

Epicarids (Isopoda) of Eniwetok Atoll¹

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THE COLLECTING of parasitic isopods in the Epicaridea suborder has not been intensive in the north central Pacific, even though many forms have been reported from the bordering continents and major islands. It is therefore to be expected that additional representatives of the four included families (Bopyridae, Cryptoniscidae, Dajidae, and Entoniscidae) will soon be discovered in Oceania.

The following list gives those epicarids so far described from North Pacific oceanic islands (forms not identified by family are bopyrids; there are no entoniscids):

- Aporobopyrosa pacifica* from Palau (Shiino, 1942, pp. 441-443)
Aporobopyrus ryūkyūensis from Palau (Shiino, 1942, p. 441)
Bopyrina andamanica from Palau (Shiino, 1939, p. 597)
Bopyrina miyakei from Palau (Shiino, 1942, pp. 438-440)
Cabirops tuberculatus (cryptoniscid) from Palau (Shiino, 1942, pp. 453-457)
Cryptione elongata from the Galapagos (Hansen, 1897, p. 112)
Dactylocepon palaoensis from Palau (Shiino, 1942, pp. 445-447)
Entopbilus omnitectus from Hawaii (Richardson, 1904, p. 681)
Faba glabra (cryptoniscid) from Hawaii (Nierstrasz and Brender à Brandis, 1931, p. 3)
Gigantione hawaiiensis from Hawaii (Danforth, 1967, p. 153)
Gigantione pratti from Eniwetok (Danforth, 1967, p. 147)
Grapsicepon micronesianum from Palau (Shiino, 1942, pp. 447-450)
Ionella [a new species from Hawaii, submitted for publication]
Merocepon xanthi from Palau (Shiino, 1942, p. 444)

Notophryxus globularis (dajid) from the "North Pacific" (Sars, 1885, p. 220)

Scyracepon hawaiiensis from Hawaii (Richardson, 1911, p. 645)

Scyracepon oceanicum from Palau (Shiino, 1942, pp. 450-452)

Zonophryxus retrodens (dajid) from Hawaii (Richardson, 1904, p. 679)

With the aid of an Atomic Energy Commission grant administered by Dr. R. W. Hiatt of the University of Hawaii, the writer was able to spend some time at the Eniwetok Marine Biological Laboratory during the summer of 1964. Despite the fact that hundreds of crab and shrimp were studied, no isopod parasites were found. In subsequent years Dr. J. W. Knudsen of Pacific Lutheran University, investigating the crustaceans of the atoll under National Science Foundation grant GB-2412, found evidence of parasitism in several crabs and shrimp from three different islands, plus one infested crab (*Phymodius*) in the museum collection. These hosts were kindly relayed to me through Dr. J. S. Garth of the Allan Hancock Foundation at the University of Southern California, and they disclosed the following isopods: *Bopyrella thomsoni muiensis* n. ssp., *Cancricepon garthi* n. sp., *Gigantione pratti* Danforth, *Grapsicepon* sp., *Merocepon knudseni* n. sp., and *Scyracepon hawaiiensis* Richardson.

Although all of the foregoing are members of the Bopyridae, the title of this article was chosen to encompass the entire suborder, with the expectation of finding members of the other families at Eniwetok Atoll, which will be included in subsequent articles under the same title.

Bopyrella thomsoni muiensis n. ssp.

Bopyrella thomsoni Bonnier 1900, pp. 347-

351

Fig. 1

¹ Manuscript received November 18, 1969.

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MATERIAL: Two pairs of bopyrids.

HOSTS: *Alpheus strenuus* Dana, male and female.

AREA: Station 193, Henry (Mui) Island.

DATE: 12 August 1966.

DESCRIPTION:

Female: Color yellowish in preservative, with irregularly placed brown edging on parts of the thorax. Specimen no. 1: 11.0 mm long and 6.5 mm wide. Specimen no. 2: 13.0 mm by 9.0 mm.

Head. No velum. Totally fused to thoracomere I, with minor notches at lateral junctions. Eyes present but small.

Thorax. Six clearly defined segments, without bosses or inter-segmental folds. Very narrow coxal plates on thoracomeres I–IV of both sides, those of I giving evidence of the fusion of I and the cephalon. Dorsum smooth and flat. Marsupium widely open, with 5 pairs of small oostegites. Oostegite I with exposed, large, posterolateral incurving projection. Seven pairs of pereopods.

