

The Biology of the Pelagic Amphipod, *Primno macropa* Guér., in the Western North Pacific 1. Systematics

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西部 北太平洋産 浮游性 端脚類, *primno macropa*의 生物學的 研究

1. 分類 및 外部形態에 대하여

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要 約

浮游性 端脚類의 一種인 *Primno macropa*는 全世界의 海洋에 널리 分布하고 있는 普遍種으로 특히 西部 北太平洋에 있어서는 다른 海域에 비하여 優占의으로 出現한다. 한편 本種은 西部 北太平洋에서는 다른 어느 海域에 비하여 個體數나 生物量이 많으며 各種 有用魚族의 主要 飼料로 주목되고 있다. 그러나 아직도 西部 北太平洋産에 대한 分類學的인 검토가 없었을 뿐더러 記載된 바도 전혀 없다. 筆者는 本種에 대한 生物學的 研究의 一環으로 지금까지의 同種異名을 정리 검토하고 外部形態와 특히 口器의 構造를 처음으로 記載하였다.

INTRODUCTION

Primno macropa Guér. is most common mesopelagic Hyperiid amphipod in all the oceans and in the Arctic and Antarctic. In the western North Pacific this species is predominant in abundance and biomass both in cold Oyashio area and warm Kuroshio area (Yoo, 1970).

Since F. E. Guérin Méneville first described it for new species in 1836 it has been recorded by many authors from world oceans.

Recently, Hurley (1955) described in detail the female individual of New Zealand species, but none of the description to the western North Pacific species was given.

The purpose of present study is to review the synonymies of this species and describe the external anatomy of the western North Pacific species.

MATERIALS AND METHODS

Samples were taken from collections made during different cruises which covered main-

ly in the western North Pacific and the adjacent seas of Japan during the period of 1964—1968 (Yoo, 1971).

Body length measurements were made from the anterior margin of the head (excluding the antennae) to the urosome (including uropods), with the animal in an extended position.

Samples for dissection were usually stained in Lignin Pink and all the appendages of the other side, plus the telson, uropods, and feeding appendages of the other side were

mounted in Turtox CMC-S mounting medium for permanent preparations.

The specimens used for drawing were preserved and drawings were made with a camera lucida and Shadowgraph (Olympus-Tokyo).

In the description I have used the modified terminology from Sars (1895) and the following abbreviations have been used in captions on the description and the text-figures (Table 1).

Table 1. Abbreviations used in morphological description

Body parts	Abbr.	Appendages	Abbr.
Cephalon	C.	Antennae 1 (superior antennae)	A 1.
		Antennae 2 (inferior antennae)	A 2.
		Labrum (upper lip)	L.
		Labium (lower lip)	l.
		Mandible	Md.
		Maxillae 1 (maxillule)	Max 1.
		Maxillae 2 (maxillae)	Max 2.
Mesosome	Ms.	Maxilliped	Mxp.
		Gnathopods 1-2	Gn 1-2.
Metasome	Mts.	Peracopods 1-5	Pr 1-5.
		Epimeral plates 1-3	Ep 1-3.
Urosome	Us.	Pleopods 1-3	pl 1-3.
		Uropods 1-3	Ur 1-3.
		Telson	T.

RESULTS AND DISCUSSION

1. Systematics.

The type species was *Primno macropa* originally described in 1836 by F. E. Guérin Méneville.

Primno macropa Guérin Méneville, 1836 : 4, pl. 17, fig. 1. Milne-Edwards, 1838 : 307; 1839 : 370; 1840 : 81. Nicolet, 1849 : 246. Lucas,

1851 : 239, pl. 18, fig. 7. Bate, 1862 : 322, pl. 51, fig. 8. Gerstaecker, 1884 : pl. 35, fig. 3. Bovallius, 1887 : 28. Stebbing, 1888 : 1441, pl. 178; 1904 : 38. Tattersal, 1906 : 25. Stewart, 1913 : 258. Barnard, 1925 : 375; 1930 : 424—425; 1932 : 287—288. Monod, 1926 : 50, fig. 49. Thorsteinsen, 1941 : 93, pl. 9, figs. 98—102. Mackintosh, 1934 : 90, fig. 20. Shoemaker, 1945 : 234—236. Hurley, 1955 : 172, figs. 219—235; 1956 : 17—18. Bogorov, 1955 : 260—

276. Vinogradov, 1956 : 209. Brusca, 1967 : 386—387.

Primno Latreillei Stebbing, 1888 : 1445, pl. 179 A.

Primno Menevillei Stebbing, 1888 : 1447, pl. 179 B.

Primno Antarctica Stebbing, 1888 : 1448, pl. 209 B.

