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Bathyhippolyte yaldwyni n.gen., n.sp., a Deepsea Hippolytid
(Decapoda, Natantia) from New Zealand*

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Abstract

A new genus and species, *Bathyhippolyte yaldwyni* (Decapoda, Natantia, Hippolytidae) are proposed for three specimens collected from New Zealand deep waters. The new genus superficially resembles the North Atlantic genus *Cryptocheles*, but is distinguished from this by a simple mandible, a normally shaped chela on the first pereopod, reduced eyes and a small spine on the first segment of the antennular peduncle.

INTRODUCTION

IN June, 1968, the Japanese research vessel "Kaiyo Maru" of the Fisheries Agency of Japan made a survey of seas around the Chatham Islands, New Zealand. During the survey a number of caridean shrimps were obtained, all being collected with a small hand-made dredge devised by Dr K. Baba of the Kumamoto University. In a haul from a depth of about 1,000m a single highly peculiar shrimp of the family Hippolytidae was found. It is different from all the members of the family so far described, and has a combination of some exclusive characters which justify the erection of a new genus.

Consultation with Dr J. C. Yaldwyn of the Dominion Museum, Wellington, showed that he had already encountered two specimens of this species collected from two different depths in a nearby area off the South Island of New Zealand. He had also recognised them as representing a new genus and species of Hippolytidae, but had not described them. Through his courtesy, we recently received these two specimens with his permission to include them in our paper. It is a great pleasure to dedicate this new hippolytid to Dr Yaldwyn.

SYSTEMATICS

Bathyhippolyte n.gen.

DEFINITION: Body smooth, without ridges or grooves, with long simple setae near middorsal line from middle of rostrum to end of sixth somite. Carapace with both antennal and branchiostegal spines; suborbital and pterygostomial angles rounded.

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Rostrum directed forwards with many teeth on upper margin and with one or no tooth on the lower margin. Third abdominal somite produced posteriorly over base of fourth somite; pleura of first four somites rounded; pleuron of fifth somite bluntly pointed. Telson with 10 to 15 spinules close to lateral margin; posterior margin truncate, without spinules. Eye reduced, not pigmented; eyestalk not visible. First segment of antennular peduncle with a small erect spine on outer margin near base; stylocerite acutely pointed, falling short of end of first segment. Outer antennular flagellum flattened, uniramous, and slightly longer than carapace; inner flagellum short, extending only to distal extremity of antennal scale. Antennal scale broad, lamellar part extending well beyond outer terminal spine. Mandible without incisor process or palp. Distal endite of maxilla entire, not cleft into two lobes. Pleuro-branches present on all pereopods; exopods on all maxillipeds; epipods on first and third maxillipeds. First and second pereopods chelate; dorsal extremity of merus of first pereopod produced to an acute spiniform process. Chela of second pereopod very small, carpus subdivided into ten joints. Dactyli of last three pereopods very long and slender, without any spinules on posterior border. Uropod slightly shorter than telson; outer margin of exopod with a spine near its base, outer terminal spine absent. Eggs few and large.

TYPE SPECIES: *Bathyhippolyte yaldwyni* n.sp.

Bathyhippolyte yaldwyni n.sp. Figs. 1-16.

TYPES: Trawl station 36, Chatham Rise, New Zealand, 44°44'S, 175°42'E, July 16, 1968, time 18.30-19.35, depth 995-1,110m, bottom mud, "Kaiyo Maru"—one ovig. ♀ (holotype, Zoological Laboratory, Kyushu University, ZLKU No. 11628).

Dominion Museum bottom station 189, off East Otago coast, edge of Karitane Canyon (= Canyon A), 45°38.5'S, 171°2'E, August 14, 1955, depth 120fms, "Alert" (collected by a combined Dominion Museum and Portobello Marine Station field party)—one ♂ (allotype, Rijksmuseum van Natuurlijke Historie, Leiden, No. D25538).

Portobello Marine Station collection station 55.8, off East Otago coast, edge of Taiaroa Canyon (= Canyon C), August 16, 1955, depth 350fms, "Alert" (collected by a combined Dominion Museum and Portobello Marine Station field party)—one ovig. ♀ (paratype, Dominion Museum, Z. Cr. 1862).

