

REDESCRIPTION OF *CALOCARIDES SOYOI*
(YOKOYA, 1933) FROM JAPAN
(CRUSTACEA: DECAPODA: AXIIDAE)

Brian Kensley and Tomoyuki Komai

Abstract.—*Calocarides soyoi* is characterized by a carapace with 3–6 lateral rostral spines, (0) 1–4 spines on the median carina, 4–7 spines on the submedian carina, and 6–10 spines on the lateral carina, and by the chelipeds of the first pereopods being strongly tuberculate and having numerous spines on the anterior and posterior margins of the meri. The species has been taken in a depth range of 138 to 270 m off northern Japan.

In 1989–1990 a biological survey of the bottom fishes of the Pacific coast of northern Japan was conducted from the T/V *Tan-shu-Maru*, under the auspices of the Japanese Fisheries Agency. A collection of decapod crustaceans captured with a small beam trawl off northeastern Honshu was sent to the second author for identification. Amongst this material were 13 specimens of a fairly large axiid shrimp (total length about 55 mm), which in turn were submitted for identification to the Smithsonian Institution's National Museum of Natural History. The material proved to be a species of *Calocarides*, most likely *C. soyoi* (Yokoya, 1933). Given the abbreviated original description and inadequate figures, it was decided to redescribe the species.

Material has been deposited in the Faculty of Fisheries, Hokkaido University (HUMZ), and in the National Museum of Natural History, Smithsonian Institution (USNM).

Family Axiidae

Calocarides soyoi (Yokoya, 1933)

Fig. 1; Tables 1; 2

Axius soyoi Yokoya, 1933:49, fig. 25.—
Horikoshi et al., 1982:30, 33, 38, 39, 120,
145, 168.

Axiopsis (Axiopsis) soyoi: Sakai, 1987:303.

Calocarides soyoi: Sakai & de Saint Laurent,
1989:4, 83, 103.

Material examined.—HUMZ-C990, 3 ♀ cl 11.3 mm, 14.1 mm, 13.0 mm, off Hachinohe, Aomori Prefecture, 42°52.6'N, 145°22.2'E, 152 m.—HUMZ-C994, ♀ cl 16.9 mm, off Fukushima Prefecture, 37°17.3'N, 141°21.4'E, 141 m.—HUMZ-C998, 3 ♂ cl 12.4 mm, 15.0 mm, 15.3 mm, off Fukushima Prefecture, 37°04'N, 141°31.7'E, 270 m.

USNM 243563, 2 ♂ cl 12.0 mm, 15.0 mm, ovig. ♀ cl 17.9 mm, off Fukushima Prefecture, 37°10.68'N, 141°17.86'E, 138 m.—USNM 243564, ovig. ♀ cl 18.8 mm, ♂ cl 14.2 mm, ♀ cl 11.8 mm, off Hachinohe, Aomori Prefecture.

Description.—Carapace with rostrum reaching to level of proximal antennal article 4, with 3–6 lateral spines, margins continuous posteriorly with lateral carinae bearing 6–10 spines; submedian carina bearing 4–7 spines; median carina bearing (0) 1–4 spines anterior of tubercle. Pleuron of abdominal somite 1 narrow, ventrally rounded; pleura of somite 2–5 ventrally broadly rounded. Telson 1.3 times longer than greatest width; lateral margin with 4 or 5 low serrations, posterolateral corner with 3 mobile small spines; posterior margin with small median spine; 2 pairs submedian fixed spines dorsally.

