

THE FIRST DEEP-SEA HYDROTHERMAL ANIMAL REPORTED
FROM TAIWAN: *SHINKAIA CROSNIERI* BABA AND WILLIAMS, 1998
(CRUSTACEA: DECAPODA: GALATHEIDAE)

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ABSTRACT

A deep-sea hydrothermal organism is reported for the first time from the coast of Taiwan. The species, *Shinkaia crosnieri* Baba and Williams, 1998, is a galatheid crab of the recently described subfamily Shinkaiinae Baba and Williams, 1998, previously known only from the Bismarck Archipelago and Mid-Okinawa Trough in Japan. Two specimens of this species were collected off northeastern Taiwan at a depth of about 1200 m from the southern end of the Okinawa Trough. *S. crosnieri* has been reported to form dense aggregations in hydrothermally active areas and one of the Taiwanese specimens has the largest size known for this species.

Although the entire eastern and southern coasts of Taiwan are very deep and steep, very little was known on the deep-sea fauna of this region until the last 20 yrs. Recent active studies on the deep-sea animals of Taiwan, however, have been based mainly on the catches of local commercial trawlers operated to at most 600 m deep. Nevertheless, some deep-sea decapod crustaceans were found to have their bodies blackened and apparently burned (Ng et al., 1998; Chan and de Saint Laurent, 1999). It is speculated that these animals might live close to hydrothermally active areas.

Deep-sea hydrothermally active areas have been detected off the coasts of Taiwan since 1978 (Soong, 1978; Wei et al., 1991). However, there is no knowledge on the possible hydrothermal fauna that exists off Taiwan. During a recent geomorphological survey of the active hydrothermal areas at the north-eastern coast of Taiwan, some animal specimens were accidentally caught by oceanographic dredge. Most of these biological samples are damaged but among them there is a large crab-like specimen that miraculously remained intact. A close examination of this specimen (and a badly damaged small specimen from the same lot) reveals that it is *Shinkaia crosnieri* Baba and Williams, 1998, the newly described galatheid subfamily, genus, and species associated with hydrothermalism from the Bismarck Archipelago and Mid-Okinawa Trough. This Taiwanese specimen also is the largest known for the species. The present report is the first record of a deep-sea hydrothermal organism from Taiwan and shows again the highly diverse deep-sea fauna of the island.

The specimens are deposited at the National Taiwan Ocean University, Keelung. The measurements 'cl' is the carapace length excluding rostrum, and 'cw' is the maximum carapace width.

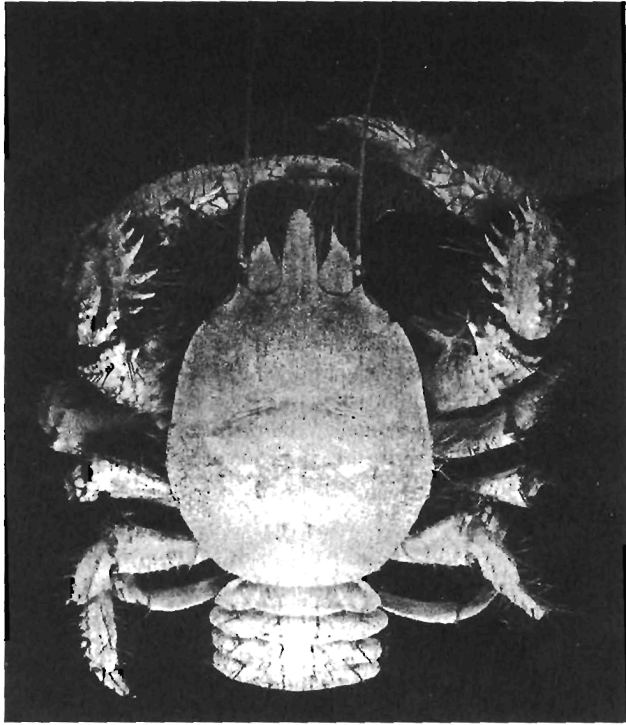


Figure 1. *Shinkaia crosnieri* Baba and Williams, 1998, N.E. Taiwan, male 58.9 mm cl, dorsal view.

