



A new species of *Pseudodiaptomus* (Copepoda: Calanoida) from Japan, with notes on the closely related *P. inopinus* Burckhardt, 1913 from Kyushu Island

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Abstract

A new species of the calanoid copepod, *Pseudodiaptomus nansei* **sp. nov.**, which has formerly been identified as *P. inopinus* Burckhardt, 1913, is described from estuaries of the Nansei Islands, southernmost Japan. This new species was compared with a population of the closely related *P. inopinus* from the neighboring Kyushu Island, western Japan, which is redescribed here. The new species is readily distinguishable from *P. inopinus* by the absence of dorsal spiniform processes on the fifth pediger in both sexes, short posterior projections of the genital operculum, and thin caudal setae of the female instead of swollen seta in *P. inopinus*. The mitochondrial gene cytochrome oxidase subunit I (mtCOI) sequences of *P. nansei* differed by 21–26% from the examined population of *P. inopinus*, in contrast to a 0–3% difference within the population of each species. The absence of descriptions identifiable to *P. nansei* in previous studies outside the Nansei Islands, coupled with no occurrence of *P. inopinus* there, suggests that *P. nansei* is endemic to Nansei Islands and geographically segregated from *P. inopinus*.

Key words: Nansei Islands, estuary, mtCOI, zoogeography

Introduction

The calanoid copepod genus *Pseudodiaptomus* Herrick, 1884 predominantly occurs in estuarine and coastal marine waters and presently comprises 77 species (Walter & Boxshall 2009). The temperate species *P. inopinus* Burckhardt, 1913 was originally described from a lake in China (Burckhardt 1913), and it is widely distributed in both fresh and brackish waters of East Asia, i.e. China (Shen & Tai 1962), Korea (Chang & Kim 1986; Lee *et al.* 2007; Chang 2009) and Japan (Kikuchi 1928; Mizuno & Miura 1984; Kawabata & Defaye 1994). One distinctive morphological characteristic of *P. inopinus* is the presence of very thick caudal setae on the female. However, Oka *et al.* (1991) recorded *P. inopinus* specimens having thin instead of thick setae from the Nansei Islands between Taiwan and Kyushu Island, western Japan, and suggested that thin caudal setae represent geographical variation within the species. In our investigation we also collected the same type of specimens from the Nansei Islands. Our morphological and molecular comparisons of these specimens with *P. inopinus* specimens with thick caudal setae collected from Kyushu Island revealed that specimens with thin setae from the Nansei Islands belong to a separate species. We herein describe the specimens collected from the Nansei Islands as *P. nansei* **sp. nov.** along with specimens identifiable as *P. inopinus* from Kyushu, and present the results of a genetic comparison between two.

Material and methods

Sample collection and examination. Zooplankton from brackish water was collected from 39 rivers and bays of seven islands of the Nansei Islands between 9 and 15 October 2008 and from 12 rivers of Kyushu between 18 and 21 August 2009 (Fig. 1). Collections were made by towing a plankton net with 0.2-mm mesh from the