

# First records of *Brada kudenovi* Salazar-Vallejo, 2017 (Annelida, Flabelligeridae) from Japan

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## Abstract

We reassess two specimens, part of the late Dr Minoru Imajima's collections, from Japan of the flabelligerid genus *Brada* Stimpson, 1853. We re-identify the specimens as *B. kudenovi* Salazar-Vallejo, 2017 and newly record this species from Japan, which represents the southernmost locality of the genus worldwide. The specimens were previously reported as *B. inhabilis* (Rathke, 1843), which has Molde, Norway as its type locality. However, the morphological features are identical to the original description of *B. kudenovi* in the following: the body is whitish in alcohol; there are one or two multiarticulate notochaetae per parapodium; the neuropodial lobes are low, not projecting; and the body papillae are short.

## Keywords

Deep sea, flabelligerids, Polychaeta, polychaete, Tohoku.

**Academic editor:** Guilherme Henrique Pereira Filho | Received 28 November 2019 | Accepted 27 December 2019 | Published 21 February 2020

**Citation:** Jimi N, Imura S (2020) First records of *Brada kudenovi* Salazar-Vallejo, 2017 (Annelida, Flabelligeridae) from Japan. Check List 16 (1): 207–210. <https://doi.org/10.15560/16.1.207>

## Introduction

The flabelligerid polychaete genus *Brada* Stimpson, 1853 was revised by Salazar-Vallejo (2017) and restricted to five species. The genus can be differentiated from its most similar genus, *Bradabyssa* Hartman, 1967, by having only eight branchiae and blunt neurospines. *Brada* species are known from shallow to deep waters in the Arctic Ocean, North Atlantic Ocean, and Bering Sea (Salazar-Vallejo 2017).

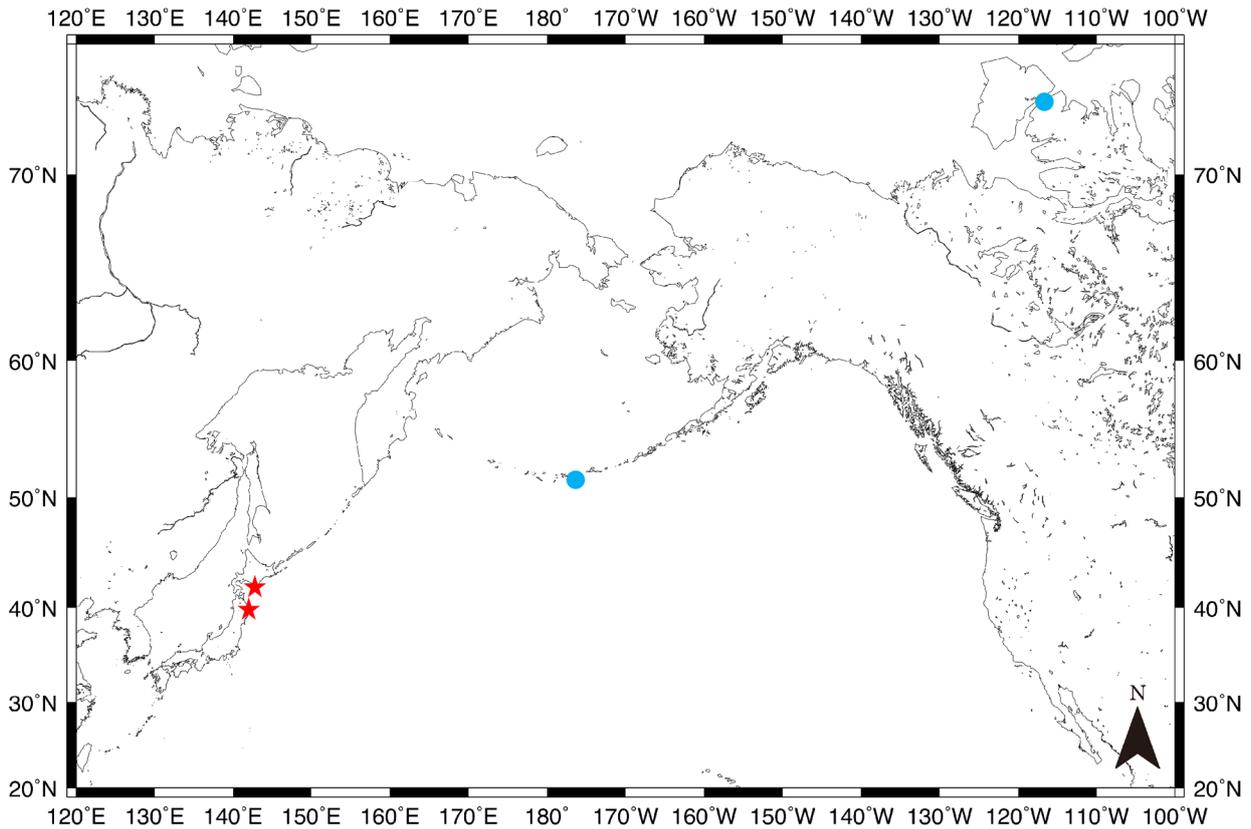
In Japan, a single *Brada* species, *Brada inhabilis* (Rathke, 1843), has been previously recorded off Tohoku and Samani as *Brada granulata* Malmgren, 1867 (Imajima 1972, 2009) (Fig. 1), but *B. granulata* was synonymized with *B. inhabilis* by Støp-Bowitz (1948).