Abdomen. Totally fused, with no evidence of segmentation, even peripherally. Five pairs of biramous pleopods, I being rectangular, large, and meeting its counterpart at the midline; II–V oval and progressively smaller. Endopodites and exopodites essentially the same structure and size, each with a midlongitudinal chitinous vein along which it is slightly folded. The ventral pleon shows an anterior, transverse, crenulated ridge, followed by 4 central, lambda-shaped elevations from which the pleopods arise. Just medioventral to the border of the abdomen are 5 (on the long side) and 3–4 (short side), squared projections. The function of these is not known.

Male: Light yellow color in preservative. Pigment spots on head, ventral thoracomere VII, and ventral pleon. Specimen no. 1: 2.5 mm long and 1.0 mm wide. Specimen no. 2: 3.3 mm by 1.2 mm.

Head. Fused to thoracomere I and deeply imbedded in it. Eyes very evident. Antennae not visible from the dorsal aspect.

Thorax. Six clearly defined segments, all the same width. Seven pairs of pereopods. Seven midventral tubercles.

Abdomen. Six segments, separated laterally and fused medially. Pleomeres arranged in a fan shape rather than transversely, with VI small, central and cordate. Pleomere I the widest part of the animal. Ventral pleon without pleopods and with a smooth elevation centrally on pleomere I. One male showed very faint lateral swellings on pleomere I; these were missing on the other specimen.

REMARKS: Specimen no. 1 was taken from the right gill chamber of the female host, and specimen no. 2 from the left gill chamber of the male host. They agree in general with Bonnier's original description of both genus and species. However, a subspecies is proposed inasmuch as there are several points of dissimilarity which coincide with the differences mentioned by Chopra (1923, pp. 469–470) for a *Bopyrella thomsoni* from the Andaman Islands.

Size discrepancy is immediately evident; Bonnier's original specimens were 2.5 mm for the female, and 0.7 mm for the male, while the Mui Island females are 11.0 and 13.0 mm, and the males 2.5 and 3.3 mm. Some variation

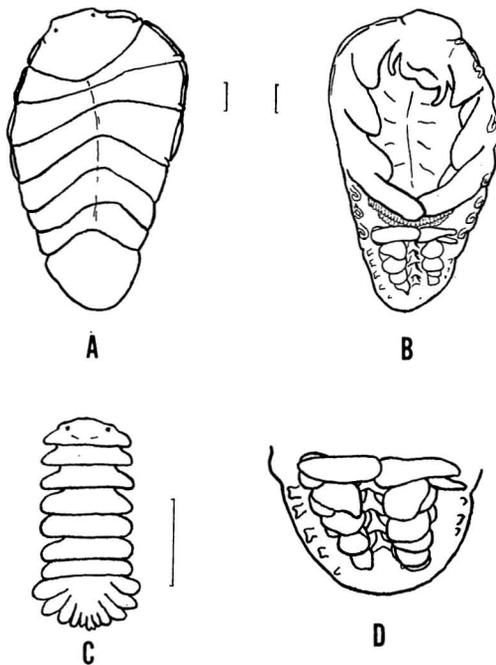


FIG. 1. *Bopyrella thomsoni muiensis* n. ssp. a, b, Dorsal and ventral aspects of female; c, dorsal aspect of male; d, enlarged ventral pleon of female.

TABLE 1
COMPARISON OF BONNIER'S FORM AND MUI ISLAND FORM OF *Bopyrella thomsoni*

FEATURE	FORM	
	Bonnier's	Mui Island
♀ head	No eyes. Fused to thoracomere I, but with obvious transverse furrow.	Small eyes. Completely fused with thoracomere I, only notches at periphery.
♀ thorax	Coxal plates on thoracomeres I-II of long side.	Coxal plates on thoracomeres I-IV of both sides.
♀ pleon	Ventral aspect with 6 transverse, crenulated ridges. Rudimentary pleural lamellae with flat lateral faces on largest units. Biramous pleopods appear as mere ovals. Pleopods I much larger than the others, but same shape.	Ventral aspect with 1 transverse, crenulated ridge, plus 4 midventral "lambda-shaped" structures. Rudimentary pleural lamellae with concavity on lateral faces of the largest. Biramous pleopods with lengthwise chitinous ridge on both the endo- and exopodites. Pleopods I elongate, meeting at midline.
♂ thorax	Progressively widening posteriorly.	Same width for all 7 segments.
♂ pleon	4 pleopods. Pleomere VI square, single. Transverse ventral ridges.	No pleopods. Pleomere VI cordate. Ventral aspect smooth, except for a central elevation on I.