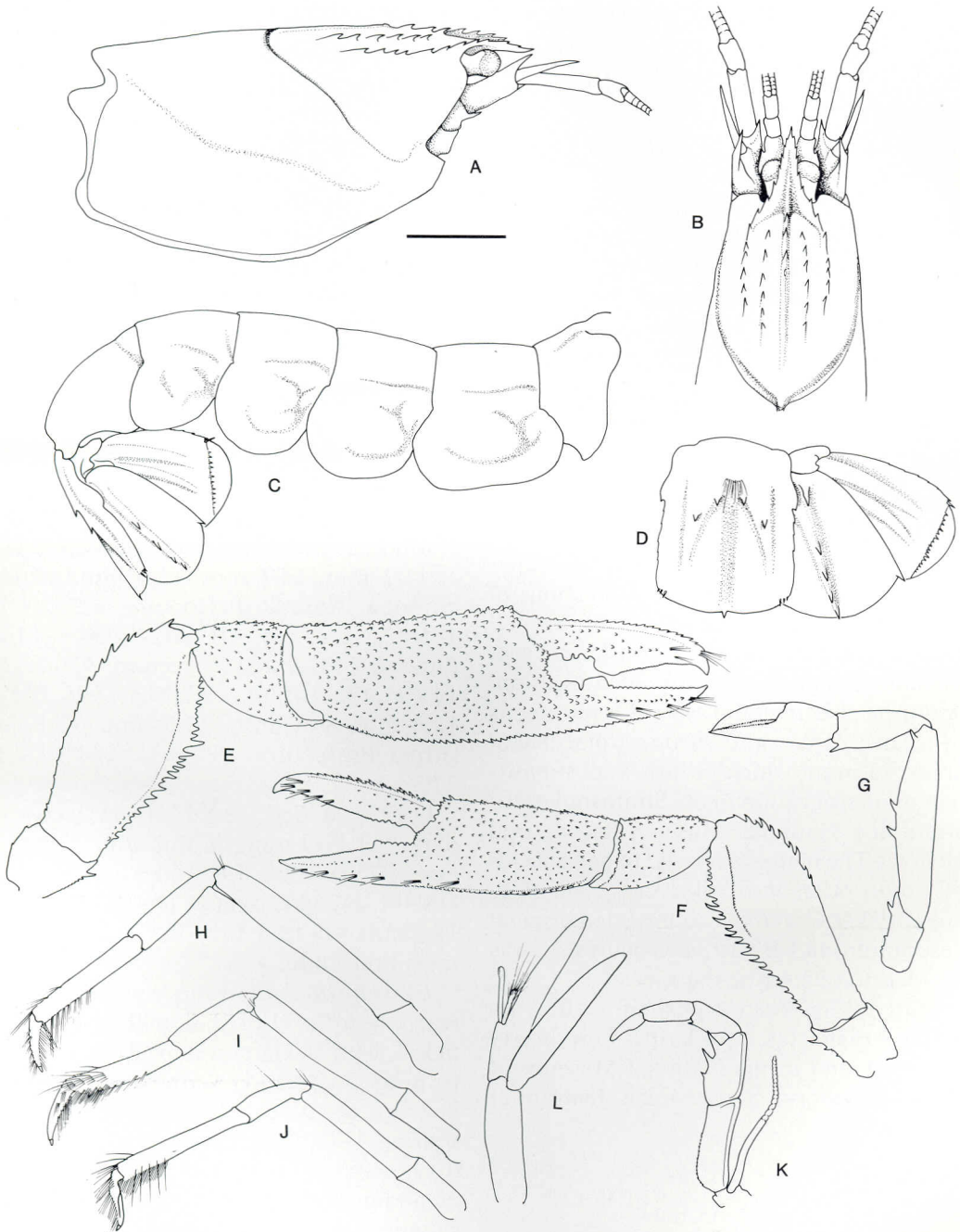


Fig. 1. *Calocarides soyoi*: A, carapace; B, anterior carapace in dorsal view; C, abdomen; D, telson and right uropod; E, pereopod 1, larger cheliped; F, pereopod 1, smaller cheliped; G, pereopod 2; H, pereopod 3; I, pereopod 4; J, pereopod 5; K, maxilliped 3; L, male pleopod 2. Scale for A-K, 5.0 mm, for L, 1.0 mm.

Table 1.—Distribution of exopods, epipods, and gills in *Calocarides soyoi*. r = reduced.

