



Morphology and life cycle of *Carybdea morandinii*, sp. nov. (Cnidaria), a cubozoan with zooxanthellae and peculiar polyp anatomy

ILKA STRAEHLER-POHL & GERHARD JARMS

Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Martin-Luther-King-Platz 3,
20146 Hamburg, Germany; e-mail: I.Straehler-Pohl@web.de, gerhard.jarms@zoologie.uni-hamburg.de

ABSTRACT

A new species of Cubozoa found in an aquarium at Hagenbecks Tierpark (Zoo), Hamburg, Germany, is described herein as *Carybdea morandinii*. The species is distinguished from all known cnidarians in the anatomy of its polyp stage. The gastric cavity of the cubopolyp is divided horizontally into two chambers by a shutter-lens-like diaphragm. Metamorphosis was total and resulted in a single, four-tentacled medusa as in other known cubozoans. Both polyp and medusa stages bear zooxanthellae, which seemed important in the metamorphic process.

Key words: Cubozoa, *Carybdea marsupialis*, *Alatina mordens*, *Tripedalia cystophora*, two-chambered gastric cavity, cyst, development

INTRODUCTION

Some 40 species of Cubozoa have been described (Daly *et al.* 2007; Gershwin 2008; Gershwin & Gibbons 2009; Lewis & Bentlage 2009), with knowledge of them based largely or entirely on the medusa stage. Life cycles have been described, in whole or in part, for only a few species: *Tripedalia cystophora* Conant, 1897 (Werner *et al.* 1971; Werner 1975, 1983); *Carybdea marsupialis* (Linnaeus, 1758) (Studebaker 1972; Cutress & Studebaker 1973; Stangl 1997; Straehler-Pohl 2001, 2009; Jarms 2003; Straehler-Pohl & Jarms 2005); *Alatina mordens* Gershwin, 2005 (= *A. moseri* according to Bentlage *et al.* 2010), a species studied as *Carybdea alata* (Arneson 1976; Arneson & Cutress 1976; Straehler-Pohl 2009); *Chironex fleckeri* Southcott, 1956 (Yamaguchi & Hartwick 1980; Hartwick 1991a); and *Carybdea sivickisi* Stiasny, 1926 (Hartwick 1991b). As in all these studies, life-cycle observations on a new species described here, *Carybdea morandinii*, sp. nov., were based on laboratory cultures. Both the morphology of the young medusa and the anatomy of the polyp differ significantly from any yet described. Rearing of young medusae of Cubozoa to maturity has unfortunately proven unsuccessful to date (Arneson 1976; Arneson & Cutress 1976; Cutress & Studebaker 1973; Hartwick 1991a, b; Stangl 1997; Straehler-Pohl 2001, 2009; Studebaker 1972; Yamaguchi & Hartwick 1980), and has yet to be completed for *C. morandinii*. We therefore describe this species based on knowledge of its unusual polyp, its metamorphosis, and its young medusa.

MATERIAL AND METHODS

Cubopolyps used in this study originated from specimens found in a saltwater tank at the Troparium of Hagenbecks Tierpark (Zoo), Hamburg, Germany, during 1999. They were discovered on a block of dead coral next to colonies of two coronate species, *Linuche unguiculata* (Swartz, 1788) and a scyphistoma of a new species later described as *Nausithoe hagenbecki* Jarms, 2001. The exact provenance of the coral rock substrate is unknown, but according to staff of Hagenbecks Tierpark, it came from somewhere in east Asia. A piece of this substrate was transferred to the laboratory at the Department of Zoology, University of Hamburg. After removal of the other species, the cubozoan polyps were cultivated on the coral block in a glass bowl, exposed to daylight, at room temperature.