should be expected in any specimen study, but since Chopra's Andaman Island form and the Mui Island forms tend to agree, the holotype must be the variant—hence the erection of a subspecies. Some of the contrasting features are given in Table 1.

The original specimen described by Bonnier came from the Tonga (Friendly) Isles and from the same host genus as the ones from Mui Island and the Andamans. Although there are over a dozen species of *Bopyrella* known from various parts of the world, *B. thomsoni* is the only form which has smooth borders on both sides of the pleon. As far as can be ascertained, the presence in the female *B. thomsoni* of abdominal subpleural-plate processes (the "rudimentary pleural lamellae" of Bonnier) is unique.

The specimen no. 1 subspecies female holotype and male allotype are deposited with the Allan Hancock Foundation collection as catalog number 664 and 664a, respectively.

I am indebted to Dr. A. H. Banner of the University of Hawaii for the identification of the host shrimp.

Cancricepon garthi n. sp.

Cancricepon Giard and Bonnier 1887, p. 172
Fig. 2

MATERIAL: One pair of bopyrids.

HOST: *Dacryopilumnus eremita* Nobili.

AREA: Station 406, Fred (Eniwetok) Island.

DATE: 8 August 1967.

DESCRIPTION:

Female: From left branchial area of the host. Yellow-white in preservative. No pigment spots. Body twisted slightly to the right. Very globose, with many eggs. 2.5 mm long by 2.0 mm wide.

Head. Wide velum at both anterior and lateral regions of the squarish head. Large evident eyes. No antennae or mouth parts visible from the dorsal aspect.

Thorax. Concave dorsally, due to the swollen marsupium. Seven thoracomeres, 7 pairs of strong pereopods. Four pairs of pleural bosses (first pair minute) and 4 pairs of coxal plates on segments I-IV. The former slightly rugose, the latter definitely more yellow than the remainder of the thorax. Pleural boss on the left side of IV with an apparent abnormality, as it is displaced medially; also, the left side of thoracomere V with an abnormal bifurcation. Thoracomere IV with a small middorsal swelling, V with a larger swelling, VI with a pronounced and square-topped protuberance, and VII with a definite spine which is noncontiguous with the elevation on segment VI.

Abdomen. Six segments, I-V each with a pair of short pleural lamellae (the longest 0.5 mm) that are digitate, plus 2 pairs of biramous pleopods. The exopodites of the pleopods are

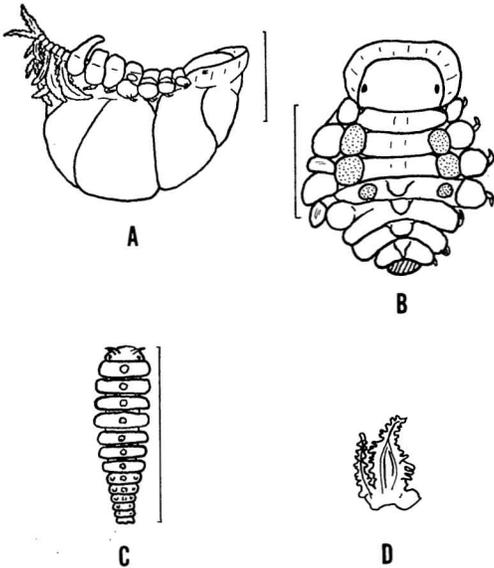


FIG. 2. *Cancricepon garthi* n. sp. *a*, Lateral aspect of female; *b*, dorsal aspect of female, pleon removed; *c*, ventral aspect of male, eyes showing through cephalon, all pereopods removed; *d*, ventral aspect, right appendages of female pleomere II, showing large plate and tubercular pleopod endopodite.

similar in appearance to the pleural plates, except that they become more lobed than digitate posteriorly. Endopodites inconspicuous swellings or bulblike structures. Uropods uniramous, similar to pleural plates in appearance, relatively short. No middorsal elevations on pleon.