	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Exopod	1	1	1	—	—	—	—	—
Epipod	1	1	1	1	1	1	1	—
Podobranch	—	—	r	r	r	r	—	—
Arthrobranch	—	—	2	2	2	2	2	—
Pleurobranch	—	—	—	—	—	—	—	—
Setobranch	—	—	1	1	1	1	1	1

Eye reaching to about midlength of rostrum, poorly pigmented. Antennal acicle slender, elongate, falling just short of distal articulation of article 4 of peduncle. Maxilliped 3, ischium with fine serrations along posterior margin; merus with 3 strong spines on posterior margin increasing in length distally; carpus with small posterodistal spine. Pereopod 1, larger cheliped with ischium having single distal spine and several serrations on posterior margin; merus with proximal part of anterior margin bearing low serrations, distal part bearing 8–10 spines, posterior margin spinose for whole length, spines longest in midlength region; carpus with lateral, anterior, and most of mesial surfaces bearing small subacute tubercles; propodal palm about 1.5 times length of fingers, entire surface fairly densely covered with small acute and subacute tubercles, cutting edge of fixed finger with 2 strong square tubercles proximally, followed by regular row of tiny crenulations; dactylus with anterior margin serrate, lateral surface granulate, cutting edge proximally concave, with 3 small and one broad tubercles followed by regular row of tiny crenulations. Smaller cheliped with ischium, merus, and carpus less robust than, but similar to, those of larger cheliped; propodal palm about 1.3 times length of fingers, cutting edge of fixed finger with about 6 small tubercles proximally followed by regular row of tiny crenulations; dactylus with few low tubercles proximally on cutting edge followed by regular row of tiny crenulations.

Pereopod 2, ischium with 2 low proximal tubercles and stronger distal spine on posterior margin; merus with 2 or 3 strong spines at about midlength and single distal spine on posterior margin; carpus with single posterodistal spine. Pereopods 3–5 lacking ischial and meral spines. Distribution of exopods, epipods, and gills, see Table 1. Pleopod 1 in male absent; uniramous in female. Endopod of pleopods 2–5 bearing appendix interna. Pleopod 2 in male with setose appendix masculina shorter than appendix interna. Lateral ramus of uropod with lateral margin bearing about 5 low distal serrations, mobile spine at articulation of suture, about 16 small spines along suture; mesial ramus with strong laterodistal

Table 2.—Carapace spination in *Calocarides soyoi*.

	Carapace length mm	Median carina spines	L/R submedian carina spines	L/R lateral carina spines	L/R rostral spines
ovig. ♀	18.8	2	6/5	7/7	5/6
ovig. ♀	17.9	3	6/6	8/7	5/4
♀	16.9	2	6/6	8/8	4/4
♀	14.1	4	4/6	6/6	3/5
♀	13.0	4	6/6	6/6	4/4
♀	11.8	4	5/4	8/7	5/4
♀	11.3	2	6/6	7/8	5/6
♂	15.3	2	5/5	8/7	4/5
♂	15.0	4	7/7	7/8	5/5
♂	15.0	3	6/5	10/10	4/4
♂	14.2	2	5/6	6/6	3/4
♂	12.4	2	4/5	—	—
♂	12.0	1	5/6	7/6	5/5

spine, dorsal longitudinal ridge bearing strong proximal spine and 4 spines on distal half.

Egg size: 1.7×2.0 mm, slightly ovate.

Color in life: Entire animal orange-brown, with lateral carapace and abdomen somewhat paler. Cornea pale yellow.

Remarks. — Few records of species of *Calocarides* (or of genera confused with *Calocarides*) exist for Japan (see List of Japanese Thalassinidea in Sakai 1987:303).

Kobjakova's record of *Calastacus quinqueseriatus* (1937:142, pl. 2, fig. 8) from the Sea of Japan appears from the figure to be fairly similar to the present species, but does not have spinose margins on the first chelipeds; these latter are also proportionally broader than in true *C. quinqueseriatus* or in the present species.

The present species differs from *C. quinqueseriatus* (Rathbun, 1902) known from Oregon to southern California, in having somewhat less slender first chelipeds, smaller and more numerous spines on the anterior margin of the propodi of the first chelipeds, anterior margins of the dactyli of the first chelipeds spinose for their whole length, rather than having just a few proximal spines, and in being a smaller species (cl ovig. ♀ *C. quinqueseriatus* 15.4–24.0 mm).

Axius habereri Balss, 1913, (see also Balss 1914) reported from Japan and Korea, is probably not a *Calocarides*, given the broad non-tubercular first pereopods and the presence of a post-cervical middorsal carina.