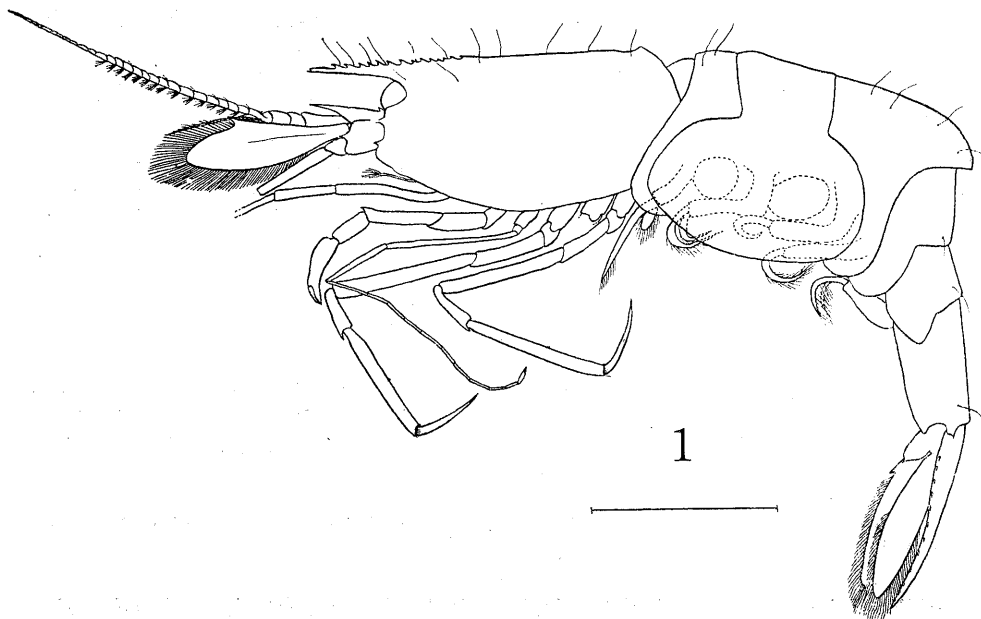


FIG. 1.—*Bathyhippolyte yaldwyni* n.gen., n.sp., holotype. Scale represents 5mm.

DESCRIPTION OF HOLOTYPE: The specimen is about 28mm in body length. Rostrum slender, extending forwards and reaching end of first segment of antennular peduncle; on its upper margin there are about 15 teeth, of which the posterior seven are placed on the carapace; the distal one is very small and situated close to the apex; lower margin straight and unarmed. Carapace 2.2 times as long as rostrum; supraorbital spine absent and pterygostomial angle rounded.

Abdomen smooth; pleura of first four somites anteriorly and posteriorly rounded. Pleuron of fifth somite bluntly pointed posteriorly. Third somite very large and posteriorly produced over base of fourth somite. Sixth somite 1.8 times as long as broad (measured at the posterior end); its pleuron is bluntly triangular; posterolateral angle pointed. Telson long, slender, dorsally flattened and 1.6 times as long as sixth somite; there are 12 spinules on the left side and 10 on the right; all spinules but one are placed close to lateral margin, the exception being a proximal spinule of the right series which is much smaller and situated a little inside the level of the other spinules. Posterior margin truncate, without spinules but with three rather stout setae and a few fine setae present between them.

Eye much reduced, not pigmented and reaching slightly beyond the line of the anterior margin of the carapace; eyestalk not visible; the cornea are juxtaposed at the base of the rostrum in dorsal view.

Antennular peduncle reaches middle of antennal scale; first segment long, slender and armed with a diagnostic small erect spine on the outer margin near the base. Stylocerite slender and falls short of end of first segment. Second and third segments equal in length. Outer flagellum flattened and composed of about 30 joints, of which the basal 20 joints have short fine setae on the ventral side and a rather long seta on the outer distal end of each articulation. Inner flagellum cylindrical, about one-third the length of the outer flagellum and extends to the distal end of the antennal scale.