However, the description of *B. inhabilis* by Imajima (1972, 2009) was brief, and a redescription based upon his specimens is needed for understanding the accurate biodiversity of Japanese flabelligerids.

In this study, we reassess the records of *B. inhabilis* from Japan and confirm the identity of the specimens in the collection of the late Dr Minoru Imajima as *B. kudenovi* Salazar-Vallejo, 2017. These are the first records of the species in Japan.

## Methods

The Imajima specimens are in the National Museum of Science and Technology, Tsukuba (NSMT). We observed them using Nikon SMZ18 and Nikon ECRIPSE



**Figure 1.** Map showing the distribution of *Brada kudenovi*. Blue dots represent previous records, and red stars represent new records.

80i microscopes and photographed them with a Canon Kiss X8i digital camera.

## Results

Family Flabelligeridae de Saint-Joseph, 1894

Genus *Brada* Stimpson, 1853

[New Japanese name: zunguri-habouki-zoku]

### *Brada kudenovi* Salazar-Vallejo, 2017

Figures 2, 3

[New Japanese name: Kudenova-zunguri-habouki, クデノヴァズングリハボウキ]

*Brada granulata*: Imajima 2009: 122, 178 (non Malmgren, 1867).

*Brada kudenovi*: Salazar-Vallejo 2017: 18–20, fig. 7.

**New records** (Fig. 1). JAPAN • off Sanriku; 39°47.25'N, 142°16.41'E–39°45.56'N, 142°16.01'E; 294–314 m depth; Dr Minoru Imajima leg., 14 Oct. 2007; 1 specimen, NSMT-Pol 110667 • off Samani (ca 42°04'N, 142°54'E; 50 m depth; Dr Minoru Imajima; 7 Aug. 1970; 1 specimen, NSMT-Pol 113254.

**Identification.** Body 19–20 mm long (complete specimens), 5 mm wide, fusiform, tapered in posterior region, whitish after fixation, 21–24 chaetigers (Fig. 2A). Body surface with fine sand particles (Fig. 2A). Body papillae small, globose, sediment particles covering all papillae. Gonopores not seen.

Prostomium low cone (Fig. 2B), black eyes present, caruncle developed, lateral lip well developed, ventral

lips reduced. Palps long, thick. Eight branchiae arranged along posterior margin of prostomium, thick, cirriform, as long as palps, arranged in a posterior row, barely separated mid-dorsally in two lateral groups, each one with four filaments (Fig. 2B). Nephridial lobes present on inner bases of second branchiae.