Male: Yellowish color in preservative. Pigment spots scattered on dorsal thorax and dorsal pleomeres. 1.0 mm by 0.25 mm.

Head. Small, with rounded anterior border. Antennae visible from dorsal aspect. Eyes evident from both dorsal and ventral sides.

Thorax. Seven clearly defined segments, lateral portions noncontiguous. Seven pairs typical pereopods. Thoracomere I separated from cephalon by shallow furrow. Midventral tubercles present on segments I–VII.

Abdomen. Six segments, the last with a mid-posterior point. Ventral pleon showing 1 obvious and 2 less evident midventral swellings on pleomeres I–III, respectively. Five pairs pleopods represented by slight mounds laterally on I–V.

REMARKS: The genus *Cancricepon* has been derived from *Cepon*, and there is some confusion concerning several critical features. Duver-

noy (1840, pp. 598–603) referred to *Kepon typus* in which the endopodites of the pleopods were not well developed in the female. Later Nobili (1905, p. 506) indicated that the endopodites were well developed. This assumption was also made by Bonnier (1900, p. 251) when he stated that the endopodite and exopodite of both *Cepon* and *Portunicepon* were essentially the same size. Giard (1906, p. 704) designated *Grapsicepon* as the genus of a specimen that was probably *Cepon typus*, which added to the confusion since *Grapsicepon* has rudimentary endopodites plus middorsal thoracic protuberances (which are not present in *Cepon*). *Cepon elegans* Giard and Bonnier (1886, pp. 889–892) was changed to *Cancricepon elegans* Giard and Bonnier (1887, p. 73), and was illustrated (Giard and Bonnier, 1887, pl. 1) as having small, flaplike endopodites. Thus, while there does not seem to be any problem about the genus of the specimen at hand, there definitely should be clarification of the “cepon” criteria.

Cancricepon is characterized by having 4 middorsal elevations on thoracomeres IV–VII, which would be adequate for recognition were it not for the fact that the words “elevation, boss, upheaval, spine, protuberance,” are relative terms.

The two previously known species of *Cancricepon* are from the shores of France. *C. elegans* was described from the Straits of Dover, parasitizing *Pilumnus hirtellus* Linné, while the similar *Cancricepon pilula* Giard and Bonnier (1887, p. 73) was originally reported from Concarneau, France, on *Xantho floridus* Montagu and *X. incisus* (Leach). Bourdon (1963, pp. 425–426) listed the two species from the same respective hosts at Roscoff (Brittany), France. Stebbing (1910, p. 116) mentioned a “*Cancricepon* sp.” on *Pilumnus longicornis* Hilgendorf from Amirante (Seychelles area). Otherwise the genus has been but rarely encountered.

The length of *Cancricepon elegans* was given for the female as 9.0 mm, while the length of *C. garthi* is at most 2.5 mm. The “pebbled” appearance of the coxal plates and/or pleural bosses, so much stressed by Duvernoy for *Cepon* and by Nobili (1905, p. 505) for *Lobocepon*, is slightly present in *Cancricepon garthi*, whereas this feature is totally absent in *C. elegans*. In the tabulated comparison between *C.*

TABLE 2

COMPARISON OF *Cancricepon elegans* WITH *C. garthi*

FEATURE	<i>Cancricepon elegans</i>	<i>Cancricepon garthi</i>
♀ head	Bilobed. Small. Velum moderately large.	Not bilobed. Large. Velum very large, making a hood around the cephalon.
♀ thorax	Thoracomere I with obvious pleural boss. Pleural bosses with smooth, oval surface. Coxal plates smaller than pleural bosses, partially hidden. Middorsal projections sharp-tipped on V-VII.	Pleural boss of thoracomere I small or missing. Pleural bosses with pebbled, circular surface. Coxal plates large and very obvious. Middorsal projections sharp-tipped only on VII.
♀ pleon	All pleural plates with tubercular, rather than digitate edges. Exopodites and pleural plates about the same size and structure. Endopodites spade-shaped.	Anterior pleural plates with digitate, posterior plates with tubercular, edges. Exopodites shorter, more narrow than corresponding pleural plates. Endopodites merely swollen ovals.
♂ pleon	One midventral swelling on pleomere I, or none at all on pleomeres.	3 midventral swellings on pleomeres I-III.

