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Bopyrids from Tanabe Bay III

By

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With 6 Text-figures

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The Bay of Tanabe continues to provide new Bopyrids. Since my second paper treating of the Bopyridian fauna of the district, several Bopyrids which are apparently new to science, or, at any rate, have not hitherto been known to occur here, have been added to the previous list. Six of these are described in the present paper:

Bopyrella angusta n. sp.
Bopyrinella antilensis var. *nipponica* n. var.
Onychocepon resupinum n. sp.
Merocepon xanthi Richardson
Grapsicepon magnum n. sp.
Grapsicepon rotundum n. sp.

In this paper, the generic name *Epiphryxus*, which I adopted in my previous paper, has been abandoned, because this term had been a little earlier applied by Nierstrasz and Brender à Brandis to another Bopyrid, *Epiphryxus adriaticus*.

I wish to express my thanks to Mr. Yoshinobu Miyashita and Mr. Yasuhiro Tokuoka of the Laboratory for submitting several new specimens for my examination.

BOPYRELLA Bonnier

1900, Bonnier, J., Trav. Stat. Zool. Wimereux, VIII, p. 347.

Bopyrella angusta n. sp.

Female (fig. 1, A & B): Flattened, slightly asymmetrical, elongated oval in shape. No pigmentation. Length 6.1 mm., width 3.4 mm.

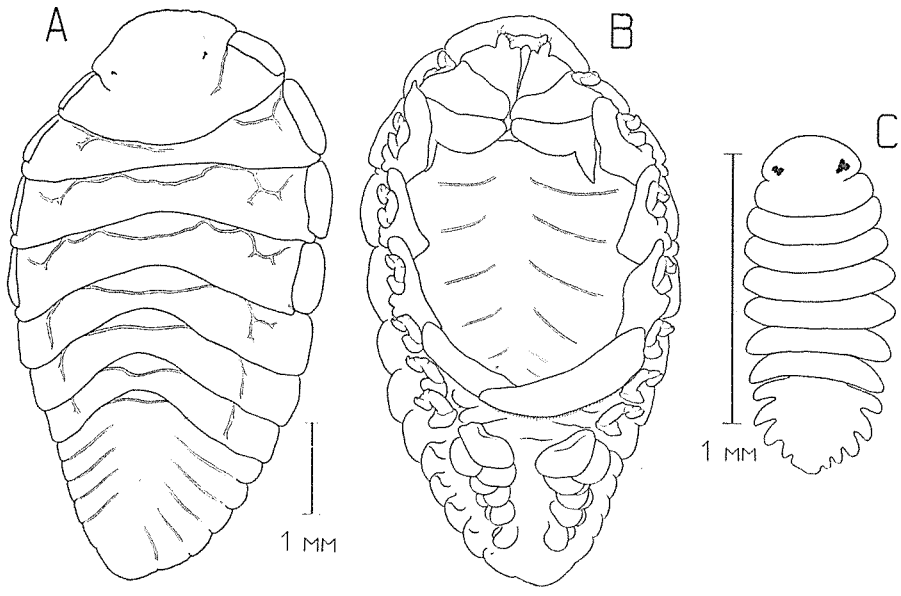

Fig. 1 *Bopyrella angusta* n. sp.
A, ♀, dorsal view; B, ♀, ventral view; C, ♂, dorsal view.

Cephalon fused with 1st thoracic segment, rounded in front and anterior lamina absent. Small eye present.

Thoracic segmentation distinct. First 4 segments bilobed on margin, with large anterior and rudimentary posterior lateral parts. Coxal plate very narrow on shorter side, while rather broad on longer side. Ovarian boss absent. Last 3 segments not bilobed and without separated coxal plate. Marsupium widely open. 1st oostegite has triangular terminal elongation; next 3 pairs greatly reduced, last pair elongated to complete posterior border of marsupium.

Abdomen nearly triangular acuminating posteriorly. 6 segments completely fused except on margin. Lateral plates slightly imbricated one upon the other, rounded on longer side, truncated on shorter side. Those of longer side provided with ridge on ventral surface. Last segment comparatively large and rounded on margin.

5 pairs of biramous pleopoda present. Endopodite of 1st pair larger than exopodite and lunar-shaped; exopodite rounded. In other pairs both rami rounded and subequal in size. Uropoda absent.

Male (fig. 1, c): Compressed antero-posteriorly. Length 1.3 mm. No pigmentation.

Cephalon fused with 1st thoracic segment, rounded in front. Large eye present.

Thoracic segmentation distinct. First 3 segments rounded on margin, while others more or less acuminated laterally.

Abdominal segments completely coalesced in middle region, but separated laterally by 4 (left) or 5 (right) deep notches. Pleopoda and uropoda absent.

Remarks: In respect of the lateral plates of the female abdomen, which are imbricated, *angusta* is like *intermedia* NZ. & B. À B., *distincta* NZ. & B. À B. and *thomasi* NZ. & B. À B. In the last named species the abdomen of the male is quite differently shaped from that of the present species. From the remaining species, which are more closely related, the new species differs in the characteristics compared in the table[1]:

		intermedia	*distincta*	*angusta*
Female	Eye	absent	absent	present
	Terminal elongation of oostegite I	triangular	rudimentary	triangular
	Abdominal segmentation	distinct only on margin	distinct for long distance from margin	distinct only on margin
	Abdominal segment VI	slightly notched	deeply notched	rounded
Male	Abdominal segmentation	distinct for long distance from margin	——	distinct only on margin

Occurrence: A female carrying a male was found in the branchial cavity of *Alpheus sp.* caught by Mr. Y. TOKUOKA of the Laboratory at Hatakeshima in Tanabe Bay on May 14th, 1934.

