

**Systematic placement and biogeographical relationships of the monotypic genera *Gypothamnium* and *Oxyphyllum* (Asteraceae: Mutisioideae) from the Atacama Desert**

generic relationships concerning Mutisieae have remained controversial (Kim, Loockerman & Jansen, 2002). It has been suggested that Mutisieae *s.l.* is polyphyletic (Kim



1991b; Tellería *et al.*, 2003) also confirm the close relationships of *Oxyphyllum* with *Leucheria*

DNA samples: *Luebert & García 2722/1116* (*rbcL*, EU736103; *ndhF*, EU729347; *trnL-trnF*, EU729339; ITS, EU729343), *Luebert & García 2829/1223* (*rbcL*, EU736104; *ndhF*, EU729348; *trnL-trnF*, EU729340; ITS, EU729344).

DNA

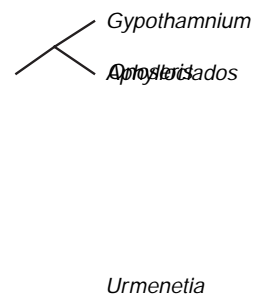
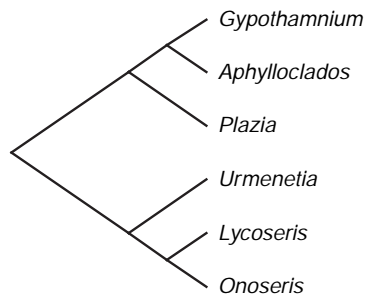
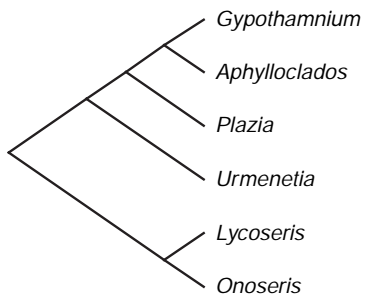
graphic and floristic studies (for example, Bacigalupi, 1931; Cabrera, 1936, 1951, 1953a, b, 1968, 1977, 1982; Ferreyra, 1944, 1995; Fabris, 1968; Vuilleumier, 1969; Anderson, 1972; Crisci, 1974a, b, 1976; Ricardi & Weldt, 1974; Egeröd & Ståhl, 1991; Harling, 1995; Dillon, 2005). The resulting distribution areas were visually analysed by tracing them onto the respective cladograms obtained from the phylogenetic analysis. Area cladograms (Page, 1988) were then constructed

probability) in which *Moscharia* is sister to the clade consisting of all other genera (96% bootstrap support and 100% Bayesian posterior probability). The analyses resolved *Oxyphyllum* as sister to the *Leucheria*-*Polyachyrushyllum*

genera is detailed in Table 1. The genera related to *Gypothamnium* are distributed in the tropical to subtropical areas of Central and South America, including Mesoamerica, north-western South America, Yungas, Prepuna, Monte, Chaco, coastal Peruvian Desert and







in a clade in a polytomy together with the sub-Antarctic, central Chilean and Patagonian subregions and the Puna province; the Mesoamerican dominion, the tropical areas of north-western South America, the Yungas, Monte, Prepuna and Paramo provinces, and the tropical and subtropical areas of eastern South America (Chacoan and Parana subregions), form a polytomy (Fig. 4J) in the first phylogenetic hypothesis (Fig. 4G), where only *Jungia* and *Leucheria* are considered as close relatives of *Oxyphyllum* (see Fig. 2A). However, when more taxa are taken into account (Fig. 4H, I), in accordance with Katinas *et al.* (2008) and Panero & Funk (2008), respectively,

related to *Marticoenia* Crisci, also monotypic and endemic to central Chile, and to *Holocheilus* Cass., with *c.* six species from Brazil, Paraguay, Uruguay and Argentina (Cabrera, 1968, 1977). Bremer (1994) included *Holocheilus*, *Leucheria* and *Oxyphyllum* in the *Leucheria* group, and treated *Jungia*, *Marticoe-*

flow from the Andes to the coast, followed by isolation of the established populations in the coastal Atacama. Assuming such a scenario, it is unlikely that *that*





**Hershkovitz MA, Hernández-Pellicer CC, Arroyo MTK.**  
**2006b.** Ribosomal DNA evidence for the diversification of



**Posada D, Crandall KA. 1998.**

ITS AND *trnLtrnND*



Quebrada del Gritón on route to Pta. Tórtolas, *c.*  
15 km SSW of Taltal, *c.* 350 m, 25.xii.1987, M.O.