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Morphology and biology of *Polydora* species (Polychaeta: Spionidae) boring into oyster shells in South America, with the description of a new species

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Abstract

Four *Polydora* species boring into oyster shells in South America are described based on museum- and new material collected mainly in Brazil. These include *P.* cf. *haswelli* newly recorded for South America, *P. ecuadoriana* and *P. rickettsi* newly recorded for the Atlantic coast of South America, and a new species described from Brazil. Extension of the distribution of these oyster-associated species may have resulted from transportation of oysters to South America for aquaculture. In all species, females deposit eggs into capsules which are joined to each other in a string and attached to the inner wall of the burrow. In *P. ecuadoriana*, *P.* cf. *haswelli* and *P. rickettsi*, larvae develop inside the capsules until the 3-chaetiger stage and then are released into the water column where they feed and develop until the 16–18-chaetiger stage. *Polydora carinhosa* **sp. nov.** exhibits lecithotrophy; larvae develop inside the capsules until the 14-chaetiger stage, then hatch and settle after a short planktonic stage. Newly settled individuals of all species construct a small silty tube on the shell surface before boring into the shell. *Polydora ecuadoriana* forms mud blisters on the inner side of oyster shells. Heavy infestation by this species poses a threat to oyster aquaculture in Brazil.

Key words: oyster disease, worm infestation, mud blister, boring, *Polydora*, taxonomy

Introduction

Most polychaete worms of the family Spionidae Grube, 1850 are free-living, but some bore into coralline algae, corals, sponges, limestone and various shells, including those of commercially important mollusks. Boring spionids can substantially reduce the commercial value of mollusks (Lauckner 1983). Most extensive damage to mollusks is usually caused by species of *Polydora* Bosc, 1802 (see Blake 1996 for a diagnosis of the genus). Excessive growth of tube-dwelling (non-boring) worms on the surface of oyster shells may result in accumulation of sediment, oyster feces, and rejected material that eventually smothers the oysters. Decomposition of this mass produces hydrogen sulphide that may cause poisoning and death of the oysters (e.g., *Polydora cornuta* Bosc, 1802; see Nelson & Stauber 1940; Mortensen & Galtsoff 1944; Galtsoff 1964). Weak infestation by shell-boring worms may not significantly affect oyster condition and commercial value, but heavy infestation causes general weakening and retards growth of the oysters (Lunz 1940, 1941; Owen 1957). In response to the boring activity of *Polydora*, the mollusk often forms blisters (i.e., thin-walled calcareous chambers) on the inner wall of the valve to avoid further penetration of the worms into its inner cavity. The worms, called blisterworms or mudworms, occupy these chambers and fill them up with mud and fecal deposits. Anaerobic decay of the blister content results in hydrogen sulphide production which makes oysters unsuitable for the half shell market (Korringa 1952; Bailey-Brock & Ringwood 1982; Bailey-Brock 1987; Handley 1993, 1994; Handley & Bergquist 1997). Some methods have been suggested to prevent or control worm infestation in cultured oysters (Dollfus 1921; Mackenzie & Shearer 1959; Skeel 1977a; Bailey-Brock & Ringwood 1982; Nel *et al.* 1996; Handley 1993, 1997, 2002; Diggles *et al.* 2002), but the