BOPYRINELLA NIERSTRASZ and BRENDER À BRANDIS

1925, NIERSTRASZ, H. F. and BRENDER À BRANDIS, G. A., Bijdragen tot de Dierkunde, Amsterdamm, Afl. XXIV, p. 6.

Bopyrinella antilensis NIERSTRASZ and BRENDER À BRANDIS[2] var. nipponica n. var.

Female (fig. 2, A & B): Flattened, very asymmetrical, elongated

1) The male character of *intermedia* is cited from CHOPRA's report in 1927, since NIERSTRASZ and BRENDER À BRANDIS have not described it. (reference no. 3, pp. 3-4, figs. 1 & 2)

2) NIERSTRASZ and BRENDER À BRANDIS, reference no. 7, pp. 6-7, Pl. 1, figs. 22-25.

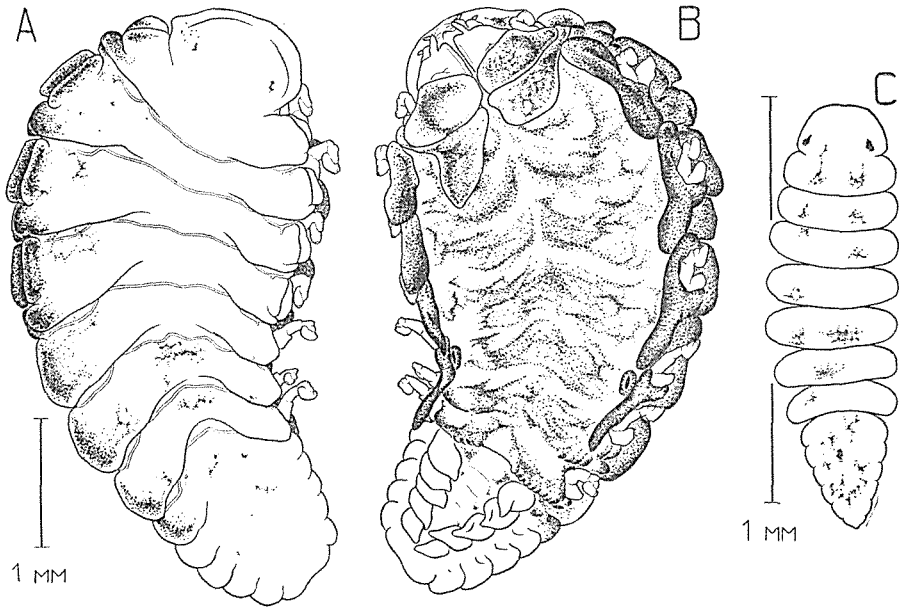

Fig. 2 *Bopyrinella antilensis* var. *nipponica* n. var.
A, ♀, dorsal view; B, ♀, ventral view; C, ♂, dorsal view.

pyriform. Ventral side and left margin of dorsal side thickly pigmented. Length 6.2 mm., width 3.4 mm.

Cephalon fused with 1st thoracic segment, laterally demarked by deep notch. Anterior lamina narrow, with round margin. Small eye present.

Thoracic segmentation more or less obliterated in mid-dorsal region; only posterior border of last segment distinct along entire length. First 4 segments bilobed on margin, but posterior lateral part of shorter side greatly reduced. Coxal plate narrow on both sides. Lateral side of last 3 segments entire and rounded. Ovarian boss rudimentary. Ventral side of thorax not swollen, marsupium widely open. Posterior lobe of 1st oostegite elongated and linguiform on shorter side, not elongated and rounded on longer side. Other oostegites very small and posterior side of marsupium not closed.

Abdomen slightly narrowed posteriorly; segments completely fused in middle region. Lateral plates imbricated one upon the other, with round margin; left plates provided with ridge at basal part on ventral side. 5 pairs of pleopoda uniramous, foliaceous, pointed at the tip and directed inwards. Uropoda absent.

Male (fig. 2, c): Length 1.0 mm. Scattered pigment spots on thorax and abdomen.

Cephalon fused with 1st thoracic segment, nearly trapezoid in shape. Rather large eye present.

Thoracic segmentation distinct. From 4th, widest segment, body gradually narrows towards both ends.

Abdomen triangular, longer than wide. Segments completely coalesced; original segmentation represented only by marginal notches. Last segment slightly produced in the middle. Pleopoda and uropoda absent.

Remarks: Although in essential points the present specimen resembles NIERSTRASZ and BRENDER À BRANDIS' *forma typica*, there are certain minor differences between them, which are shown in the table:

		antilensis	*nipponica*
Female	Margin of cephalon	nearly straight	rounded
	Ventral side of thorax	swollen	not swollen
	Coxal plate of thorax	on longer side of segment II–IV	on both sides of segment I–IV
	Terminal elongation of oostegite I	on both sides	only on shorter side
	Ventral side of abdomen	with longitudinal rugae	smooth
	Outline of abdomen	nearly triangular	nearly quadrangular
	Pleopoda	irregular in shape, not imbricated	foliaceous, imbricated
Male	Cephalon	short, slightly depressed in front	long, not depressed in front
	Outline of abdomen	semicircular	triangular

In addition to these differences of character, the specimens were found in such widely separated places as Curaçao in the Atlantic and Tanabe Bay in the Pacific. Moreover, their hosts belong to different genera, *antilensis* infesting *Thor floridanus*, while *nipponica* is a parasite of *Spirontocaris rectirostris*.