TAXONOMIC ACCOUNT

Family Galatheidae Samouelle, 1819
 Subfamily Shinkaiinae Baba and Williams, 1998
Shinkaia crosnieri Baba and Williams, 1998
 (Figs. 1,2)

Shinkaia crosnieri Baba and Williams, 1998: 148, figs. 3–6.

Material Examined.—N.E. Taiwan, RV OCEAN RESEARCH 1, sta. DR 11, dredge, about 1200 m, April 1999, 2 males 21.1 mm cl \times 16.8 mm cw (badly damaged) and 45.0 mm cl \times 39.5 mm cw.

Diagnosis.—Carapace longitudinally oval, dorsal surface fairly smooth, with some scattered long stiff setae; lateral margin nearly unarmed except for outer orbital and cervical spines. Rostrum long, dorsally flattened, bearing two or three small lateral spines near tip. Eyestalks immovable, long and flattened, somewhat triangular, margins slightly denticulate; cornea reduced, as a colorless transverse band along ventral surface of stalk. Antennular peduncle armed with two long, strong lateral spines on basal article. Antennal peduncles composed of four articles. Pterygostomian flap anteriorly produced, covering basal parts of antennal peduncle. Short, broad epipods present on maxilliped III and anterior three pereopods. Chelipeds (pereopod I) strong and nearly equal, almost entirely