elegans and *C. garthi* (Table 2), no attempt has been made to include *C. pilula*. At no place in the articles by Giard and Bonnier is a clear distinction made between *C. elegans* and *C. pilula*—indeed, Mouchet (1932, p. 505) wrote, "Giard et Bonnier n'en ont pas donné une diagnose précise, mais il est évident qu'il doit y avoir une très grande ressemblance. . . ." Even where the males of *C. elegans* and *C. pilula* are shown (Giard and Bonnier, 1887, pl. 2), there does not seem to be any major difference. Hence it must be assumed that subsequent references in the literature to *C. pilula* in France are based upon the host being a *Xantho*, rather than upon study of the parasite.

The bopyrid pair has been deposited with the Allan Hancock Foundation collection, as female holotype no. 671, and male allotype no. 671a.

Named in honor of Dr. J. S. Garth of the University of Southern California, who has courteously borne with my procrastination in determining epicarid identifications.

Gigantione pratti Danforth

Gigantione pratti Danforth 1967, pp. 147-149

MATERIAL: One pair of bopyrids.
 HOST: *Phymodius unguilatus* (Milne-Edwards).
 AREA: Bruce (Aniyaanii) Island.
 DATE: 23 February 1957.
 COLLECTOR: A. H. Banner.

This form was found in the left branchial

cavity of the host. It has been described and sketched in the indicated reference, and is the only one of the Eniwetok Atoll parasitic isopods so far discovered which was not collected in the field by Dr. Knudsen. The female holotype is catalog no. 110191, and the male allotype is no. 110190, in the U.S. National Museum.

Grapsicepon

Grapsicepon Giard and Bonnier 1887, p. 69
 Fig. 3

MATERIAL: Female bopyrid, immature.
 HOST: *Trapezia speciosa* Dana.
 AREA: Station 63, Fred (Eniwetok) Island.
 DATE: 17 March 1965.

DESCRIPTION:

Female: From the right gill chamber of the host. Almost white in the preservative. Minute pigment streaks on thoracomeres II, III. Body twisted strongly to the left. Length, excluding uropods, 2.6 mm; width 1.0 mm.

Head. Square in outline, having a wide velum on the anterior and lateral borders. Velum widest posterolaterally, giving a triangular shape to the cephalon. Eyes very evident, at extreme borders of the head proper. No antennae visible from the dorsal aspect.

Thorax. Seven clearly indicated segments, still retaining the juvenile condition of widely separated pleura. No evident pleural bosses or costal plates. Thoracomeres VI-VII with small but obvious posteriorly directed hooks mid-

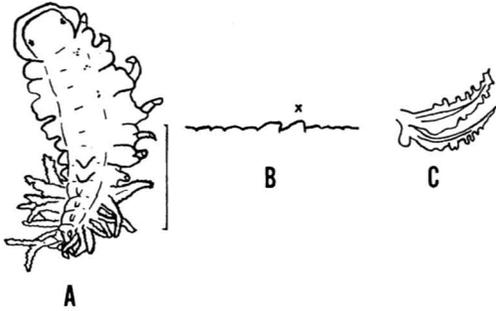


FIG. 3. *Grapsicepon* sp. *a*, Dorsal aspect of female; *b*, profile of dorsum, thoracomere VII indicated by "X"; *c*, ventral aspect, left appendages of female pleomere I, with reduced endopodite.

dorsally. Seven pairs of strong pereopods. Marsupium bordered by 5 pairs of small, cordate oostegites, widely separated and not flexed medially.

Abdomen. Six segments clearly delineated but with V–VI minute. Slight middorsal elevations on pleomeres I–III. A pair of elongated tuberculated plates on pleomeres I–V. Uniramous uropods 0.5 mm long, similar in appearance to the lateral plates; recurved. Five pairs of biramous pleopods, the exopodites slightly shorter than, and similar in appearance to, the lateral plates; endopodites as small swellings.

Male: No male was found.

