



On the disintegration of Molluginaceae: a new genus and family (*Kewa*, Kewaceae) segregated from *Hypertelis*, and placement of *Macarthuria* in Macarthuriaceae

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Abstract

Molecular studies have shown that Molluginaceae in the traditional sense is polyphyletic. Several genera have already been separated into various families (e.g. Caryophyllaceae, Limeaceae, Lophiocarpaceae, Microteaceae), but recent studies have shown that *Macarthuria* and *Hypertelis* also make Molluginaceae polyphyletic if they remain to be included in this family. *Hypertelis* is biphyletic, with its type species found to belong to Molluginaceae *sensu stricto*, but the remainder of the genus is to be placed elsewhere. Therefore a new genus, *Kewa*, is proposed for the rest of *Hypertelis*, and two new family names are coined: Kewaceae and Macarthuriaceae, which are here morphologically characterized.

Key words: Australia, Madagascar, new family, new genus, Saint Helena, South Africa

Introduction

Molluginaceae were originally segregated from Aizoaceae based on anthocyanin presence and several morphological characters that are now known to be plesiomorphic in Caryophyllales (including the old Centrospermae). However, no clear synapomorphies are known for Molluginaceae (Endress & Bittrich 1993) and it is thus unsurprising that the family has been found to be polyphyletic in phylogenetic studies (Cuenoud *et al.* 2002, APG III 2009). Several genera previously placed in Molluginaceae have since been removed to other families, for instance *Corbichonia* Scopoli (1777: 264, now Lophiocarpaceae), *Limeum* Linnaeus (1759: 994, now Limeaceae), and *Corrigiola* Linnaeus (1753: 271) with *Telephium* Linnaeus (1753: 271, now Caryophyllaceae), but not all genera had been sequenced by the time of APG III (2009). Some unsampled genera have recently been included in studies on classification of Caryophyllales (Schäferhoff *et al.* 2009), the evolution of pigments (Brockington *et al.* 2011) and C₃/C₄ metabolism transitions (Christin *et al.* 2011). In these studies, *Microtea* Swartz (1788: 53) was placed in its own family Microteaceae, and *Hypertelis* Fenzl (1836: 352) and *Macarthuria* Hügel ex Endlicher (1837: 11) were found to belong elsewhere in Caryophyllales (see figure 1). We attempt to further resolve the issue of the remaining polyphyly in Molluginaceae by proposing two new family names.

In APG III (2009), *Macarthuria* was placed with *Limeum* in Limeaceae, based on its morphology, but no material of *Macarthuria* had at that time been included in any molecular study. Molecular evidence has shown that *Macarthuria* is sister to all core Caryophyllales (Brockington *et al.* 2011, Christin *et al.* 2011). Because it would be untenable to unite all these into a single family (which would result in Caryophyllaceae and Cactaceae being in the same family), a new family encompassing just this single genus, Macarthuriaceae, is described below.

Hypertelis, with nine species, has been found to be polyphyletic in a recent study (Christin *et al.* 2011). Its type species, *H. spergulacea* E.Mey. ex Fenzl (1839: 263), which was designated by Phillips (1951: 291), was found to be placed inside Molluginaceae *sensu stricto*, and was nested within *Mollugo* Linnaeus (1753: 89), from which it was previously segregated on the basis of its fleshy leaves with large stipules adnate to the leaf base and clasping the stem. The relationship was well-supported based on multiple plastid markers and single-copy nuclear genes, and the position was identical in both datasets (Christin *et al.* 2011). *Mollugo* itself is polyphyletic within Molluginaceae (Arakaki *et al.*,

Name of uncertain position:—*Hypertelis longifolia* Gandoger (1912: 708) was collected from the Cape of South Africa. This taxon may well be the same as *Kewa trachysperma* (over which it would take nomenclatural priority), but the description is not sufficient to place it accurately among the two annual species of *Kewa*. The original description discusses petals and sepals, which cannot be distinguished in this genus (although there are petaloid sepals), so it may be a different genus altogether. We decided against making a combination for this name which has not been in use but for the type specimen (which we failed to locate).

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