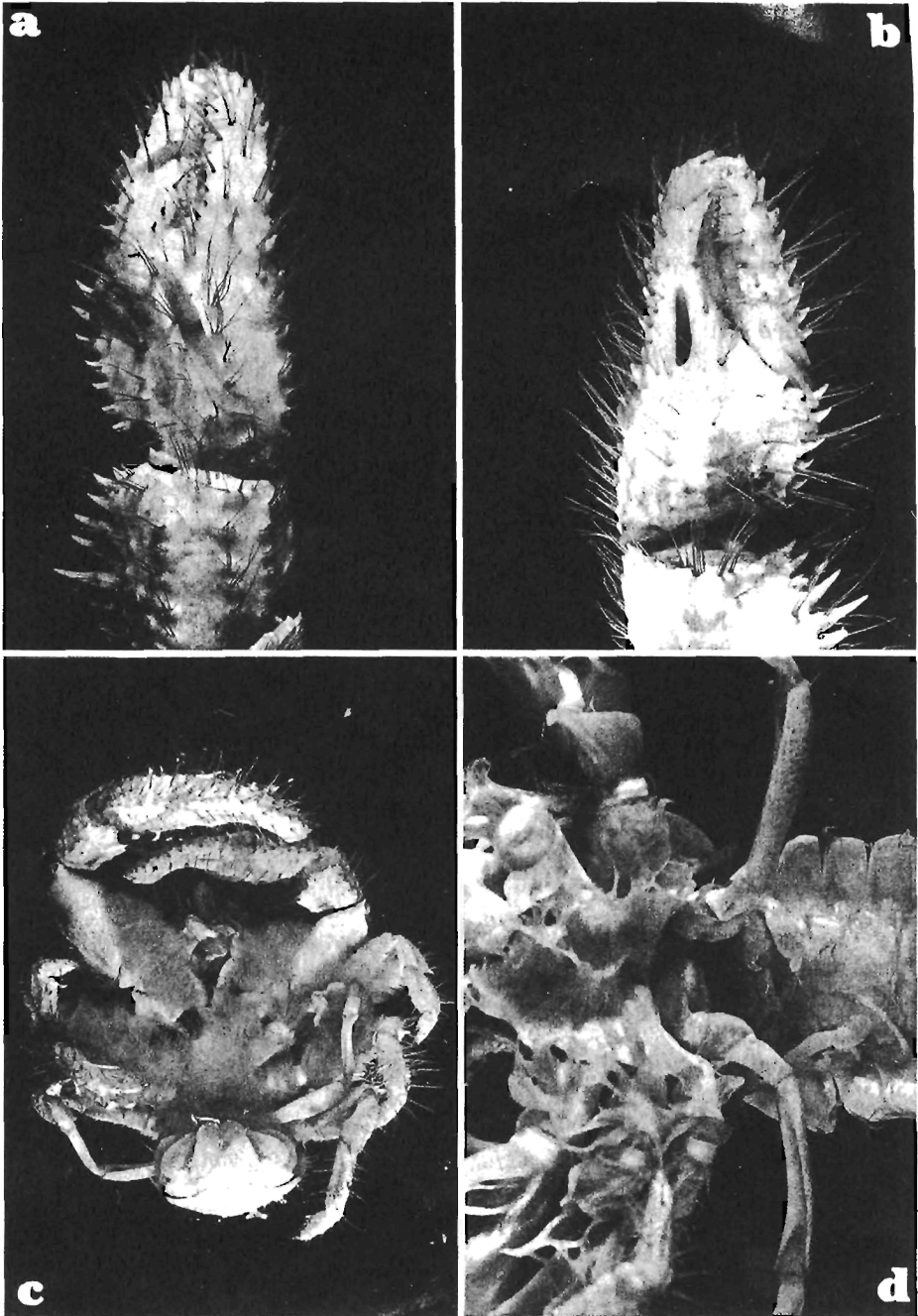


Figure 2. *Shinkaia crosnieri* Baba and Williams, 1998, N.E. Taiwan, male 58.9 mm cl: (a) chela and carpus of right cheliped, outer view, with tube-like invertebrate attached on chela. (b) chela of right cheliped, inner view showing deeply excavated longitudinal pit. (c) ventral view of entire animal showing mat of long silky setae on body. (d) ventral view of thoracic sternum and anterior abdomen showing pleopods I and II.

covered with long stiff setae; carpus bearing dorsal crest of strong teeth; chela armed with row of spines along dorsal and ventral margins, having deeply excavated longitudinal pit on inner surface near base of fixed finger; fingers straight, with cutting edges serrated with small teeth and bearing prominent molariform tooth near base of movable finger, fixed finger terminating in flat calcareous tooth. Walking legs (pereopods II to IV) stout, with many scattered long stiff setae; dactyli short, with comb of dense corneous spines along ventral margin. Pereiopod V slender and nearly smooth, chela with brush of dense setae. Ventral surface of cephalothorax covered with mat of long silky setae. Abdomen not distinctly sculptured but with rows of long stiff setae, pleura directed laterally. Males with pleopods I and II stout, terminal segment foliaceous; pleopod I strongly twisted distally. Pleopods III to V reduced. Tailfan bearing long dense setae along distal margin; telson composed of seven unequal platelets.

Coloration.—Body ivory white overall. Long stiff setae light brown. Mat of silky setae on ventral surfaces muddy white.

Distribution.—Known from active hydrothermal areas at 976–1483 m deep off Bismarck Archipelago, and at Okinawa Trough east of Okinawa as well as N.E. Taiwan.

Remarks.—The Taiwanese specimens generally agree with the original description of *Shinkaia crosnieri* given by Baba and Williams (1998) except for the smooth lateral margin of the carapace. Nevertheless, the two Taiwanese specimens are one very large and one very small, and Baba and Williams (1998) have pointed out that the spines on the lateral margin of the carapace in this species are poorly developed in young and obsolescent in large adults. The larger Taiwanese specimen, 45.0 mm cl, is the largest known for this species. The largest specimen in Baba and Williams (1998) is 41.2 mm cl. A comparison of the material from Mid-Okinawa Trough (North Ihiya Seamount, 'Shinkai 2000': Dive/Cruise no. 2K#672, 27°33.0'N, 126°58.0'E, 1390 m, 14 May 1993, 1 male, 2 females, paratypes [Japan Marine Science and Technology Center, JMSTC Ano-0006-93]; Dive 979, 27°47.22'N, 126°53.92'E, 976 m, 27 September 1997, 1 male 35 mm cl, 1 female 36 mm cl [Kumamoto University]) with the Taiwanese material showed that they are undoubtedly the same.

