



Early zoal development of the shrimp *Hippolyte leptocerus* (Decapoda, Caridea, Hippolytidae)

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Abstract

The morphology of the first three zoal stages of *Hippolyte leptocerus* (Heller, 1863) are described and illustrated in detail from laboratory-hatched material. The ovigerous females were collected on the Alfacs Bay, Ebro Delta, Spain (Western Mediterranean). The early larval stages (ZI, ZII, ZIII) showed the anterolateral margin of carapace with denticulations, a median tubercle behind rostrum, scaphocerite segmented distally (only ZI and ZII), exopodal seta at the maxillule and pleonite 5 with a pair of dorsolateral spines. The morphology of the first three zoal stages of *H. leptocerus* is typical of species with an extended larval development. Morphological characteristics of the genus *Hippolyte* are discussed.

Key words: Caridea, *Hippolyte*, zoea, morphology, larval development

Introduction

The genus *Hippolyte* (Leach, 1814) show an wide geographic and ecological distribution, comprising more than 30 species distributed worldwide except in extremely cold waters (d'Udekem d'Acoz, 1996). The taxonomy and systematic of the species of the genus *Hippolyte* is still problematic; the available information reveals a great deal of intraspecific variability in developmental traits, showing a high morphological variability in adults (d'Udekem d'Acoz, 1996; García Raso *et al.* 1998).

Among of the genus *Hippolyte*, 14 species are recently recorded in north-eastern Atlantic and Mediterranean waters (d'Udekem d'Acoz, 1999). *Hippolyte leptocerus* has been recorded on photophile algae from intertidal zone to 30 m depth along the eastern Atlantic from western Ireland to Mauritania, including the Madeira and Cape Verde Islands and throughout the Mediterranean Sea and Black Sea (d'Udekem d'Acoz, 1996).

Information on larval morphology of genus *Hippolyte* is available for 14 species: *H. acuta* (Stimpson, 1860) (Yokoya, 1957); *H. bifidirostris* (Miers, 1876) (Packer, 1985); *H. clarki* Chace, 1951 (Needler, 1934 as *H. californiensis*); *H. coerulescens* (Fabricius, 1775) (Gurney, 1936 as *H. acuminata*); *H. inermis* Leach, 1815 (Bourdillo-Casanova, 1960; Heegard, 1963; Le Roux, 1963; Zupo and Buttino, 2001); *H. multicolorata* Yaldwyn, 1971 (Packer, 1985); *H. obliquimanus* Dana, 1852 (Terossi *et al.*, 2010), *H. pleuracanthus* (Stimpson, 1871) (Shield, 1978); *H. prideauxiana* Leach, 1817 (Lebour, 1931); *H. sapphica* d'Udekem d'Acoz, 1993 (Ntakis *et al.*, 2010); *H. varians* Leach, 1814 (Sars, 1911; Webb, 1921; Lebour, 1931); *H. ventricosa* H.Milne Edwards, 1837 (as *H. orientalis* Gurney, 1927); *H. williamsi* Schmitt, 1924 (Albornoz & Wehrtmann, 1997) and *H. zostericola* (Smith 1873) (Negreiros-Fransozo *et al.*, 1996). Except for *H. obliquimanus*, *H. pleuracanthus* and *H. sapphica*, the descriptions of their zoal stages are incomplete or not described in detail. The complete larval development was described only for *H. pleuracanthus* and *H. sapphica*.

The present study aimed to describe in detail the morphology of the three first zoal stages of *Hippolyte leptocerus* from a population of western Mediterranean. This represent the first complete description of the early larval stages of genus *Hippolyte* species from eastern Atlantic and western Mediterranean.