On these grounds I differentiate the present specimen from *antilensis* and treat it as a variety.

Occurrence: A female specimen accompanied by a male was found in the branchial cavity of *Spirontocaris rectirostris* (STIMPSON) caught by myself at Hatakeshima in Tanabe Bay on May 14th, 1934.

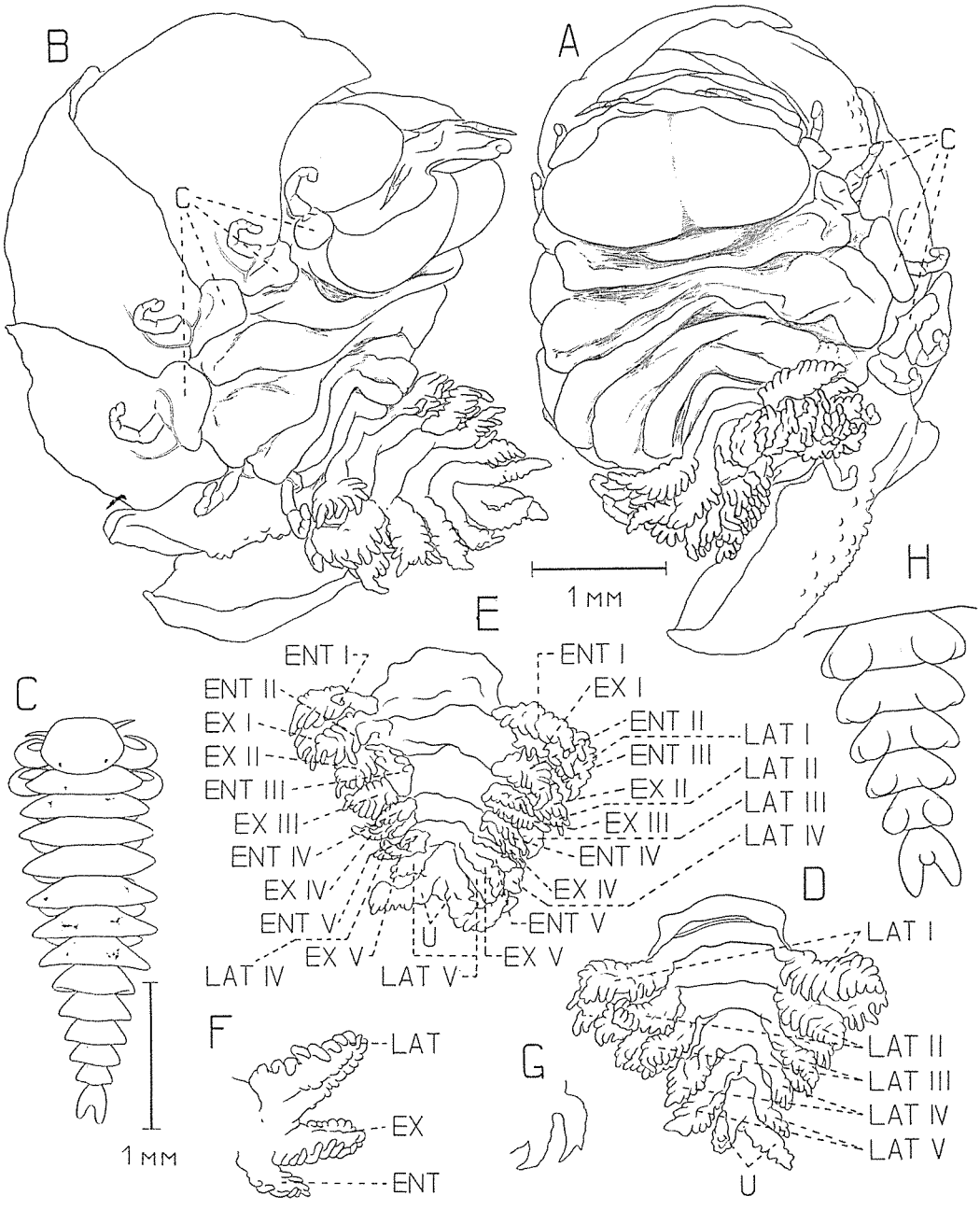

Fig. 3 *Onychocepon resupinum* n. sp.

A, ♀, dorsal view; B, ♀, dorso-lateral view; C, ♂, dorsal view; D-G, ♀; D, abdomen, dorsal view; E, same, ventral view; F, pleopod and lateral plate (segment I, right); G, processes of posterior lamina; H, ♂, abdomen, ventral view.

ONYCHOCEPON PÉREZ

1921, PÉREZ, CH., C. R. Acad. Sci., t. 173, pp. 59-60.

Onychocepon resupinum n. sp.

Female (fig. 3, A & B): Greatly asymmetrical and dorsally concave, ventrally highly convex. No pigmentation. Length 3.8 mm., width 2.8 mm.

Cephalon very large, about twice as wide as long, oval in shape, bilobated and very swollen. Anterior lamina lamellar and irregular on margin. Cephalic appendages exposed in dorsal view. Eye absent. Posterior lamina has 2 pairs of hook-like lateral processes (fig. 3, G).

7 thoracic segments distinctly separated by deep grooves. Lateral portion of 1st segment encroached upon by swollen cephalon, but not eliminated; in succeeding segments this portion more or less expanded. 7th segment very short and narrow. Coxal plate lamellar and irregular in shape; small in first 2 segments, large in next 2 segments and absent in the rest. Ovarian boss not separated. Mediodorsal process absent. Marsupium highly vaulted and complete.

