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## First record of *Acetes sibogae sibogae* Hansen, 1919 in Japan

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**Abstract.** The occurrence of the shallow-water sergestid shrimp *Acetes sibogae sibogae* Hansen, 1919 (Crustacea, Decapoda, Sergestidae) in Japan has been confirmed. This is the first record of this species and reflects a notable northward range expansion to Okinawa-jima Island, Ryukyu Archipelago, Japan.

**Key words:** new record, *Acetes sibogae sibogae*, Sergestidae, Japan

### Introduction

The shallow-water sergestid shrimp *Acetes sibogae sibogae* Hansen, 1919 (Crustacea, Decapoda, Sergestidae) has been recorded in South and South-East Asian waters from India to the Philippines and the northern coast of Australia, above approximately 40°S (Omori, 1975; Xiao & Greenwood, 1993; Chan, 1998; Hanamura, 1999). Three subspecies (*A. sibogae australis*, *A. s. sibogae*, and *A. s. sibogalis*) have been recognised over this geographical range owing to their morphological characteristics (e.g., Omori, 1975; Pérez Farfante & Kensley, 1997; Hanamura, 1999), but *A. s. sibogalis* is considered a junior synonym of *A. s. sibogae* (see De Grave & Fransen, 2011). Further taxonomic analysis regarding this subspecific classification is needed (e.g., Ravindranath, 1980).

This species is important in the coastal crustacean community in Asia and has often been exploited in regional small-scale fisheries in Asian countries (Holthuis, 1980; Xiao & Greenwood, 1993; Chan, 1998; Hanamura, unpublished data).

Before the index occurrence, three *Acetes* spe-

cies, *A. japonicus* Kishinouye, 1905, *A. chinensis* Hansen, 1919, and *A. erythraeus* Nobili, 1905 were known to occur in Japan (Chihara & Murano, 1997). During a recent survey of *Acetes*, we found a considerable number of swarming shrimp in a mangrove estuary in Kokuba-gawa River (26°11'49.4"N, 127°41'11.1"E), Okinawa-jima Island, Ryukyu Archipelago, Japan. We collected samples every month between March 2017 and May 2017. These shrimp were identified as *Acetes sibogae sibogae*, which was hitherto not recorded in Japan (e.g., Hayashi, 1992).

This paper is the first record of this interesting species in Japan and provides some taxonomic information. The carapace length (cl in mm) is given to indicate the size of the shrimp. The materials examined herein have been deposited in the National Museum of Nature and Science, Tsukuba, Japan (NSMT).

### Taxonomic account

*Acetes sibogae sibogae* Hansen, 1919

[New Japanese name: Jiboga akiami]

(figs. 1& 2)

### Restricted synonymies

*Acetes sibogae* Hansen, 1919: 38, pl. 3, fig. 4a-h:

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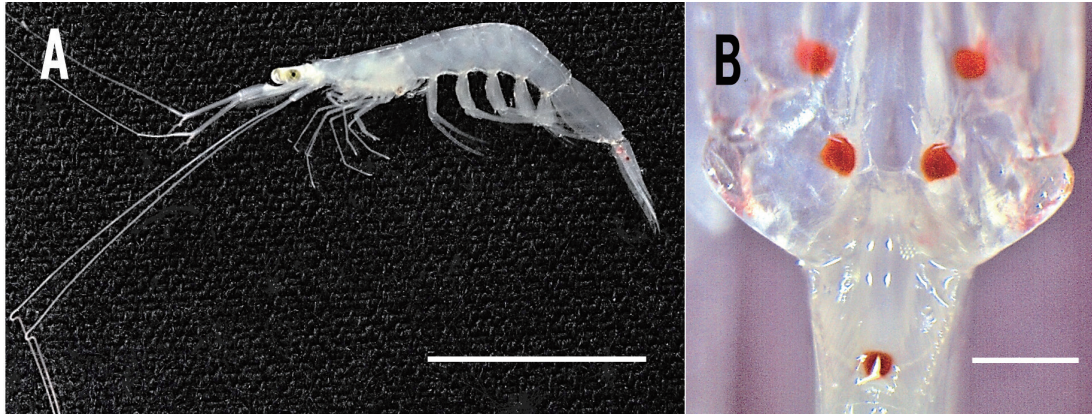


Fig. 1. *Acetes sibogae sibogae* Hansen, 1919, male 3.3 mm cl (A, B) from the Kokuba-gawa River, Okinawa-jima Island, Japan: A, lateral view of whole body; B, ventral view of last abdominal segment and uropods. Scale bars: 5 mm in A; 250 µm in B.

Ravindranath, 1980: 266: figs. 8 & 9; Hanamura, 1999: 465, figs. 1 & 2.

*Acetes sibogae sibogae*: Omori, 1975, fig. 27.

*Acetes sibogalis* Achuthankutty & George, 1973: 139, figs. 1-20.

*Acetes orientalis* Achuthankutty & Ayyappan Nair, 1976: 233, figs. 1-19.

