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Morphological cladistic analysis of *Ophiurolepis* Matsumoto, 1915 (Ophiurida: Ophiuridae) from the Southern Ocean

REBECCA L. HUNTER
Department of Biological Sciences, Auburn University, Auburn, Alabama, USA.

Abstract

A phylogenetic analysis using morphological characters was done on the Antarctic ophiuroid genus *Ophiurolepis* Matsumoto, 1915. This genus is one of the more abundant and ecologically dominant ophiuroid genera in the Antarctic and surrounding Southern Ocean. Maximum parsimony was used to infer phylogenetic relationships. Although strongly supported nodes were not recovered for most groupings within *Ophiurolepis*, this first attempt at a phylogeny revealed the presence of three tentative clades. Two of the three *Ophiurolepis* clades included species currently assigned to other genera, but closely allied with *Ophiurolepis* in the taxonomic literature. This indicates that *Ophiurolepis* as currently defined is not a monophyletic group. Additional forms of data, namely molecular, are needed to more definitively resolve relationships within this group.

Key words: Antarctica, cladistics, *Homalophiura*, morphology, ophiuroid, *Ophiurolepis*, Southern Ocean, *Theodoria*

Introduction

The brittle star genus *Ophiurolepis* Matsumoto, 1915 is one of the more speciose ophiuroid genera in the Southern Ocean (Fell *et al.* 1969). Nine of the fourteen species are endemic to the Antarctic/subantarctic region and four species have a circumpolar distribution (Table 1). A circumpolar distribution has been proposed as the general distributional pattern for Antarctic ophiuroids, presumably influenced by the west-wind drift (Fell 1962; Pawson 1993). Of the five non-endemic species, *O. martensi* (Studer, 1885) and *O. scissa* (Koehler, 1908) extend from Antarctica to southernmost South America, and *O. turgida* Mortensen, 1936 has been found only from the southernmost South American shelf (Mortensen 1936). In addition to Antarctica, *O. mordax* Koehler, 1922 has been reported from the abyssal region of the Mozambique Channel (Vadon & Guille 1984; Guille & Vadon 1986). Recently, *O. carinata* (Studer, 1876), previously known only from the subantarctic Kerguelen and South Sandwich Islands, was collected close to methane seeps off Concepción Bay, Chile at approximately 36°S latitude (Sellanes & Krylova 2005).

Little is known about the life history of any *Ophiurolepis* species. Lifespan was calculated for *O. brevirima* Mortensen, 1936 and *O. gelida* (Koehler, 1901) as 25 and 33 years respectively, by analyzing vertebral ossicle growth bands (Dahm 1996). In his monograph on the echinoids and ophiuroids of the Antarctic/subantarctic region, Mortensen (1936) speculated about the reproductive biology of several *Ophiurolepis* and other closely related species. He postulated that six species (*O. brevirima, O. gelida, O. tuberosa* (Mortensen, 1936), *Theodoria partita* (Koehler, 1908), *T. wallini* (Mortensen, 1925), and *Homalophiura inornata* (Lyman, 1878)) were dioecious with some form of direct development, but were not viviparous. Egg size was reported as ~0.3 mm diameter in these species. This is well within the oocyte diameter range (0.1–1.0 mm) known for brooding ophiuroids (Hendler 1991), but also within range for those with non-feeding pelagic lecithotrophic

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