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First zoeal stage of ?*Cataleptodius parvulus* (Fabricius, 1793) and *Xanthodius denticulatus* (White, 1848) (Decapoda: Brachyura): larval evidences and systematic position

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Abstract

The first zoeal stages of ?*Cataleptodius parvulus* and *Xanthodius denticulatus* are described and compared with zoeae of other members of the subfamily Xanthinae. The larvae of ?*C. parvulus* and *X. denticulatus* differ mainly in: 1) spinulation of rostral and dorsal spines; 2) type of antenna; 3) setation of the basis of first maxilliped; and 4) type of telson. Features common to both species include a carapace provided with well-developed spines on the dorsal (1), rostral (1), and lateral (2) portions; and the antennal protopod and rostrum similar in length. The morphological differences between the zoea I of *X. denticulatus* and ?*C. parvulus* are nevertheless consistent enough to suggest that these species do not belong to the same genus *Xanthodius* Stimpson, 1859 as previously supposed. Also we presume that *?C. parvulus* does not belong to the genus *Cataleptodius*.

Key words: zoeal morphology, *Cataleptodius, Leptodius,* Xanthinae

Introduction

The superfamily Xanthoidea MacLeay, 1838 consists of three families: Panopeidae Ortmann, 1893, Pseudorhombilidae Alcock, 1900 and Xanthidae MacLeay, 1838 (Ng *et al*. 2008). The Xanthidae consists of 13 subfamilies, one of which is Xanthinae MacLeay, 1838. Two species, ?*Cataleptodius parvulus* (Fabricius, 1793) and *Xanthodius denticulatus* (White, 1848) are included in the Xanthinae. Both have wide geographic distributions in the western Atlantic, extending from Bermuda, Florida, the Gulf of Mexico, West Indies and Venezuela to Brazil (Rocas Atoll and Fernando de Noronha and São Paulo for ?*C. parvulus*; and St. Paul's Rocks and from Ceará to Bahia and São Paulo for *X. denticulatus*) (Melo 1996; Alves *et al*. 2006). The current taxonomic status of ?*C. parvulus* is still doubtful (Ng *et al*. 2008). This species was previously assigned to *Leptodius* A. Milne-Edwards, 1863 by Lebour (1944), and to *Xanthodius* Stimpson, 1859 by Martin (1984) and Melo (1996).

The zoeal stages of some species of Xanthinae have been described: *Leptodius exaratus* (H. Milne Edwards, 1834), by Fielder *et al.* (1979); *Micropanope sculptipes* Stimpson, 1871, by Andryszak & Gore (1981); *Garthiope barbadensis* (Rathbun, 1921), by Gore *et al*. (1981, as *Micropanope barbadensis*); *Xantho hydrophilus* (Herbst, 1790), by Ingle (1983, as *Xantho incisus*); *Cataleptodius floridanus* (Gibbes, 1850), by Ingle (1987); *Xantho poressa* (Olivi, 1792) by Rodríguez & Martin (1997); *Xantho pilipes* A. Milne Edwards, 1867 by Paula & Santos (2000); and *Microcassiope minor* (Dana, 1852) by Clark *et al*. (2004). Lebour (1944) partially described the first zoeal stages of both ?*C. parvulus* (as *Leptodius parvulus*) and *X. denticulatus*. However, the evidence from larvae has not been taken into account in evaluating the relationships of these genera within the Xanthinae. Only Lai *et al*.

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Our results agree with the proposal of Ng *et al*. (2008) that it is not possible to establish the correct taxonomic status of ?*C. parvulus*. We were able to determine that the morphological features of the first zoeal stage of ?*C. parvulus* are closest to some zoeae of representatives of the family Panopeidae Ortmann, 1893, as follows: *Hexapanopeus angustifrons* (Benedict & Rathbun, 1891), *Acantholobulus bermudensis* (as *Panopeus bermudensis*) Benedict & Rathbun, 1891 and *H. paulensis* (see Costlow & Bookhout 1966; Martin *et al*. 1985; Fransozo *et al*. 1990, respectively). However, the first zoeal stage of ?*C. parvulus* differs from other panopeid zoeae, such as *Eurypanopeus abbreviatus* (Stimpson, 1860) (Negreiros-Fransozo 1986a), *Panopeus americanus* Saussure, 1857 (Negreiros-Fransozo 1986b), *Panopeus austrobesus* Williams, 1983 (Montú *et al*. 1988), *Acantholobulus schmitti* (as *Hexapanopeus schmitti*) Rathbun, 1930 (Bakker *et al*. 1989), *Panopeus meridionalis* Williams, 1983 (Luppi *et al*. 2003), *Hexapanopeus caribbaeus* (Stimpson, 1871) (Vieira *et al*. 2004), *Dyspanopeus sayi* (Smith, 1869) (Marco-Herrero *et al*. 2013), and *Panopeus lacustris* Desbonne, 1867 (Souza *et al*. 2013).

The above-mentioned discrepancies in the zoeal morphology may represent different evolutionary branches, which reflect the inadequacy of the present taxonomic groupings of xanthoids (Rice 1980; Martin *et al*. 1985). Detailed morphological studies of the complete larval development of a large number of crab species are needed, and in addition, other kinds of studies such as spermiotaxonomy and/or genetics could help to better delimit the evolutionary relationships among the xanthoid crabs.

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