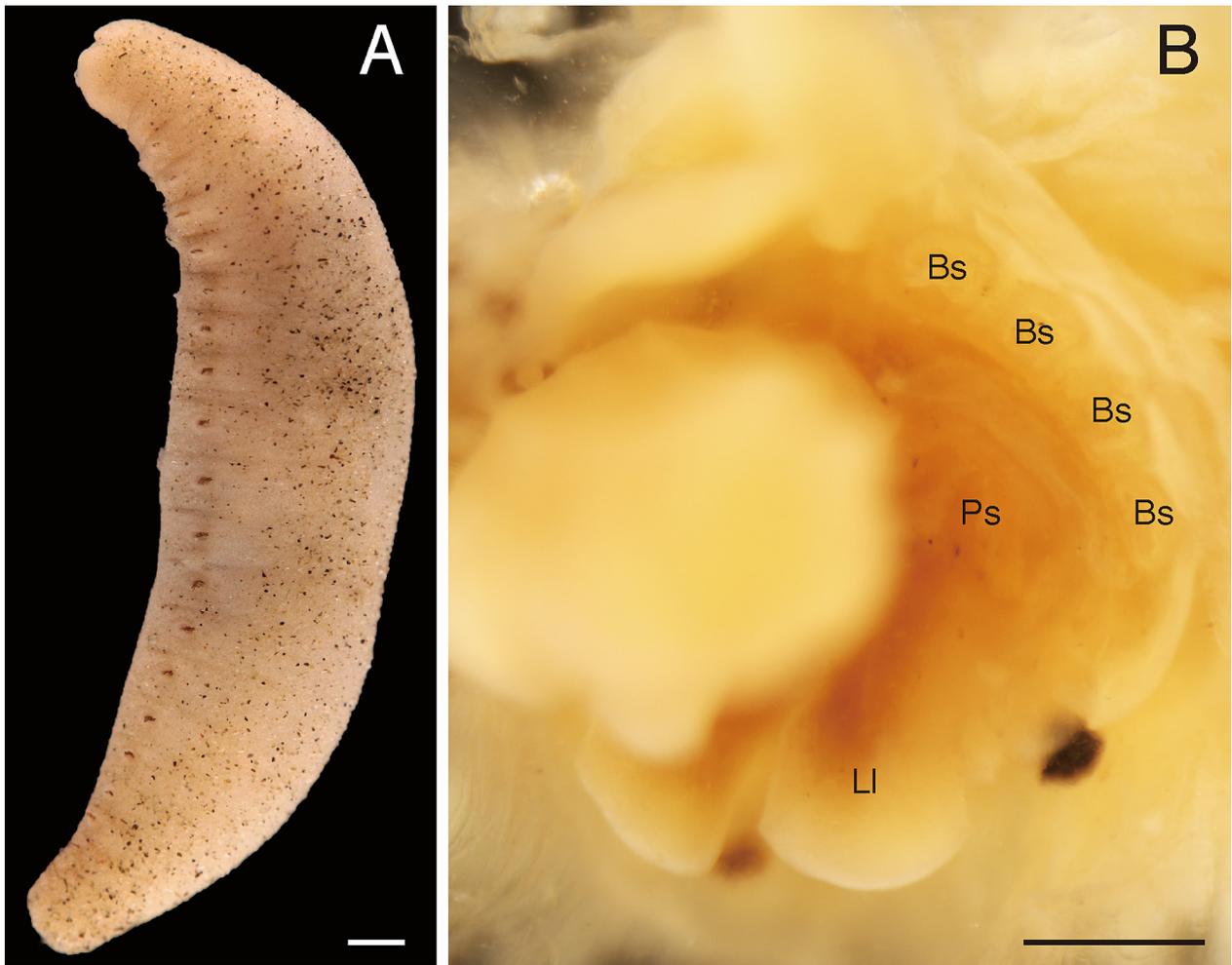
Cephalic cage poorly developed, as long as notochaetae in following chaetigers, consisting of notochaetae, and neurochaetae multiarticulated capillary on chaetiger 1.

Parapodia poorly developed. Notopodia and neuropodia close to each other. Notopodia inconspicuous, chaetae surrounded by about eight rounded, short papillae. Neuropodia small truncate lobes, surrounded by about 10 rounded, short short papillae. Notochaetae multiarticulated capillaries, one or two chaetae per ramus, with articles short basally, long medially and distally (Fig. 3A). Falcate neurospines on chaetiger 2 and following ones, 4–6 per ramus, with medium-sized anchylosed articles basally and medially, distally hyaline (Fig. 3B).

