



A first assessment of lichenized Arthoniales in Bolivia with descriptions of two new species

DAMIEN ERTZ¹, ADAM FLAKUS², MAGDALENA OSET³, HARRIE J. M. SIPMAN⁴ & MARTIN KUKWA³. *

¹Department Bryophytes-Thallophytes, Botanic Garden Meise, Nieuwelaan 38, 1860 Meise, Belgium; e-mail: damien.ertz@br.fgov.be

²Laboratory of Lichenology, W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, 31-512 Kraków, Poland; e-mail: a.flakus@botany.pl

³Department of Plant Taxonomy and Nature Conservation, University of Gdańsk, Wita Stwosza 59, PL-80-308 Gdańsk, Poland; e-mails: magdalenasyrek@wp.pl, dokmak@ug.edu.pl

⁴Botanischer Garten & Botanisches Museum Berlin Dahlem, Königin-Luise-Strasse 6–8, D-14191 Berlin, Germany; e-mail: h.sipman@bgbm.org

*Corresponding author: dokmak@ug.edu.pl

Abstract

Records of 48 species belonging to the order Arthoniales from Bolivia are presented. *Cryptothecia rosae-iselae* Flakus & Kukwa and *Lecanactis minuta* Ertz, Flakus & Kukwa are described as new to science. Thirty-seven species are reported for the first time from Bolivia, seven of which, *Alyxoria apomelaena*, *Cryptothecia darwiniana*, *C. groenhartii*, *C. megalocarpa*, *Herpothallon furfuraceum*, *Lecanographa uniseptata*, and *Opegrapha subvulgata*, are new to South America. This raises the number of Arthoniales known from the country up to 72. Two new combinations are proposed: *Alyxoria apomelaena* (A. Massal.) Ertz for *Opegrapha apomelaena* A. Massal. and *Myriostigma napoense* (Kalb & Jonitz) Kukwa for *Cryptothecia napoensis* Kalb & Jonitz. *Cresponea melanocheiloides* is the second species of the genus shown to contain a xantholepinone. *Cresponea melanocheiloides* is reported as new to Costa Rica and Panama, *Cryptothecia megalocarpa* as new to the Netherlands Antilles and Guyana and *C. striata* is new to Colombia, Costa Rica, French Guiana and the Netherlands Antilles. Distribution data are reported for each species, with taxonomic remarks provided for new and some problematic taxa.

Key words: *Alyxoria*, Arthoniaceae, *Cryptothecia*, *Lecanactis*, *Myriostigma*, Roccellaceae, taxonomy

Introduction

Arthoniales Henssen ex D. Hawksw. & O.E. Erikss. is a large and diverse order of about 1500 mainly lichenized fungi placed in Arthoniomycetes O.E. Erikss. & Winka and forming the sister-group of the Dothideomycetes O.E. Erikss. & Winka (Kirk *et al.* 2008; Schoch *et al.* 2009; Ertz *et al.* 2014). Most species of Arthoniales form lichen symbioses with trentepohlioid or more rarely with chlorococcalean algae, some are lichenicolous and a few are considered as being doubtfully lichenized or not lichenized at all. Arthoniales is most diverse in tropical and subtropical regions, sometimes forming the dominant lichen vegetation, especially in coastal habitats with a Mediterranean or desert type climate (Follmann & Werner 2003; Tehler 1983, 1990). The order is also a major component of the lichen vegetation of many tropical forest types. South America is often thought to be very diverse in Arthoniales with some regions being considered as hot spots of the group, such as the temperate to tropical Pacific-Andean coastland (Follmann & Werner 2003). Recent studies in South America led to the descriptions of many new species of Arthoniales, suggesting that this region is still very poorly studied (e.g. Aptroot *et al.* 2013, 2014a, b; Cáceres *et al.* 2013, 2014a; Lima *et al.* 2013; Menezes *et al.* 2013a, b; Alves *et al.* 2014; Xavier-Leite *et al.* 2014).

Based on our recent lichenological studies in Bolivia, we can assume that this country may have one of the richest lichen biota in South America (e.g., Flakus 2013; Flakus & Wilk 2006; Flakus & Lücking 2008; Flakus & Kukwa 2012; Flakus *et al.* 2012a, b; Oset & Kukwa 2012; Kukwa *et al.* 2012, 2013, 2014). However, the diversity and distribution of lichenized fungi is still largely unexplored in this country and Arthoniales is one of the least studied groups there. So far only 33 lichen species, mostly foliicolous, have been reported from this region (Table 1). Also the lichenicolous *Plectocarpon stereocaulicola* Kukwa, Etayo & Flakus has been recently described (Kukwa *et al.* 2012).