



Early larval morphology of the armed nylon shrimp *Heterocarpus ensifer ensifer* A. Milne-Edwards, 1881 (Decapoda, Caridea, Pandalidae) from laboratory culture

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Abstract

The first four zoeal stages of the shrimp *Heterocarpus ensifer ensifer* were obtained under laboratory conditions. The morphology of each larval stage was described and illustrated in detail. The *Heterocarpus*'s larval features fit into the characteristics of the family Pandalidae, and indicate a close relationship with the genus *Plesionika*.

Key words: Decapoda, Pandalidae, *Heterocarpus ensifer ensifer*, zoeal stages

Introduction

The family Pandalidae Haworth, 1825, currently composed by 22 recognized genera (De Grave *et al.*, 2009), has a cosmopolitan distribution from littoral shores to more than 3000 m (Chace 1985). In the north Atlantic and Mediterranean Sea, this family is represented by the genera *Bitias* Fransen, 1990, *Pantomus* A. Milne-Edwards, 1883, *Heterocarpus* A. Milne-Edwards, 1881, *Chlorotocus* A. Milne-Edwards, 1882, *Atlantopandalus* Komai, 1999, *Dichelopandalus* Caullery, 1896, *Pandalina* Calman, 1899, *Stylopandalus* Coutière, 1905, *Pandalus* Leach, 1814, *Plesionika* Bate, 1888 (Williams 1984; D'Udekem D'Acoz 1999). The larval morphology is still unknown for the first three genera while for the following five genera more accurate descriptions according to the modern standards are needed. Only *Pandalus* and *Plesionika* have detailed descriptions but only for few species.

Three species of the genus *Heterocarpus* are reported in the north east Atlantic Ocean and Mediterranean waters (D'Udekem D'Acoz 1999): *H. ensifer ensifer* A. Milne-Edwards, 1881, *H. grimaldii* A. Milne-Edwards & Bouvier, 1900 and *H. laevigatus* Bate, 1888. *H. ensifer* is an amphiatlantic species distributed in the western Atlantic from North Carolina to Brazil, including the Caribbean Sea and Gulf of Mexico (Lozano-Álvarez *et al.* 2007), in the eastern Atlantic from southwest and Mediterranean Spanish coast to Gabon in the western Africa and in the archipelagos of Azores, Madeira, Canary Islands and Cape Verde (D'Udekem D'Acoz 1999; D'Udekem D'Acoz *et al.* 2001). This pandalid shrimp has also been reported across the Indo-West Pacific, but their taxonomic identity is uncertain (Crosnier & Forest 1973). This species not only is a species that inhabits sandy-muddy bottoms over the continental and island slopes (88-821 m depth) (González *et al.* 2001) but also can show a pelagic distribution during juvenile stages (González 1995). The ovigerous females occur from January to December suggesting a year-round reproductive activity (González *et al.* 2001; Lozano-Álvarez *et al.* 2007). Frequently, tons of *H. ensifer* constitute the bycatch of the artisanal fishery of *Plesionika narval* and *Plesionika edwardsii* in Canary Island archipelago. However, experimental fishing with bottom traps has been carried out to ascertain the potential fishery resource of this species in the Canary Islands, Hawaii and Cape Verde (Gooding 1984; Santana *et al.* 1997; González & Tariche 2009).