Euprimno macropus Bovallius, 1889 : 400—407, pl. 17, figs. 24—40; pl. 18, figs. 1—2. Chevreux, 1900 : 148. Vosseler, 1901 : 87, pl. 8, fig. 21. Lo Bianco, 1903 : 43, fig. 70. Stebbing, 1904 : 38. Walker, 1909 : 52. Stephensen, 1924 : 143, chart 22. Chevreux and Fage, 1925 : 416, fig. 411. Bulycheva, 1955 : 1047—1050. Irie, 1957 : 41—52; 1958 : 138—145; 1959 : 20—42.

Since the genus *Primno* (Amphipoda: Hyperiidæ) was established in 1836 by F. E. Guérin Méneville, numerous contributions have been published. Among them, Bovallius (1889) employed new generic name *Euprimno* in his paper and explained the change of generic name *Primno* to *Euprimno* that "In 1836 Guérin Méneville institute the new genus *Primno*, which name is here corrected into *Euprimno*, because *Primno* was previously applied to a genus of Crustacea by Rafinesque-Schmartz in 1814". Since then two generic names have been cited by many authors without any discussion. This confusion would be unified by "International Code of Zoological Nomenclature" in future. For the present the name *Primno macropa* is thus used for the western North Pacific species.

2. External anatomy

a. Description of female.

Length: 6—23mm.

Body: slender, not much thicker and with whitish red or yellowish color.

Antennae: A 1. (Fig. 1a). Of 2 segments; 1st (peduncle) as long as broader and less than 1/3 length 2nd; 2nd proximally wide, tapering acutely toward the apex; superior margin has about 5—6 long flaccid sensory setae in the middle and along the interior margin there are 10 minute spines. **A 2.** Rudimentary.

Mouthparts: L. Small and faintly bilobed. **Md.** (Fig. 1b). Cutting edge a squarish plate with numerous small incisions distally; inside the cutting edge a bundle of a few strong spines on inner margin; molar process a disc-shaped, furnished with densely sharp-pointed teeth and long bristles. **1.** Inner lobes very small, outer large, distally bristled. **Max 1.** (Fig. 1c) Outer plate the longer, distal margin with small teeth and spines along the outer margin; inner plate has about 3 strong teeth distally, smaller ones continued down outer margins, setae proximally on inner margin. **Max 2.** (Fig. 1d). Inner lobe slightly shorter; both tolerably long and narrow, distally and marginally bristled. **Mxp.** Inner lobe not pointed distally and with setae; outer lobes shorter than peduncle, proximal width about 1/3 length, distally lanceolated, a few setae on inner margin and end.

Gnathopods: Gn 1. (Fig. 1e). Basos width about 1/5 length, tending to be narrowest medially. Ischium short and wide. Merus produced 1/2 along carpus distally in triangular process. Carpus length 1/3 basos. Propodus narrowing to slender dactylos, fringe of small bristles anteriorly. Dactylos 1/3 propodus length, chelated anteriorly. **Gn. 2.** (Fig. 1f). Basos ovate, glandulat, margins convex, medial width nearly 1/2 length. Ischium short and wide. Merus short, triang-

ularly produced about $2/5$ along carpus, total length twice width, margins parallel. Carpus slender. Propodus narrowing to small dactylos, 2 or 3 marginal bristles. Dactylos at least $1/5$ propodus length.

Peraeopods: **Pr 1.** (Fig. 1g). Basos like Gn 1 width $1/7$ length. Ischium slightly less than $1/6$ basos in length, anteriodistal margin has 3 small short spines. Merus subequal with ischium, posterior margin has 2 seta-tipped serrations. Carpus width $2/3$ length, posterior margin has 3 seta-tipped serrations, posteriodistal angle produced in pronounced acute tooth. Propodus $1/2$ basos length, slender, linear, posterior margin fringed with small bristles. Dactylos $2/5$ propodus length.

Pr 2. (Fig. 1h). Very similar to Pr 1.

Pr 3. (Fig. 1i). Basos narrowing proximally, posterior margin straight; anterior has 2 small serrations proximally, greatest width nearly $1/2$ length. Ischium length about $1/4$ basos, posterior margin produced as flange, anterior has 1 or 2 small serrations. Merus somewhat m-shaped, width nearly twice length and nearly $1/2$ basos length; anterior margin has 2 or 3 small serrations, anteriodistal angle a sharp tooth; posterior surface a proximally rounded and distally concave flange, posterodistally acute. Carpus ovate, as long as basos, greatly expanded greatest width more than $1/2$ length, posterior margin straight, posteriodistal angle acute; anterior strongly serrated with 16 short and long seta-tipped teeth. Propodus slender, subequal with carpus. Dactylos, slender about $1/3$ propodus length. **Pr 4.** (Fig. 1j). Basos ovate, anterior margin has about 3–4 small serrations, anteriodistal angle sharp. Ischium $1/5$ basos length; 1–2 minute serrations anteriorly. Merus a little constricted

proximally, width $1/2$ length; both distal angles strongly produced downwards in sharp teeth, each margin has 2 or 3 minute serrations. Carpus $1/2$ basos length, posterior margin has 2 or 3 minute serrations; anterior about 5 strong teeth; anteriodistal surface minutely toothed. Propod linear, slightly more than $1/2$ basos length; anterior margin chelated; anterior and posterior surfaces with slightly concave, anterior strongly convex, finely and inversely crenate. Dactylos slender, posterior margin has few setae. **Pr 5.** (Fig. 1k). Basos posterior margin slightly concave, anterior strongly convex, finely and inversely crenate. Ischium subequal with merus. Carpus width $1/3$ length, subequal with propodus. Propodus length, widening slightly to obliquely truncate end margin; end and anterior margins fringed with bristles; a row of fine bristles medially.