The species recorded by Yokoya (1933) as *Axius soyoi*, from Fukushima (almost exactly the same locality as the present species) appears to be very similar to the present species. The major difference mentioned in the description is that the median carina lacks any spines or tubercles. Yokoya's description and figures are, unfortunately, insufficiently detailed, especially in the nature of the first chelipeds, the uropods and telson. Yokoya's species was based on ten specimens; no holotype was designated. The second author attempted to trace these syn-

types, from Tokyo Imperial University through Kyushu University, to Kitakyushu Museum where a single syntype was located. This dried and damaged specimen proved to be something other than a *Calocarides* species, with four distinctive spines on the lateral cervical groove, and four spines on the anterolateral margin of the carapace. Several possibilities now present themselves: Yokoya had more than one species amongst the ten specimens, or, the supposed extant syntype is some other species whose data or labels were misplaced in the several moves of the *Sôyô-Maru* material, or, the true syntypes still exist and may be brought to light.

We have decided to take a conservative position, and refer to the present material as *Calocarides soyoi*. We consider the possibility remote that two different species of *Calocarides* occur in the same depth-range in the same localities off the Fukushima Prefecture. We have not selected a neotype, as there is still a distinct possibility that Yokoya's syntypic material will be found. Amongst the present 13 specimens, there is some variation in the spination of the carapace (see Table 2). The lateral and submedian carinal spine counts agree well with those given by Yokoya. The median carinal spination ranges from one to four spines; given this variation, it seems possible that some specimens may lack spines on this carina entirely, as in Yokoya's material.

Acknowledgments

We thank Drs. Y. Yabumoto and K. Ueda of the Kitakyushu Museum, and Mr. H. Minei of Kyushu University for their help in tracking Yokoya's material. We are deeply indebted to Dr. T. Inada of Tohoku Regional Fisheries Research Laboratory, Mr. O. Yamamura of the Research Institute of the North Pacific Fisheries, Hokkaido University, and the staff of the T/V *Tanshu-Maru* for collecting the material. We are grateful to Dr. R. B. Manning of the Smith-

sonian Institution, and Dr. A. B. Williams of the National Marine Fisheries Service, for their comments on the manuscript.

Literature Cited

- Balss, H. 1913. Diagnosen neuer ostasiatischer Macruren.—*Zoologischen Anzeiger* 42(5):234–239.
- . 1914. Beiträge zur Naturgeschichte Ostasiens. Ostasiatische Decapoden II. Die Natantia und Reptantia.—*Abhandlungen der Mathematisch-Physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften* 2, suppl. 10:1–100.
- Horikoshi, M., T. Fujita, M. Takeda, M. Okiyama, S. Ohta, E. Tsuchida, & M. Yamamoto. 1982. Preliminary compilation of the results obtained by the "Survey of Continental Shelf Bordering Japan" carried out on board the S/S Sôyô-Marû during 1923–1930. In M. Horikoshi, ed., Report for a part of the result of Grant-in-Aid for Cooperative Research (A), Ministry of Education, Science and Culture: "Studies on off-shore and deep-sea faunas in the west Pacific and Indian oceans" (Proj. No. 00534033). Ocean Research Institute, University of Tokyo, 252 pp.
- Kobjakova, S. I. 1937. Systematische Uebersicht der Dekapoden aus dem ochotskischen und japanischen Meere.—*Studies and Transactions of the Leningrad State University* 15:93–154. [In Russian, with German Summary]
- Rathbun, M. J. 1902. Descriptions of new decapod crustaceans from the west coast of North America.—*Proceedings of the United States National Museum* 24(1272):885–905.
- Sakai, K. 1987. Two new Thalassinidea (Crustacea: Decapoda) from Japan, with the biogeographical distribution of the Japanese Thalassinidea.—*Bulletin of Marine Science* 41(2):296–308.
- , & M. de Saint Laurent. 1989. A check list of Axiidae (Decapoda, Crustacea, Thalassinidea, Anomura), with remarks and in addition descriptions of one new subfamily, eleven new genera and two new species.—*Naturalists* 3:1–104.
- Yokoya, Y. 1933. On the distribution of decapod crustaceans inhabiting the continental shelf around Japan, chiefly based upon the materials collected by S. S. Sôyô-Marû, during the year 1923–1930.—*Journal of the College of Agriculture, Tokyo Imperial University* 12(1):1–226.

(BK) Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.; (TK) Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University, Hakodate, Hokkaido 041, Japan.