6 abdominal segments separated, short and narrow. Lateral plate (fig. 3, D & F) comparatively short, foliaceous, with digitated margin and similar in appearance to pleopoda. Last segment without lateral plate.

5 pairs of pleopoda (fig. 3, E & F) biramous. Endopodite shorter than exopodite, the latter shorter than lateral plate. Both rami foliaceous, digitated on margin and directed outward. Uropoda uniramous, more than twice as long as last pleopod and margin slightly digitated.

Male (fig. 3, C): Body attenuated posteriorly, with distinct segments. Scattered pigment spots on dorsal surface. Length 7.8 mm.

Cephalon wider than long, somewhat trapezoid in front, rounded behind. Small eye present.

Thoracic segments acuminate laterally, with medio-ventral tubercle. First 2 pairs of thoracic legs much larger than others and externally visible in dorsal view.

First 5 abdominal segments trapezoid in shape. Last segment V-shaped, with a median tubercle at the base of lateral lobe. Pleopoda uniramous (fig. 3, H), represented by 5 pairs of round processes. Uropoda absent.

Remarks: I have mentioned above that the lateral portion of

the first thoracic segment in the female has not completely disappeared though largely encroached upon by a swollen cephalon. In another specimen I examined, the swelling of the cephalon was so great that this part of the segment was completely concealed. Reduction of this portion in the other species of *Onychocepon*[1] may also be caused by the same process and not be due to degeneration of the segment.

According to the definition of the genus *Onychocepon* formulated by NIERSTRASZ and BRENDER À BRANDIS,[2] the pleopoda are absent in the male. In my species, however, the pleopoda are present. PÉREZ did not make any mention of this character in his species *harpax*, but his figure[3] apparently indicates the presence of pleopoda. Only the male of *giardi* NZ. & B. À B. seems to have no pleopoda. It is, therefore, advisable to change the diagnosis of *Onychocepon* under this heading and recognize that the male is with or without pleopoda.

Differences of *resupinum* from other species of the genus *Onychocepon* are shown in the table:

		harpax	*giardi*	*resupinum*
Female	Cephalon	bilobed	not bilobed	bilobed
	Coxal plate of thorax	at least in segments I-V, narrow	in segments II-VII, narrow	in segments I-IV, wide
	Pleopoda	long	long	short
	Entopodite	about as long as exopodite (?)	about as long as exopodite	shorter than exopodite
	Exopodite	about as long as lateral plate (?)	about as long as lateral plate	shorter than lateral plate
Male	Pleopoda	present	absent	present

Occurrence: Two females each carrying a male were found in one and the same host, *Pinnotheres purpureus* ALCOCK, taken by Mr. Y. MIYASHITA of the Laboratory at Seto on June 23rd, 1933.

MEROCEPON RICHARDSON

1910, RICHARDSON, H., Depart. Comm. Lab. Bur. of Fish., Doc. no. 738, Washington, pp. 33-34.

1) NIERSTRASZ and BRENDER À BRANDIS, reference no. 6, pp. 81-82.
2) NIERSTRASZ and BRENDER À BRANDIS, loc. cit.
3) PÉREZ, no. 11, pp. 59-61, text-fig. 2.