Pleopods: Biramous, normal.

Uropods: **Ur 1.** Somewhat lanceolate, reaching almost as far as Ur 3.; greatest width nearly $1/4$ length; outer margin finely toothed throughout; inner finely toothed for distal $1/3$; apically acute small secondary apex on inner margin. **Ur 2.** Reaching as far as Ur 1., lanceolate, outer margin has 4 or 5 fine seta-tipped serrations, both margins very finely toothed distally, rest of inner margin smooth; apically acute; outer margin convex, greatest width $1/3$ length, proximally very narrow. **Ur 3.** Almost subrectangular, width $2/5$ length; outer margin has about 4 fine serrations, distal margin finely toothed and medially produced to broad point, inner smooth. **T.** Subtriangular, wider than long, about $1/5$ length Ur 3.

b. Description of male.

Morphological characters of male are very

like to female, except the structure of antennae and body length (3-12mm). In the mouthpart 3-segmented mandibular palp presents only in male.

Above description of the western North Pacific species agrees closely with previous description of South Pacific species (Hurley, 1955), but there are some differences in detail.

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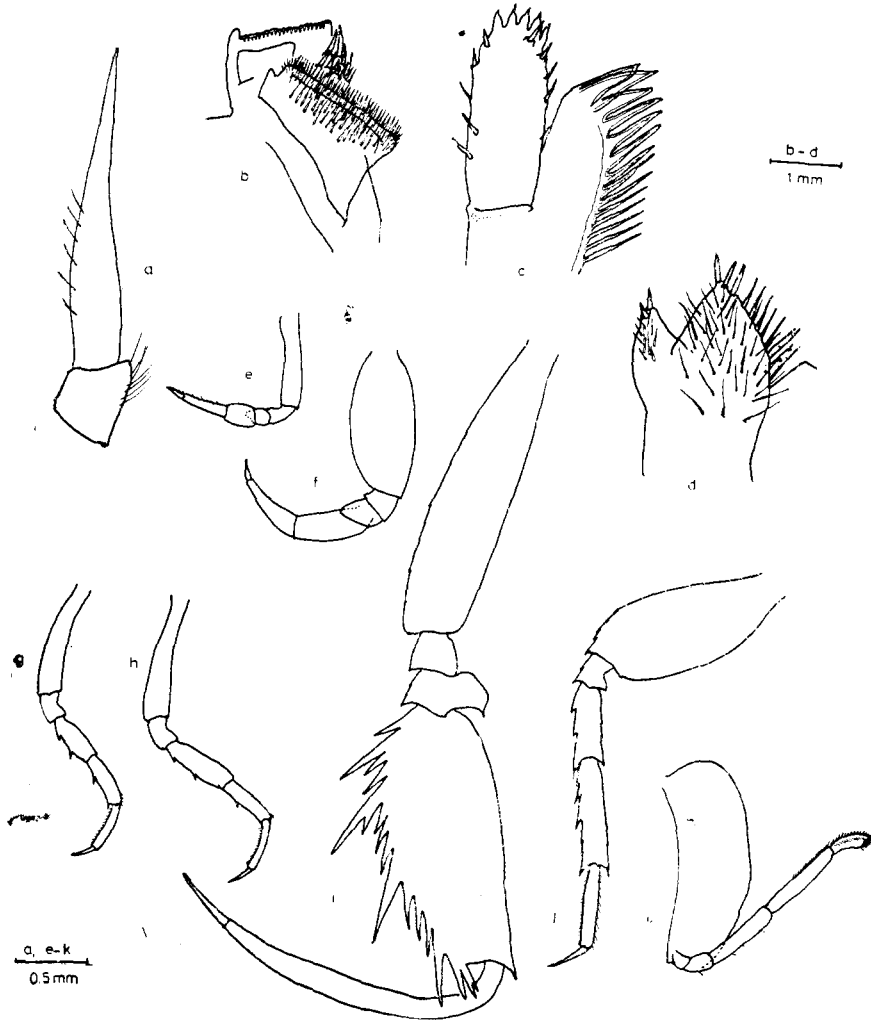


Fig. 1. *Primno macrofa* Guér. 13mm. a. A 1.; b. Md.; c. Mx 1.; d. Mx 2.; e-f. Gn 1-2.; g-k.