



<http://dx.doi.org/10.11646/zootaxa.3616.5.5>

<http://zoobank.org/urn:lsid:zoobank.org:pub:C2CBD925-E6DB-4106-93F6-11B21848AA9D>

***Ascidia subterranea* sp. nov. (Phlebobranchia: Ascidiidae), a new tunicate belonging to the *A. sydneyensis* Stimpson, 1855 group, found as burrow associate of *Axiopsis serratifrons* A. Milne-Edwards, 1873 (Decapoda: Axiidae) on Derawan Island, Indonesia**

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**Abstract**

A new tunicate, *Ascidia subterranea* sp. nov., was found in burrows of the axiid crustacean *Axiopsis serratifrons* on Derawan Island, Indonesia. It differs from other ascidians in its habitat as well as numerous morphological peculiarities which are described in detail. The shrimp *Rostronia stylirostris* Holthuis, 1952 was found inside *A. subterranea* sp. nov., and 4 species of bivalves, 3 species of polychaetes, 1 gastropod, 1 polyplacophoran and 1 sponge species were found as burrow associates besides the ascidian.

**Key words:** Tunicata, Phlebobranchia, Ascidiidae, *Ascidia sydneyensis* group, shrimp burrows, burrow associates, Indonesia

**Introduction**

Decapod burrows frequently harbor associated macrofauna. The nonsymbiotic mutualism between alpheid shrimp and their associated gobiid fish is well documented (Karplus 1987). Burrows of axiidean and gebiidean shrimp (formerly grouped together as “Thalassinidea”, Robles et al. 2009, De Grave et al. 2009, Dworschak et al. 2012) have been found to accommodate invertebrates such as turbellarians, nemerteans, polychaetes, echiurans, bryozoans, gastropods, bivalves, phoronids and other crustaceans (copepods, cephalocarids, carideans, brachyurans and amphipods) (see recent summary in Dworschak et al. 2012 and references therein, but also MacGinitie 1934, Pohl 1946, Farrow 1971, Felder & Rodrigues 1993, O'Reilly 2000, Itani 2004, Kneer et al. 2008 a, Komai 2009), as well as vertebrates (gobiid fishes) (see recent summary in Dworschak et al. 2012 and references therein, but also MacGinitie & MacGinitie 1968, Hoffman 1981, Atkinson & Taylor 1991, Itani & Tanase 1996, Senou 2004, Suzuki et al. 2006, Kinoshita et al. 2010). If burrows are sufficiently spacious and stable, multiple associated species can coexist; amphipods, palaemonid shrimp, one sabellid and one spirorbid polychaete species, the bivalve *Barrimysia cumingii* A. Adams, 1856 and the goby *Austrolethops wardi* Whitley, 1935 were all found sharing burrows of the strahlaxiid shrimp *Neaxius acanthus* A. Milne-Edwards, 1878 in the Spermonde Archipelago, Indonesia (Kneer et al. 2008 a, Kneer et al. 2008 b). So far, tunicates have not been reported to inhabit crustacean burrows.

The axiid shrimp *Axiopsis serratifrons* A. Milne-Edwards, 1873 has a circumtropical distribution (Kensley 1981). It was found to construct relatively spacious burrows (diameter 40 \* 80 mm, much larger than the shrimp with a maximum length of 60 mm) in a study by Dworschak & Ott (1993) in the Caribbean (Belize), but no