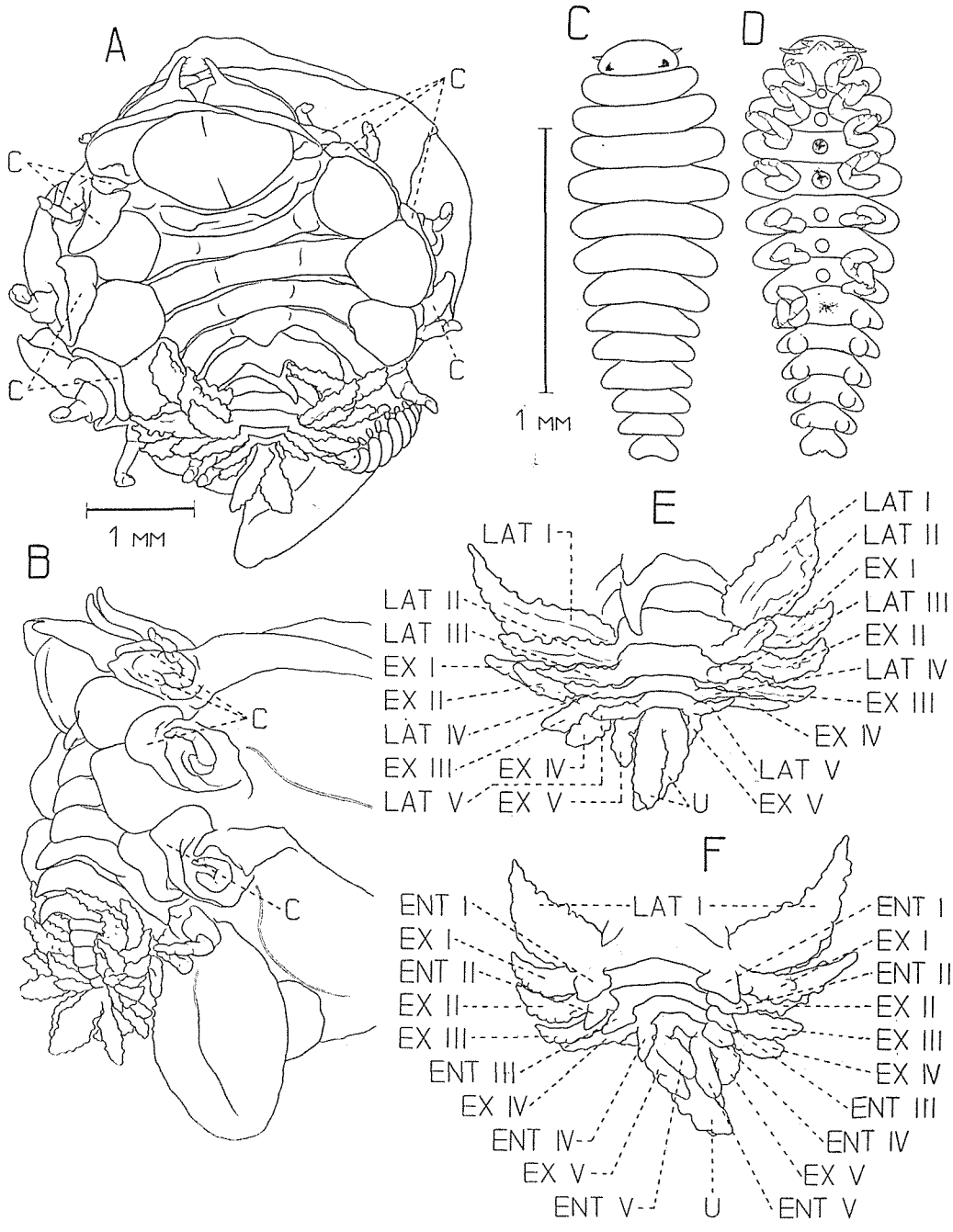

Fig. 4 *Merocepon xanthi* RICHARDSON

A, ♀, dorsal view; B, ♀, lateral view; C, ♂, dorsal view; D, ♂, ventral view; E, ♀, abdomen, dorsal view; F, same, ventral view.

Merocepon xanthi RICHARDSON[1]

Female (fig. 4, A & B): Compressed antero-posteriorly, asymmetrical on two sides; dorsally concave, ventrally highly convex. No pigmentation. Length 4.2 mm., width 3.5 mm.

Cephalon large, wider than long, slightly bilobated in anterior part. Frontal lamina lamellar, broader in lateral part and notched on margin. Eye absent.

7 thoracic segments distinct, subequal in length in middle region and lateral part not bilobed. Very large round ovarian boss present in 2nd-4th segments, occupying entire lateral part. Coxal plate developed in first 4 segments, lamellar and nearly triangular in shape; plate of 1st segment rather small. Last 3 segments have medio-dorsal process, acuminated towards the tip. Process of 7th segment somewhat curved like a hook. Marsupium highly vaulted and complete.

6 abdominal segments very short and narrow, distinctly separated. Lateral plate (fig. 4, E) freely projected laterally, foliaceous, with tuberculated margin and similar in appearance to pleopoda. 1st plate greatly expanded, others rather small and narrow. Last segment without lateral plate.

5 pairs of pleopoda biramous (fig. 4, F). Exopodite foliaceous, tuberculated on margin and directed dorsi-externally. In 1st segment exopodite much shorter than lateral plate, in others not. Endopodite rudimentary and nearly triangular in shape. Endopodite of 5th pleopoda well developed, only slightly shorter than exopodite. Uropoda uniramous, broad and long, about twice as long as exopodite of last pleopoda and tuberculated on margin.

Male (fig. 4, C & D): Body elongated, with distinct segmentation. A few scattered pigment spots on ventral side. Length 1.6 mm.

Cephalon wider than long, rounded in front, nearly straight behind.

Thorax narrows gradually from 4th, widest segment towards both ends. Each segment has medio-ventral tubercle and round lateral margin.

6 abdominal segments also rounded on margin. Last segment somewhat bilobed and provided with a small median process on posterior margin. 5 pairs of pleopoda uniramous, tubercle-shaped. Uropoda absent.

1) RICHARDSON, reference no. 13, pp. 34-35, text-fig. 31.

Remarks: RICHARDSON[1] has figured and described the exopodite of the first pleopoda as well developed into foliaceous lamella much larger than other appendages. According to my opinion this large lamella is, however, nothing else than the lateral plate of the first segment.

Occurrence: Three females each carrying a male were found in the three respective hosts: *Actaea sp.*, *Chlorodopsis pilmnoides* (WHITE) and *Xanthias elegans* (STIMPSON). The first named host was caught by Mr. Y. MIYASHITA at Shirahama on June 24th, 1933, the remaining two were collected by myself on May 16th, 1934 at Yuzaki, Seto. The description and figures given above are based upon the specimen found on *Actaea sp.* This is the first occurrence to be reported from Japan. RICHARDSON's type specimen came from Phillipine Islands.

GRAPSICEPON GIARD and BONNIER

1887, GIARD, A. and BONNIER, J., Trav. Inst. Zool. Lille et Lab. Zool. Mar. Wimereux, t. V, p. 69.

Grapsicepon magnum n. sp.

Female (fig. 5, A): Body rounded, slightly asymmetrical. Dorsal flat, ventral highly convex. No black pigment. Dorsal side coloured scarlet in living state on account of ovary. Length 11.3 mm., width 9.4 mm.

Cephalon distinct from thorax, nearly trapezoid, but irregular in outline. Frontal lamina lamellar, expanding laterally beyond cephalic width and irregular on margin. Eye absent. Posterior lamina has 2 pairs of simple lateral processes.

