



A new echiuran-associated snapping shrimp (Crustacea: Decapoda: Alpheidae) from the Indo-West Pacific

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Abstract

Alpheus echiurophilus **sp. nov.** (Crustacea: Decapoda: Caridea: Alpheidae) is described based on material from Japan (Ryukyu Islands) and Vietnam (Nha Trang Bay); an additional, morphologically slightly different specimen from Madagascar (Nosy-Bé) is preliminarily referred to *A. cf. echiurophilus* **sp. nov.**, awaiting collection of additional material and/or genetic comparison. All specimens of the new species were collected from burrows of thalassematid echiurans, either on intertidal and shallow subtidal sand-mud flats or in the mixed sand-gravel-rock intertidal. *Alpheus echiurophilus* **sp. nov.** belongs to the *A. leviusculus* species group, being morphologically closest to the Indo-West Pacific *A. leviusculus* Dana, 1852, *A. hululensis* Coutière, 1905, *A. ladronis* Banner, 1956, and the western Atlantic *A. zimmermani* Anker, 2007. The new species can be separated from all of them by a combination of morphological characters and also appears to have a diagnostic colouration.

Key words: *Alpheus*, infauna, association, symbiosis, Annelida, Echiura, Thalassematidae, Japan, Vietnam, Madagascar

Introduction

Burrows of large echiurans (also known as innkeeper worms, now in the phylum Annelida) are known to harbour numerous symbionts, including mollusks, polychaetes, and in particular, decapod crustaceans (e.g., Morton 1988; Berggren 1991; Anker *et al.* 2005, 2007; Anker 2012; Marin 2014). Some burrows may contain entire symbiotic communities, while others are inhabited by only one symbiont as some symbionts appear to be mutually exclusive (Morton 1988; Anker *et al.* 2005). However, the biology of most echiuran associates remains largely unknown.

Our recent investigations of the intertidal and shallow subtidal infauna at several distant localities in the Indo-West Pacific, viz. Nosy-Bé in northwestern Madagascar (AA, 2008), Okinawa and Ishigaki Islands of the Ryukyu Archipelago, southern Japan (TK, 2008–2014), and Nha Trang Bay, southern Vietnam (IM, 2014), resulted in the collection of a previously unknown species of the snapping shrimp genus *Alpheus* Fabricius, 1798, associated with echiuran burrows. The new species is described and illustrated in the present study, although the identification of the Madagascan specimen, which is morphologically slightly different from the Japanese and Vietnamese specimens (see below), remains to be confirmed genetically. Differentiating characters among the new species and closely allied species are discussed.

Material is deposited in the following institutions: CBM – Natural Museum and Institute, Chiba, Japan; OUMNH.ZC.—Oxford University Museum of Natural History, Oxford, United Kingdom; FLMNH UF—Florida Museum of Natural History, University of Florida, Gainesville, USA. Carapace length (cl, in mm) was measured from the tip of the rostrum to the posterior margin of the carapace.

on the mesial surface of the dactylus (Fig. 9C). In view of these differences and the presence of numerous species complexes in the genus *Alpheus*, as well as the significant geographical distance between Japan/Vietnam and Madagascar, the Nosy-Bé specimen is preliminarily referred to *Alpheus* cf. *echiuropophilus* **sp. nov.** Additional material from the southwestern Indian Ocean and/or a genetic comparison (e.g., barcoding segment of COI gene) between available materials of *A. echiuropophilus* and *A. cf. echiuropophilus* are needed to elucidate the taxonomic identity of the latter taxon.

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