S. crosnieri was previously known from the Edison Seamount at the Bismarck Archipelago and the Ihiya Seamount in the Mid-Okinawa Trough, and forms large aggregations around hydrothermal vents (Baba and Williams, 1998). The present material was collected off the north-eastern coast of Taiwan at the southern end of the Okinawa Trough (Fig. 3). It is most likely that the hydrothermal sites off N.E. Taiwan are similar in topography as those hydrothermally active areas at the central graben of the Okinawa Trough described by Hashimoto et al. (1995). The other biological samples taken with the present specimens from the same dredge are a *Munidopsis* specimen (Galatheididae), some broken large *Bathymodiulus* mussels, many tiny gastropods and slender vestimentiferan tube-worms. These animals are also similar to the hydrothermal community reported from the Mid-Okinawa Trough by Hashimoto et al. (1995). Furthermore, there are some transparent tube-like invertebrates attached on the chelipeds of the larger male of *S. crosnieri*.

Other than some deep-sea hydrothermal sites that have been detected off the N.E. coast of Taiwan, several hydrothermally active areas are also found near the southern coast of Taiwan (Soong, 1978). However, the deep-sea areas of southern Taiwan belong to the South China Sea basin and it is not known whether the hydrothermal fauna, if there is any, of this region is similar to that of the northeastern coast. More deep-sea survey in the future may provide insights into the diversity of the hydrothermal communities around Taiwan.

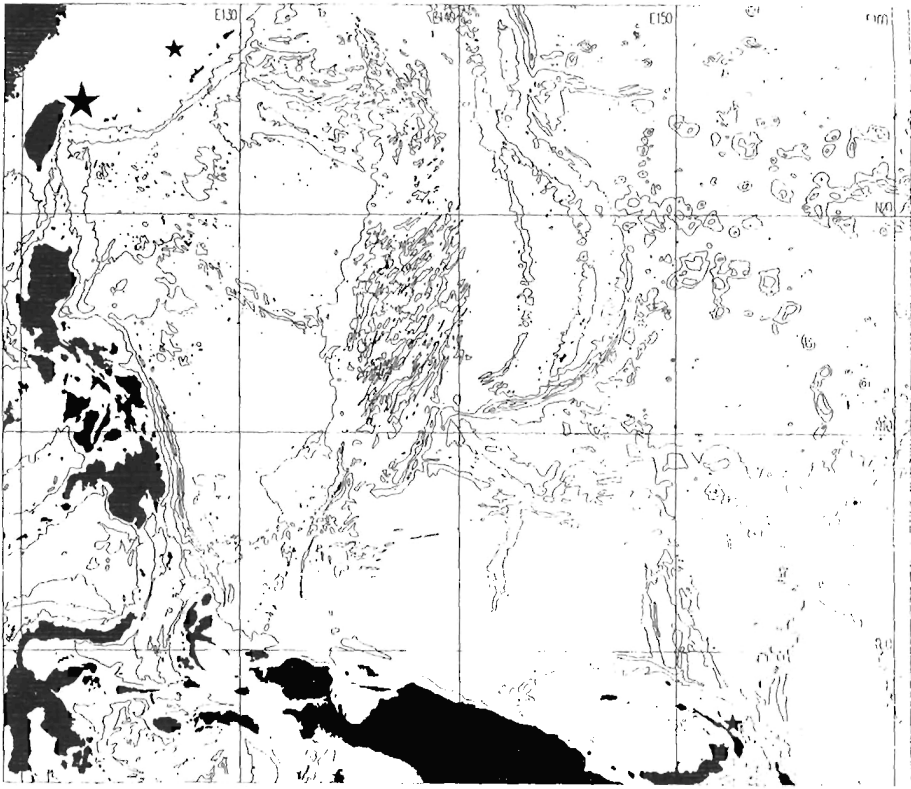


Figure 3. Distribution of *Shinkaia crosnieri* Baba and Williams, 1998 (marked with ★), bathymetry charted at 3000 m intervals, land areas shaded (modified from Baba and Williams, 1998).

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