positioned sister to one of four primary *Lomandra* clades, but nested inside *Lomandra sens. lat.*,

indicating a closer relationship between these genera than previously thought. The affiliation of these bisexual, hermaphroditic genera within the otherwise unisexual, dioecious *Lomandra* clade supports the recognition of the ‘*Lomandra* complex’ as an expanded genus, *Lomandra*; and represents either an example of the evolution of unisexuality followed by reversion, or else multiple losses of hermaphrodite flowers.

Morphological and anatomical data were obtained for leaf and floral macroscopic characters, mid-leaf section anatomy and cuticle microscopic features and analysed with maximum parsimony and bayesian inference methods to reconstruct the anatomical phylogeny. These data were also utilised to generate a DELTA key for identifying species of *Lomandra* from a combination of macroscopic morphological and microscopic leaf anatomical features.

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Matthew Donnon

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