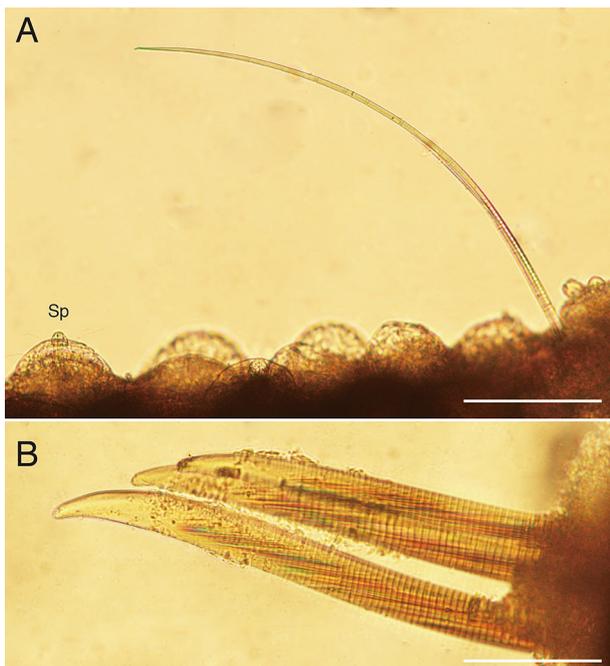
**Distribution.** Pacific coast of northern Honshu to Hokkaido, Japan, at depths of 50–314 m (dredged; present study); Bering Sea at depths of 143–257 m (dredged, type locality; Salazar-Vallejo 2017); Arctic Ocean, at 26 m deep (dredged; Salazar-Vallejo 2017).

## Discussion

The northern Honshu specimen was first reported as *B. granulata* (synonym of *B. inhabilis*) with collection data



**Figure 2.** *Brada kudenovi* Salazar-Vallejo, 2017, NSMT-Pol 110667. **A.** Whole body in lateral view. **B.** Frontal view of the anterior end with right palp on site (Bs = branchial scar; Ps = palp scar; LI = lateral lip). Scale bar: A = 1 mm; B = 500  $\mu$ m.



**Figure 3.** *Brada kudenovi* Salazar-Vallejo, 2017, NSMT-Pol 110667, chaetiger 7. **A.** Notochaeta and a small papillae (Sp). **B.** Neurospines. Scale bar: A = 200  $\mu$ m; B = 100  $\mu$ m.

only. However, the morphological features are closer to the original description of *B. kudenovi* in the following ways: body whitish when preserved in alcohol; with 1 or 2 multiarticulate notochaetae per parapodium; neuropodial lobes low, not projecting; body papillae short. Therefore, we identified the specimens as *B. kudenovi*, and these specimens represent new records from Japan. Both *B. inhabilis* and *B. kudenovi* have a fusiform body with short papillae (Salazar-Vallejo 2017). However, *Brada kudenovi* can be discriminated from *B. inhabilis* by the following features: in *B. kudenovi* body is whitish in ethanol, with non-projected neuropodial lobes, with 1 or 2 notochaetae per bundle, whereas in *B. inhabilis* body is grayish or tan, neuropodial lobes are projected, and there are 3–4 notochaetae per bundle. All species of *Brada*, as reported by Salazar-Vallejo (2017), were collected from the North Atlantic Ocean, Arctic Ocean, and Bering Sea (47–78°N). This study represents the southernmost record of *Brada* (39°N).

### Acknowledgements

We are grateful for Dr Hironori Komatsu for help in finding the specimens. This study is partly supported by

JSPS KAKENHI No. 19J00160. We also thank to Dr Sergio I. Salazar-Vallejo and Dr Alexandra Rizzo for providing valuable comments on this manuscript.

## Authors' Contributions

NJ designed the study and drafted the manuscript. NJ conducted the morphological analysis. SI improved the manuscript. All authors read and approved the final manuscript.

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