Thoracic segmentation distinct. Margin of 2nd-4th segments bilobed, posterior lateral part greatly expanded; 1st and 5th-7th segments not bilobed. Ovarian boss, elongated oval in shape, developed in first 4 segments. Coxal plate absent. Medio-dorsal process present in 6th and 7th segments, very long, acuminate to the tip and erected almost perpendicular to body surface. Marsupium vaulted and complete.

6 abdominal segments distinct, very short and narrow. Lateral plate (fig. 5, C, E & F) freely projected laterally, but comparatively short; margin strongly digitated and similar in appearance to pleopoda. Last segment without lateral plate.

1) RICHARDSON, reference no. 13, p. 35, text-fig. 31, a.

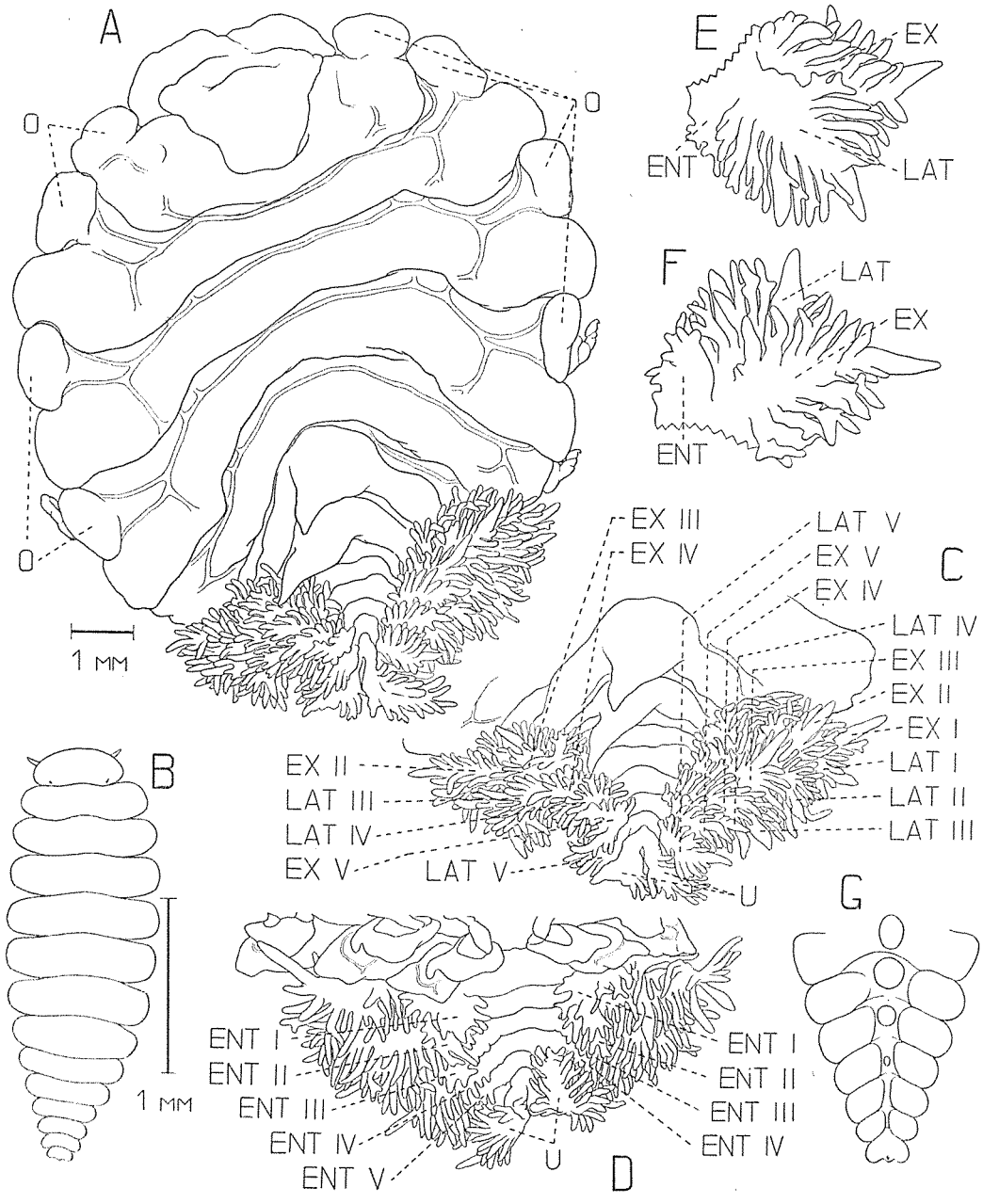

Fig. 5 *Grapsicepon magnum* n. sp.

A, ♀, dorsal view; B, ♂, dorsal view; C–F, ♀; C, abdomen, dorsal view; D, same, ventral view; E, pleopod and lateral plate (segment III, right), dorso-anterior view; F, same, ventro-posterior view; G, ♂, abdomen, ventral view.

5 pairs of biramous pleopoda present (fig. 5, D, E & F). Exopodite about as long as lateral plate, strongly digitated on margin. Endopodite rudimentary, more or less digitated. Uropoda uniramous, also digitated on margin, much longer than last pleopoda.

Male (fig. 5, B): Length 2.4 mm. No pigmentation. All segments including those of abdomen separated.

Cephalon wider than long, rounded in front, nearly straight behind. Very minute eye present.

7 thoracic segments rounded on lateral margin and with a median tubercle on ventral side. From widest 5th segment body narrows towards both ends.