REMARKS: *Ergyne*, *Grapsicepon*, *Paracepon*, *Portunicepon*, and *Tylocepon* all have pronounced elevations on thoracomeres VI–VII in the middorsal area—the "dorsal tubercle absent" given for *Portunicepon* by George (1946, p. 389) apparently was an error. *Tylocepon* can be discounted because its spine on VI is trifid; *Portunicepon* and *Ergyne* can be discounted since they both have well-developed endopodites on the pleopods; and *Paracepon* can be discounted since its pleural plate borders are not digitated or tuberculated.

There are seven species of *Grapsicepon* reported for the world, and the discovery of a representative, mature pair of this Fred Island bopyrid would be important in determining whether the Eniwetok form is a new species, or merely an immature form of the neighboring Japanese *G. magnum* and *G. rotundum* (Shiino, 1936a, pp. 167–172), or of the Palau *G. micronesianum* (Shiino, 1942, pp. 447–450).

Merocepon knudseni n. sp.

Merocepon Richardson 1910, pp. 33–34

Fig. 4

MATERIAL: One pair of bopyrids.

HOST: *Eriphia sebana* (Shaw and Nodder).

AREA: Station II, Fred (Eniwetok) Island.

DATE: 5 February 1965.

DESCRIPTION:

Female: Found in the right branchial chamber of the host crab. Light yellow color in preservative. No pigment spots. Body slightly twisted to the left. Pronounced costate appearance to the dorsum. Length 18.0 mm to telson, width 10.0 mm at thoracomere IV.

Head. Strongly bilobed. An obvious velum along the anterior and lateral borders, widest laterally. Each cephalic lobe almost an ellipse. No eyes. Antennae not visible from the dorsal aspect. Oral cone hidden ventrally by the swollen marsupium.

Thorax. Seven clearly delineated segments, the first 4 with greatly swollen pleural bosses, each constricted so as to produce 4 obvious swellings per thoracomere. Last 3 segments each with only a reduced, single swelling laterally. Coxal plates on first 4 thoracomeres, each being a swelling only slightly smaller than its accompanying pleural boss. A middorsal swelling on segment V; a larger, similar swelling on segment VI with a soft posterior bulge; a middorsal, posterior-facing, definite hook on segment VII. Seven pairs of strong pereopods. High, completely covered marsupium, having the fifth pair of oostegites turgid and moved posteriorly from the balance of the incubatory plates.

Abdomen. Length 4.0 mm. Six obvious segments; I–V with a pair each of pinnate lamellae which slightly decrease in length posteriorly. Plate I is 6.5 mm long on the right (larger) side, 5.5 mm on the left side. Each lamella has definite knob-shaped tuberosities along one edge, and strong irregularities on the other. Five pairs of biramous pleopods, the endopodites present as irregular or oval swellings. Exopodites very similar in appearance and size to the lamellae of the corresponding pleomeres. Lengths of the left exopodites: I = 5.0 mm, II = 4.0 mm, III =

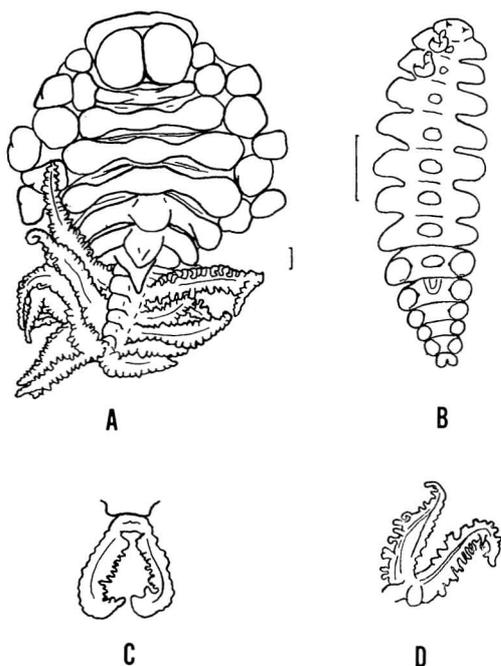


FIG. 4. *Merocepon knudseni* n. sp. *a*, Dorsal aspect of female; *b*, ventral aspect of male, showing right pereopods I-II only; *c*, uropods of female; *d*, ventral aspect, left appendages of female pleomere II.