**Materials examined.**

NSMT-Cr 25571, 10 males (4.1- 4.8 mm cl), 10 females (5.0-6.5 mm cl), Kokuba-gawa River, Okinawa-jima Island, Japan, May 2017, coll. Jun Fukuchi, det. Yukio Hanamura.

**Taxonomic notes**

**Morphological characteristics**

There is a red spot on the ventral side of the last abdominal segment (Fig. 1-B). There are two red spots on the uropod, one of which is on the sympod of the uropod and the other of which is on the basal part of the endopod.

In males, the lower antennular flagellum consists of 13 segments (Fig. 2-A). There is a clasping spine and an accessory spine arising from the same segment. The following segment bears three spines. The segment opposing the tip of the clasping spine bears

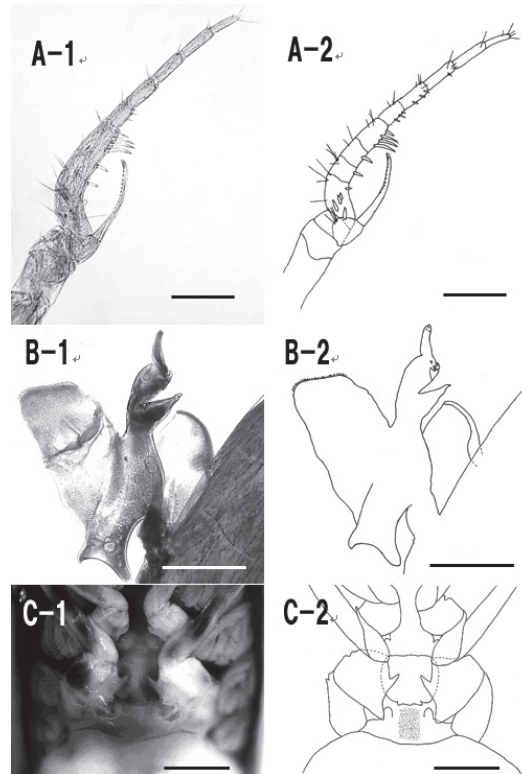


Fig. 2. *Acetes sibogae sibogae* Hansen, 1919, male 4.3 mm cl (A, B) and female 6.5 mm cl (C) from the Kokuba-gawa River, Okinawa-jima Island, Japan: A, male lower antennular flagellum; B, petasma; C, thelycum. The thelycum was stained with bromophenol blue. Scale bars: 250 µm in A-1, A-2; 500 µm in B-1, B-2; 1 mm in C-1, C-2.

three to six spines, with the most common number being four or five. The capitulum of the petasma carries two falcate spines (Fig. 2-B). There are a few minute spines on the distal end of the capitulum.

In females, the lower antennular flagellum consists of 14 to 18 segments. The distal inner margin of the basis of the third pereopod terminates in a projection, and the coxa is produced into a strong blunt tooth on the distal inner margin (Fig. 2-C). The lateral margins of the third thoracic sternite are elevated; there is a pair of small protuberances on the anterior part.

### Remarks

The morphological features above are consistent with those of *A. s. sibogae*. The number of falcate spines of the capitulum of the petasma differs from those in *A. s. sibogae* and *A. s. australis*, although most morphological characteristics are commonly shared between the two subspecies. Genetic analysis is required to determine the extent of differentiation between these subspecies.

### Occurrence and environmental conditions

Despite searching for it in several neighbouring rivers, such as the Yuhi-gawa River, Taiho-gawa River, Oura-gawa River, and Haneji-gawa River, we found *Acetes sibogae sibogae* only in the Kokubagawa River in the Manko estuary (Ramsar Site no. 996) in Okinawa-jima Island, Japan.

The water condition of the Kokubagawa River is cloudy, whereas the other rivers are clear and highly transparent. *Acetes* consume phytoplankton, small zooplankton, fine sediments, and detritus (Xiao & Greenwood, 1993). Fine sediments and detritus cloud the river water, and water quality has a major influence on the biomass and species composition of phytoplankton and zooplankton, which *A. s. sibogae* may consume. Water quality may affect the distribution of this shrimp.

We collected all *Acetes* material between 4 pm to 7 pm, when the tide was rising. Shrimp were obtained near the muddy bottom using scoop nets. The water temperature at the sampling site ranged from 22°C to 25°C, and the salinity ranged from 22 to 33. We collected most samples when the salinity was about 27, but more detailed information is required to determine the best salinity for *A. s. sibogae*.

In mangrove estuaries on the northwestern coast of peninsular Malaysia, *A. sibogae* occurs exclusively in the uppermost reach; in contrast, *A. indicus* and *A. japonicus* uses lower streams in the same estuarine system. This may allow *A. sibogae* to avoid competition with other species for food sources and micro-habitats (see Hanamura et al., 2012).

*Acetes japonicus* has been recorded in both Kyushu, southern Japan and in Taiwan but not in Okinawa-jima Island, although it is located between Kyushu and Taiwan. Both *A. s. sibogae* and *A. japonicus* may occur in these regions, but we have not found any *Acetes* species other than *A. s. sibogae* on Okinawa-jima Island.

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