Abdomen triangular (fig. 5, G), with segments much narrower and shorter than in thoracic region and rounded at the side. Last segment nearly cordiform, with a small median process on posterior margin. First 3 segments have medio-ventral tubercle, that of 3rd segment very small. Pleopoda uniramous, represented by oblong protuberances occupying greater part of ventral surface. Uropoda absent.

Remarks: Of four species of the genus *Grapsicepon* thus far known, *fritzii* GIARD & BONNIER is only nominal. KOSSMANN'S *messoris* is also incompletely known. His description can not well be used as a diagnosis of the species. Unfortunately there are illustrations of neither the female nor the male. The only ramus figured by him[1] out of his so-called triramous abdominal appendage (pleopod plus lateral plate) is quite different from that shown in my fig. 5, E & F. The differences from the two species *edwardsi* GIARD & BONNIER and *choprae* NZ. & B. À B., will be made plain in the next section where another new species of the genus is also compared.

Occurrence: A female specimen carrying a male was found in the branchial cavity of *Schizophrys aspera* STIMPSON caught by Mr. Y. MIYASHITA at Seto on October 19th, 1933.

Grapsicepon rotundum n. sp.

Female (fig. 6, A): Body rounded, slightly asymmetrical, dorsally concave, ventrally highly vaulted. No black pigment. Ventral side coloured in scarlet in living state, on account of developing embryos. Length (excl. uropod) 5.3 mm., width 5.2 mm.

1) KOSSMANN, reference no. 5, pl. XI, fig. 7.

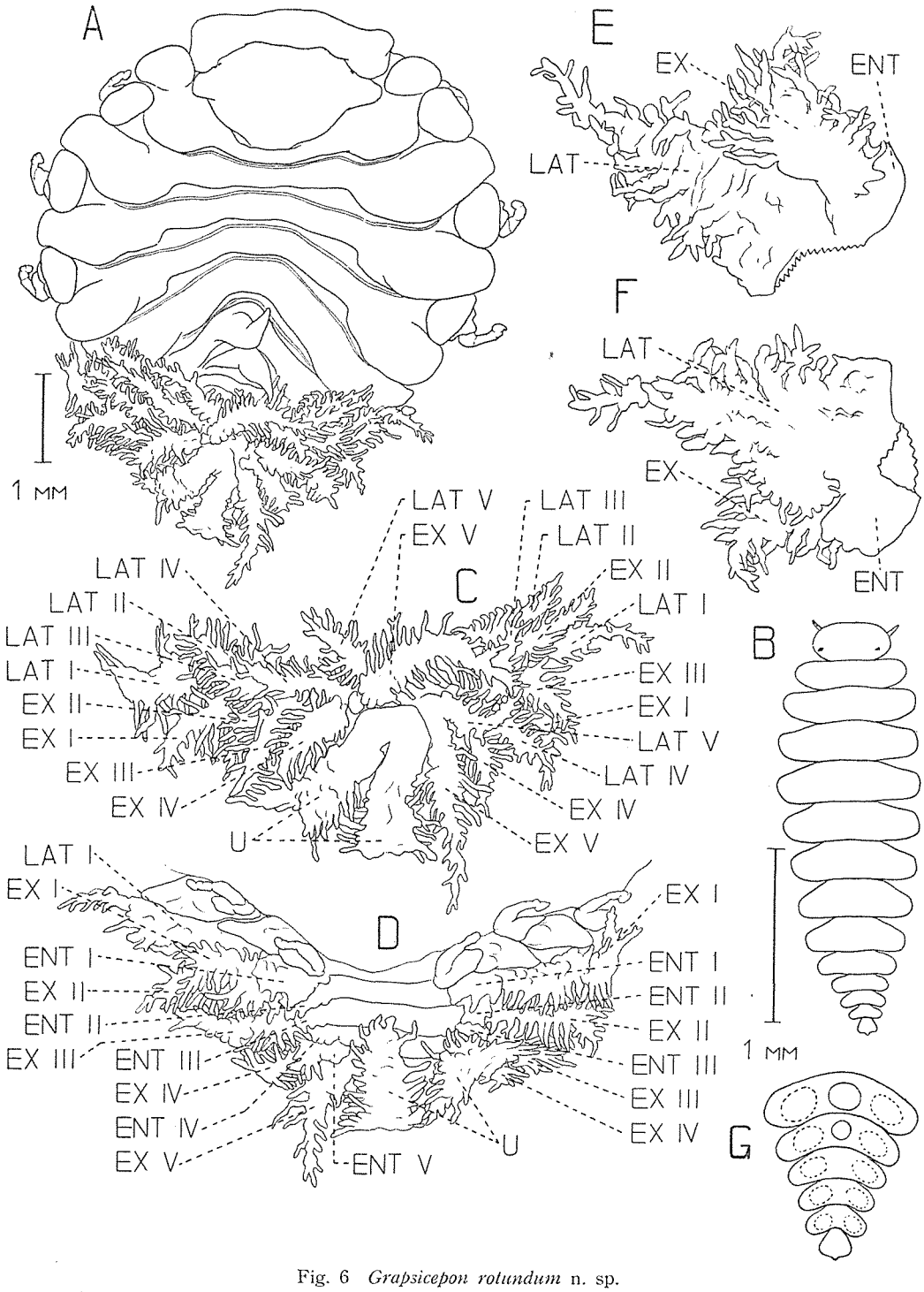

Fig. 6 *Grapsicepon rotundum* n. sp.
A, ♀, dorsal view; B, ♂, dorsal view; C–F, ♀; C, abdomen, dorsal view; D, same ventral view; E, pleopod and lateral plate (segment I, right), posterior view; F, same, anterior view; G, ♂, abdomen, ventral view.

