

A New Species of *Cladolabes* (Echinodermata: Holothuroidea: Dendrochirotida: Sclerodactylidae) from Nagasaki, Japan, with Partial Redescription of the Neotype of *C. limaconotus*

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(Received 30 June 2013; Accepted 27 February 2014)

We describe the new sclerodactylid sea cucumber *Cladolabes kirara* sp. nov. based on 10 specimens collected in the intertidal zone of the west coast of Nagasaki Prefecture, Japan. For comparison, we also examined the neotype specimen of *Cladolabes limaconotus* Brandt, 1835 (type species of the genus) and provide illustrations of the general appearance of its body and of ossicles from a tentacle, the introvert, and the middle part of the body. The new species is readily distinguishable from its congeners by the shape of the ossicles in the integument of the body wall, which are two-pillared tables with rudimentary discs, distally united pillars, and most frequently two holes and a cross-beam between the pillars.

Key Words: Echinodermata, Holothuroidea, Dendrochirotida, Sclerodactylidae, *Cladolabes kirara* sp. nov., taxonomy, new species, Japan.

Introduction

The taxonomic identity of the dendrochirotid holothurian genus *Cladolabes* Brandt, 1835, as well as that of its type species, *C. limaconotus* Brandt, 1835 (type locality: Ogasawara Ids., Japan), was obscured for a long time due to the lack of type material. The genus had often been confused with other genera, such as *Urodemas* Selenka, 1867 (e.g., Deichmann 1944), before Heding and Panning (1954) re-diagnosed *Cladolabes*. Their work was based on neotypification of a specimen exhibiting the typical features of *C. limaconotus* that was collected in 1893 in Nagasaki, Japan, and deposited in the Zoological Museum, University of Copenhagen (ZMUC), Denmark. While Heding and Panning's (1954) new definition has been widely accepted by later researchers (e.g., Cherbonnier 1988), the taxonomy of *Cladolabes* has been hampered by the highly polymorphic nature of the ossicles and calcareous ring, which can vary drastically within a species (Heding and Panning 1954). Because these are key distinguishing features, a number of ossicles and calcareous rings from many specimens should be examined in order to arrive at a better taxonomy of the species in this genus.

Heding and Panning (1954) assigned eight species to *Cladolabes*, including the type species, but nine are currently recognized (Paulay 2013), of which *C. limaconotus* and *C. schmeltzii* (Ludwig, 1875) have been recorded from Japanese waters (Brandt 1835; Heding and Panning 1954; Imaoka 1995; Imahara 2011, 2013). A species of *Cladolabes* that we recently found intertidally in Nagasaki, western Japan,

turned out to be different not only from both *C. limaconotus* and *C. schmeltzii*, but also from all the other congeners. In this paper, we describe this shore-dwelling species as new to science. For comparison, we examined the neotype specimen of *C. limaconotus*, a partial redescription of which is also given.

Materials and Methods

Ten specimens were collected by staff of the Saikai Pearl Sea Resort, Sasebo, Nagasaki, on 28 March 2013 in the intertidal zone of a boulder shore (33°15'13"N, 129°33'25"E) on Bojima Island, Kujukushima Islands, near the west coast of Nagasaki Prefecture. We fixed five of the specimens in 80% ethanol after anaesthetization; the remaining five were fixed without anaesthesia. Anaesthetization was performed in a menthol solution: 0.37 g of menthol was dissolved into 100 ml of 99% ethanol, which was diluted to 3.0% with seawater. The specimens were immersed in the diluted solution for 0.5–1.0 h; when the anaesthesia had taken effect, the tentacles emerged in response to a gentle squeeze of the body. Before fixation, magnesium chloride (MgCl₂·6H₂O) was added to the solution at a ratio of 3.0 g per 100 ml for further anaesthetization.

We dissected all 10 specimens and examined the tentacles, the Polian vesicles, the stone canals, and the calcareous rings under a stereoscopic microscope (Nikon SMZ). To observe ossicle morphology, small pieces of tissue were taken from each specimen from the following parts of the