4.0 mm, IV = 3.0 mm, and V = 4.0 mm. Exopodite of V flattened more than are the others. Uropods uniramous, a pair of flattened, hook-ended, tubercular appendages, each 3.5 mm long.

Male: No pigment, although some color is evident in the posterior digestive tract. Length 6.0 mm, width 2.0 mm.

Head. Small in relation to body size. Tiny eyes. Antennae do not show from the dorsal aspect. Cephalon somewhat sunken into thoracomere I, but not fused to it.

Thorax. Seven segments, widely separated laterally. Seven pairs of strong pereopods. Midventral swellings on I-VII, most pronounced on II-IV; very weak on I.

Abdomen. Six definite segments, sixth with a slight posterior indentation. Lamellae of I-V definitely swollen ventrally, indicating uniramous pleopods, but much more peripheral than is usual for male bopyrids. Weak midventral swelling on pleomere I only.

REMARKS: The genus was first proposed by Richardson (1910, pp. 33-35) for *Merocepon*

xanthi found in *Phymodius ungulatus* from the Philippine Islands. Shiino (1936a, pp. 164-167) found *Merocepon xanthi* in Japan, and apparently felt that the exopodites of pleopod I as described by Richardson were not the pleopoda, but were the lateral plates of pleomere I. Shiino also mentioned midventral swellings on all thoracomeres and on pleomere I of the male he described; Richardson made no mention of such swellings on her male specimen.

The hosts of the Japanese forms were *Actaea* sp. *Chlorodopsis pilumnoides*, and *Xanthias elegans*. Subsequently, *Merocepon xanthi* was reported from Palau (Shiino, 1942, p. 444) on the crab *Phymodius monticulosis*. Thus *Merocepon xanthi* has been collected five times from five different host species, and the new *M. knudseni* is from yet a different host genus and species.

The new form differs from *Merocepon xanthi* in many particulars, one of the most obvious being that of size. The *M. knudseni* female is 18.0 mm long and the male, 6.0 mm, whereas the *M. xanthi* female and male were 3.3 mm and 1.5 mm, respectively. Other differences are shown in Table 3.

Richardson (1910, p. 34) apparently used—as a critical separating feature from the closely related genus *Scyracepon*—the number of mid-dorsal “bosses” on *Merocepon xanthi*, the leaf-like exopodites of pleopod I (the identification of which Shiino felt was in error), and the segmentation of the male abdomen. Of these three criteria, the fused pleon of *Scyracepon* males alone is of value. Nevertheless, the genus *Merocepon* apparently is valid.

The female holotype and the male allotype were deposited in the Allan Hancock Foundation collection as nos. 6512 and 6512a, respectively.

Named in honor of Dr. J. W. Knudsen, who found this interesting form at Eniwetok Atoll.

Scyracepon hawaiiensis Richardson

Scyracepon hawaiiensis Richardson 1911, pp. 645-647

Fig. 5

MATERIAL: A female bopyrid.

HOST: *pilumnus* sp.

AREA: Station 355, Fred (Eniwetok) Island.

DATE: 28 July 1967.

TABLE 3

COMPARISON OF *Merocepon xanthi* WITH *M. knudseni*

FEATURE	<i>Merocepon xanthi</i>	<i>Merocepon knudseni</i>
♀ head	Bilobate only slightly, at the front.	Very strongly bilobed for entire length.
♀ thorax	Weakly costate, segments II–IV with large pleural bosses only.	Strongly costate, segments I–IV with both pleural boss and large swollen posterolateral lobe.
♀ pleon	3 pairs of coxal plates, small, triangular, on segments II–IV (Shiino gives I–IV). Exopod of pleopod I "leaf-like" (probably Richardson's error).	4 pairs of coxal plates, large, circular, on segments I–IV. Exopods of all pleopods similar in appearance.
♂ head	Eyes obvious.	Eyes minute.
♂ thorax	No mention of midventral swellings.	Midventral swellings on all thoracomeres.
♂ pleon	Pleopods circular swellings in "normal" location.	Pleopods I–III with tiny medial projections. All pleopods slightly peripheral to normal location.

