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Redescription of *Peniculus minuticaudae* Shiino, 1956 (Copepoda: Pennellidae) from aquarium-held marine fishes in Japan, with notes on its occurrence and life cycle in captivity

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Abstract

Infections with the pennellid *Peniculus minuticaudae* Shiino, 1956 occurred on three species of marine fishes, the unicorn leatherjacket filefish, *Aluterus monoceros* (L.), the hairfinned leatherjacket, *Paramonacanthus japonicus* (Tilesius), and the brown-banded butterflyfish, *Roa modesta* (Temminck & Schlegel), held at a public aquarium in Kagoshima, Japan. Using specimens from the aquarium and type material, the postmetamorphic and premetamorphic adult females of *P. minuticaudae* are redescribed. The adult male, copepodid I, and late chalimus stages are described for the first time. The three fish species represent new host records for *P. minuticaudae*. Fishes were found heavily infected with *P. minuticaudae*, and extensive lesions associated with infections were found on the skin and around the fin rays of *R. modesta*. While pennellids usually use two hosts during their life cycle, it is very likely that *P. minuticaudae* completes its life cycle using one host, as suggested by copepodids, chalimi, adult males, premetamorphic adult females, and postmetamorphic adult females of the parasite all being found on a single fish.

Key words: Copepoda, new host records, life cycle, heavy infection, Kagoshima

Introduction

The copepod genus *Peniculus* von Nordmann, 1832 contains 14 species which infect the fin rays of actinopterygians (Boxshall and Halsey 2004). Three species, *P. ostraciontis* Yamaguti, 1939, *P. minuticaudae* Shiino, 1956, and *P. truncatus* Shiino, 1956 have been reported from Japan (Yamaguti 1939; Shiino 1956), but our knowledge of the life history of these Japanese species is limited. Yamaguti (1939) and Shiino (1956) described the aforementioned species based on specimens of postmetamorphic adult females, and in the case of *P. minuticaudae* Shiino (1956) described the premetamorphic adult female as well. More recently, Nagasawa *et al*. (2011) reported postmetamorphic adult females of *P. minuticaudae* infecting two monacanthids (Monacanthidae), *Stephanolepis cirrhifer* (Temminck & Schlegel) and *Thamnaconus modestus* (Günther), farmed in Japanese waters. In the present paper, we redescribe the postmetamorphic and premetamorphic adult females of *P. minuticaudae* based on specimens taken from three heavily infected marine fishes held at a public aquarium in Japan and examination of type material. We also provide the first description of the adult male, copepodid I, and late chalimus stages of *P. minuticaudae*, and report on its occurrence and life cycle at the aquarium.

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