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Two new species of *Cardiodectes* Wilson, 1917 (Copepoda: Siphonostomatoida: Pennellidae) from gobiid fishes (Actinopterygii: Perciformes) in the western Pacific Ocean

DAISUKE UYENO

Faculty of Science, University of the Ryukyus, 1 Senbaru, Nishihara, Nakagami, Okinawa 903–0213, Japan.

E-mail: daisuke.uyeno@gmail.com

Abstract

Two new species of the genus *Cardiodectes* Wilson, 1917 (Siphonostomatoida: Pennellidae) are described based on females from gobiid fishes (Actinopterygii: Perciformes) in coastal waters of the Pacific Ocean. Both new species belong to the ‘*rubosus*’ group sharing a trunk without an abdomen. *Cardiodectes bellwoodi* n. sp. parasitizes *Istigobius nigroocellatus* (Günther) in Australian waters and differs from members of the ‘*rubosus*’ group by having a trunk length less than twice its width, and a pair of large anterior lobes with branched processes. *Cardiodectes shini* n. sp. is similar to *C. asper* Uyeno & Nagasawa but is distinguishable by the presence of a well-developed, bilobed process between the bases of the maxillae, and by the cephalothorax bearing only two pairs of lobes.

Key words: parasitic copepods, pennellid, mesoparasite, goby, Ryukyu Islands, *Cardiodectes bellwoodi* n. sp., *Cardiodectes shini* n. sp.

Introduction

The pennellid genus *Cardiodectes* Wilson, 1917 is known to be a mesoparasite on marine fishes (e.g. Bellwood 1981; Perkins 1983; Uyeno & Nagasawa 2010). Two species, *C. bellottii* (Richiardi) and *C. medusaeus* (Wilson), were originally described as members of the genus *Peroderma* Heller and *Lernaenicus* Le Sueur, respectively. Wilson (1917) established the genus *Cardiodectes* based on the former, and 12 species (*C. anchorellae* Brian & Gray; *C. asper* Uyeno & Nagasawa, 2010; *C. bertrandi* Uyeno & Nagasawa; *C. boxshalli* Bellwood; *C. cristatus* Shiino; *C. frondosus* Schuurmans Stekhoven; *C. hardenbergi* Markevich; *C. krishnai* Sebastian; *C. longicervicus* Shiino; *C. rotundicaudatus* Izawa; *C. rubosus* Leigh-Sharpe; *C. spiralis* Bellwood) have been subsequently described (Brian & Gray 1928; Markevich 1936; Schuurmans Stekhoven 1937; Shiino 1958; Sebastian 1968; Izawa, 1970; Bellwood 1981; Uyeno & Nagasawa 2010). Boxshall (2000), however, subsequently implied that *C. bellottii* is a senior synonym of *C. medusaeus*. The life cycle of the genus has been described for *C. medusaeus* that utilizes pelagic gastropods as intermediate hosts and lanternfishes as definitive hosts, respectively (Perkins 1983). Recently, increased attention has been paid to pennellid copepods, including many *Cardiodectes* species, because of the expansion of macro-photography by SCUBA divers. This increased awareness has resulted in the discovery of numerous undescribed species. In this study, two new species are described based on females collected from gobiid fishes (Actinopterygii: Perciformes) in the coastal waters of the Pacific Ocean, off North Australia and Japan.

Material and methods

All of the gobiid fishes examined in this study were collected while SCUBA diving . Parasitic copepods (Fig. 1)