Cephalon distinct from thorax, wider than long, anteriorly rounded, posteriorly V-shaped, produced laterally on either side. Frontal lamina broad, lamellar, with angular lateral corners. Very minute eye present.

Thoracic segmentation distinct. First 4 segments greatly expanded in lateral portion. 2nd-4th segments bilobed on margin, with well-developed posterior lateral part. Last 3 segments neither bilobed nor expanded in lateral part. Coxal plate absent. Round ovarian boss present in first 4 segments. Medio-dorsal process present in last 2 segments, pointed at the tip and curved like a hook. Process of 6th segment directed antero-dorsally, that of 7th segment postero-dorsally. Marsupium complete and vaulted.

6 abdominal segments separate, short and narrow. Lateral plate (fig. 6, C, E & F) elongated, freely projected outwards; margin strongly digitated and similar in appearance to pleopoda. Last segment without lateral plate.

5 pairs of pleopoda (fig. 6, D, E & F) biramous. Exopodite narrow, elongated and strongly digitated on margin. In 1st segment exopodite shorter than lateral plate, in posterior segments much longer. Entopodite rudimentary, more or less digitated. Uropoda uniramous, longer and broader than pleopoda, also strongly digitated.

Male (fig. 6, B): All segments separated. No pigmentation. Length 2.4 mm.

Cephalon wider than long, oval in shape. Small eye present.

7 thoracic segments rounded on margin and bear medio-ventral tubercle. 4th segment widest.

6 abdominal segments also round on lateral margin. Last segment nearly triangular, with a small median process on posterior side. Pleopoda uniramous, oval, quite rudimentary and more or less fused with segment. Uropoda absent. Medio-ventral tubercle present in first 2 segments.

Remarks: The present species is distinguished from the preceding one in that the pleopoda and the lateral plates of the female are narrower and longer, as well as in that the pleopoda of the male are much degenerated. Farther differences between the two species and their differences from *edwardsi* GIARD & BONNIER and *choprae* Nz. & B. A B. are summarized in the table shown in next page.

Occurrence: A female and a male were found in the branchial cavity of *Leptodius exaratus* (MILNE-EDWARDS) caught by myself at Ezura, Seto on May 17th, 1934.

		edwardsi	*choprae*	*magnum*	*rotundum*
Female	Cephalon	rounded	oval	trapezoid	rhombic
	Eye	absent	absent	absent	present
	Lateral plate and exopodite of pleopoda	narrow and long, slightly digitated	broad and long, crenated	broad and short, deeply digitated	narrow and long, deeply digitated
	Endopodite of pleopoda	tubercular	lamellar	lamellar	lamellar
	Ovarian boss	not very large	very large in II-IV	not very large	not very large
Male	Pleopoda	small, rounded	small, rounded	large, elongated oval	rudimentary, round
	Medio-ventral tubercle in abdominal segment	I-III	absent	I-III	I-II

CATAPHRYXUS n. gen.

Syn. *Epiphryxus* SHIINO[1]

type species : *Cataphryxus primus* (SHIINO) = *Epiphryxus primus* SHIINO[2]

In a preceding contribution to "Bopyrids from Tanabe Bay" (Nov. 15, 1933) I established a new genus *Epiphryxus* based on a single new species *E. primus*. Prior to this, however, this name had been used by NIERSTRASZ and BRENDER À BRANDIS in their joint work "Alte und neue Epicaridea" (Sept. 17, 1932) to describe a Phryxid *Epiphryxus adriaticus*. Since the journal "Anatomischer Anzeiger" vol. 101 (1933)[3] in which their work was reported came to my hand only after my work had been published, I was not aware that the term had been assigned to another Phryxid.

Character of female	*Epiphryxus* Nz. & B. À B.	*Epiphryxus* SHIINO
Thoracic legs	absent on longer side of segment III-VII	present in all segments on both sides
Lateral plates	5 pairs, unilobed	4 pairs, bilobed
Pleopoda	5 pairs, uniramous	4 pairs, bi- or triramous
Uropoda	present	absent

1) SHIINO, reference no. 15, pp. 281-283.
2) SHIINO, loc. cit.
3) pp. 99-100, figs. 17-18.

The diagnoses of the two genera, to which the same term has been applied by NIERSTRASZ and BRENDER À BRANDIS on the one hand and by myself on the other, are, of cause, different. They are summarized in the table shown in the preceding page.

In order to save confusion hereafter and also to observe the rule of priority, I propose keeping the name *Epiphryxus* for *Epiphryxus adriaticus* NZ. & B. À B., while giving the new name *Cataphryxus* to my species previously called *Epiphryxus primus* SHIINO.

Definition of *Cataphryxus* n. gen. is as follows:

Female Phryxid-form. Thoracic segmentation obliterated on longer side. 7 pairs of thoracic legs present. 5 abdominal segments separate, first 4 bearing bilobed lateral plate. Last segment small, without lateral plate. 4 pairs of pleopoda bi- or triramous. Uropoda absent.

Male cephalon and thoracic segments distinct. Abdominal segments completely fused. Pleopoda and uropoda absent.

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Abbreviations used in text-figures:— C, coxal plate; ENT, entopodite; EX, exopodite; LAT, lateral plate; O, ovarian boss; U, uropod.