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Two new sympatric species of *Eusarsiella* (Ostracoda: Myodocopida: Sarsiellidae) from the Florida Keys with a morphological phylogeny of Sarsiellinae

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Abstract

We describe two new sympatric species of Sarsiellidae from coastal Florida, USA: *Eusarsiella bryanjuarezi* **sp. nov.** and *Eusarsiella eli* **sp. nov.** We also present a morphological character matrix and maximum likelihood phylogenetic analysis for Sarsiellinae based on original species descriptions, representing 139 sarsiellins (including *E. bryanjuarezi* and *E. eli*). While support values across the phylogeny are low, *E. bryanjuarezi* and *E. eli* form a sister group pair with 68 % bootstrap support. Our phylogeny also showed support for six other sympatric sister-species pairs, distributed across Sarsiellinae's range, which may be candidates for the study of speciation and niche differentiation. Similar to other analyses of myodocopids, our Sarsiellinae phylogeny recovered only three monophyletic genera: *Anscottiella*, *Cymbicopia*, and *Chelicopia*, indicating that characters used in taxonomy may often be homoplasious. Because of our finding of multiple polyphyletic genera, including the two most speciose genera in the subfamily (*Eusarsiella* and *Sarsiella*, the type genus) Sarsiellinae is a strong candidate for taxonomic revision.

Key words: systematics, taxonomy, ostracod, Sarsiellinae, *Eusarsiella*, morphological phylogeny

Introduction

Sarsiellidae Brady & Norman, 1896 (Ostracoda: Sarsielloidea) is a family of benthic marine ostracods known worldwide from subarctic to Antarctic latitudes, and intertidal to abyssal depths (Kornicker & Caraion 1980). Together with the families Philomedidae Müller, 1906 and Rutidermatidae Brady & Norman, 1896, Sarsiellidae is a member of the superfamily Sarsielloidea, which is particularly intriguing evolutionarily because it shows variation in genetically well-studied characters, especially lateral compound eyes (Rivera & Oakley 2009; Kornicker 1985). Although a nearly comprehensive morphological phylogeny was recently published (Karanovic 2012), molecular phylogenies including sarsiellids suffer from sparse species-level sampling (*e.g.*, a single species in Yamaguchi & Endo 2003; Oakley & Cunningham 2002; Tinn & Oakley 2008), and unlike many ostracod lineages with rich fossil records, there are no known sarsiellid fossils (Siveter *et al.* 2010). Therefore, current hypotheses of evolution within-Sarsiellidae, (e.g. that the genera *Spinacopia*, *Cymbicopia*, *Alphasarsiella*, and *Adelta* are plesiomorphic within Sarsiellinae; Karanovic 2012), depend solely on morphological characters.

Sarsiellidae includes two subfamilies: Sarsiellinae Brady & Norman, 1896 and Dantyinae Kornicker & Cohen, 1978. Sarsiellinae is considerably more diverse, including 14 genera (Kornicker 1991; 1995), whereas Dantyinae has only two (Kornicker & Thomassin 1998). The largest genus in Sarsiellinae is *Eusarsiella* Cohen & Kornicker, 1975 (79 species, see below), although its taxonomic status was questioned (Hall 1987). Here, we describe two new species of *Eusarsiella* from the Florida Keys, USA, which were collected at the same site off Long Key (Figure 1). Shallow-water myodocopins tend to exhibit high levels of endemism (Titterton & Whatley 1988) and low dispersal (Morin 1986), which could give them more opportunities for population subdivision (Palumbi 1994). However, the prevalence of sympatric species pairs in Sarsiellidae has not been investigated. We score

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especially *Eusarsiella*, whose species are found distributed throughout the tree. Given these issues, and the generally low support of nodes in morphological analyses, discussions of hypothetical character polarity within Sarsiellinae (e.g. Karanovic 2012) will remain uncertain without a corroborating phylogenetic hypothesis, for example from molecular data.

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