DESCRIPTION:

Female: Found in the right gill chamber of the host. Color white in preservative. Body twisted slightly to the left. No pigment spots. Length 4.5 mm, width 4.0 mm. (The length of the *S. hawaiiensis* female from Hawaii was 5.0 mm, according to information from the Smithsonian Institution—Richardson neglected to indicate any size.)

Head. Bilobed, with a wide velum forming a flat anterior surface to the cephalon. No eyes.

Thorax. Seven clearly defined thoracomeres, each with a middorsal area slightly thicker than the corresponding lateral parts; that of V considerably raised, that of VI high and projected posteriorly, and that of VII a definite spine. Thoracomeres I–IV with pronounced pleural bosses that are folded anteriorly; more evident on the right (long) side than on the left. Four pairs of coxal plates on I–IV, approximately spherical. Segments V–VII without evident pleural bosses or coxal plates, and completely covered by the abdominal lamellae. Marsupium very deep, completely covered; oostegite pair V quite tumid. Eggs, but no embryos, present. Seven pairs of well-formed pereopods.

Abdomen. Six segments, the telson having uniramous uropods, fringed, and similar in appearance to the pleonal lamellae. Pleomeres I–V with biramous pleopods; endopodites as small swellings, exopodites being long, fringed, and almost identical to their corresponding pleural lamellae. There is an individual deformity on the specimen, inasmuch as only 4 segments of

the pleon have appendages on the left, while there are 5 on the right.

Male: No male was found with this adult female, which is unfortunate, since the partial or total fusion of the pleomeres of the *Scyracepon* male is unique for this group of bopyrids.

REMARKS: Tattersall (1905, p. 35) established the genus and species *Scyracepon tuberculosa* from Ireland; *S. hawaiiensis* was described by Richardson (1911, p. 645) from the Hawaiian Islands; *S. oceanicum* was found in Palau (Shiino, 1942, pp. 450–452); and Shiino (1936b, pp. 170–173) also named *S. quadribamatum* from Shimoda, Japan. Despite the fact that the original description gave the head of the female as "simple, elliptical," the heads of *S. hawaiiensis*, *S. oceanicum*, and *S. quadribama-*

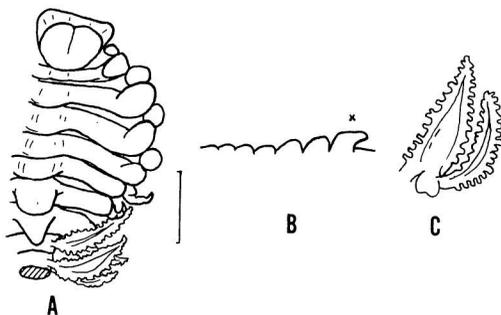


FIG. 5. *Scyracepon hawaiiensis*. a, Right part of dorsal aspect of female, terminal 4 pleomeres removed; b, profile of thorax, thoracomere VII indicated by "X"; c, ventral aspect, left appendages of female pleomere I.

tum are bilobed (the head of the last was somewhat damaged).

There is some ambiguity regarding the pleon appendages, since Tattersall stated that the pleopods were biramous throughout, and the rami were coarsely pinnate on one edge. He did not mention any pleonal lamellae. Richardson corrected this to indicate that the "biramous" structures were really the "lame pleurale" and the pleopod exopodite of each segment, with the endopodite of the pleopod present only as a small swelling. Shiino apparently agreed with this approach, and the specimen in hand bears it out.

The use of the number of middorsal spines for identification of cepons is questionable at best and should be employed only after all other features have been explored. For instance, Tattersall (1905, p. 35) indicated that in *S. tuberculosa*, thoracomeres II-VII had dorsal bosses, with only 3 pronounced. Richardson's sketch of *S. hawaiiensis* (1911, p. 645) shows but 3 major elevations; Shiino (1942, p. 450) gives "Dorso-median process present on 5th to 7th segments . . ." for *S. oceanicum*; Shiino (1936b, p. 171) stated that for *S. quadrihamatum* the thoracomeres IV-VII were provided with mediodorsal processes. Thus these forms would be *Mesocepon* of Shiino (1951, pp. 36-39), *Merocepon* of Richardson (1910, pp. 33-34), and *Cancricepon* of Giard and Bonnier (1887, p. 172), if the processes and their number were the only criteria.

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