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Convolutriloba macropyga sp. nov., an uncommonly fecund acoel (Acoelomorpha) discovered in tropical aquaria

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Abstract

A new species of *Convolutriloba* Hendelberg & Åkesson, 1988, collected from an aquarium in Marietta, Georgia, USA, and cultured at the University of Georgia comprises exceptionally large individuals, up to 10 mm in length. Like other members of the genus, *Convolutriloba macropyga* **sp. nov.** reproduces asexually and possesses symbiotic zoochlorellae, but it also routinely reproduces sexually, laying relatively large eggs that hatch into aposymbiotic juveniles with a statocyst and frontal organ (which are absent in the adults). *C. macropyga* has a narrow tolerance for extremes of temperature and salinity: it cannot survive outside of a temperature range of 18–28°C and suffers 50% lethality at salinity as low as 24 ppt and as high as 44 ppt. It cannot survive total darkness for longer than 23–26 days, even with prey provided, suggesting an obligate symbiosis with its algal endosymbiont. A method for inducing sexual reproduction in other convolutrilobids is presented, as are suggestions for successful shipping of these acoels.

Key words: Asexual reproduction, sexual reproduction, reverse budding, symbiosis, anterior-posterior axis, toxicity, acoel, flatworm, shipping

Introduction

The genus *Convolutriloba* was erected with the discovery and description of *Convolutriloba retrogemma* Hendelberg & Åkesson, 1988. Hendelberg & Åkesson (1988) hesitated to place the genus in a family due to uncertainties about the maturity of the examined animals. Two years later, Winsor (1990) described *Convolutriloba hastifera* Winsor, 1990, from Australia. Winsor (1990) had mature specimens at hand and, by comparison, confirmed the maturity of specimens of *C. retrogemma* investigated by Hendelberg & Åkesson. On the basis of the male copulatory organ in these species, he assigned the genus to the family Haploposthiidae (Winsor 1990). *Convolutriloba longifissura* Bartolomaeus & Balzer, 1997, is the third and most recently discovered species of the genus. Gschwentner *et al.* (1999) investigated sagittocysts in this species and, weighting the homology of these micro-organs more heavily than that of the male copulatory organ, which appeared to be secondarily reduced, reassigned the genus to the family Sagittiferidae Kostenko & Mamkaev, 1990.

The genus has attracted attention due to its uncommon modes of asexual reproduction. *C. retrogemma* reproduces by reverse budding, a process in which a daughter individual is released at the posterior end of the mother individual, with its anterior-posterior axis reversed 180° to that of the mother individual (Hendelberg & Åkesson 1988; Hendelberg & Åkesson 1991). In *Convolutriloba longifissura* a longitudinal fission, so far the only described case of such fission in bilaterians, occurs in the posterior daughter individual of a transverse fission (Bartolomaeus & Balzer 1997; Åkesson *et al.* 2001).

These species are particularly amenable to study because of the ease with which they can be maintained in the laboratory. In fact, only one species, *Convolutriloba hastifera*, has been described from natural habitats;

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