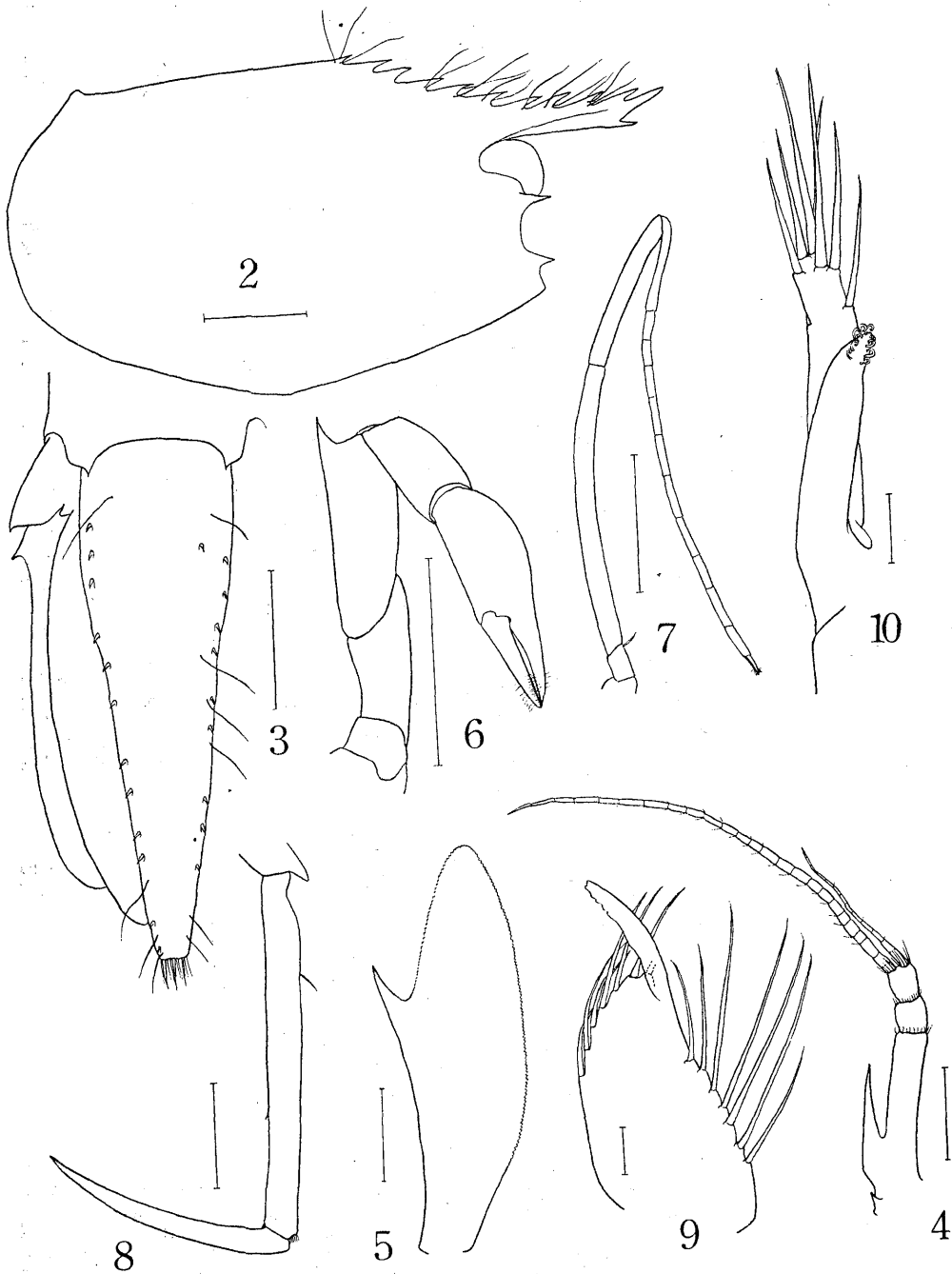
Antennal scale broad, three times as long as broad measured at the base of the outer spine; outer margin concave and ends in a stout spine which falls short of the expansion of the lamellar part. Basicerite armed with an acute spine on outer side. Carpocerite long, reaching outer spine of scale.

Mandible bears neither an incisor process nor a palp; molar process ends in a slender process with several minute denticulations. The maxillule has slender proximal endite; distal endite is much broader; palp bears two hairs. Distal endite of maxilla entire, not cleft into two parts; proximal endite reduced to a small lobe; palp short and rather broad; scaphognathite well developed. First maxilliped has large distal endite; proximal endite small; palp large and broad; the caridean lobe is also well developed; exopod flagellum short and small, epipod broad. The second maxilliped is rather different from the usual form; the distinct epipod is absent; the exopod well developed, with a long plumose hair at the middle in addition to the terminal hairs. Third maxilliped reaches end of scale; ultimate segment about 1.5 times as long as penultimate segment; antepenultimate segment twice as long as penultimate; the exopod small and does not reach to middle of antepenultimate segment.

The branchial formula:

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	—	—	—	1	1	1	1	1
Arthrobranchs	—	—	—	—	—	—	—	—
Podobranchs	—	—	—	—	—	—	—	—
Epipods	1	—	1	—	—	—	—	—
Exopods	1	1	1	—	—	—	—	—

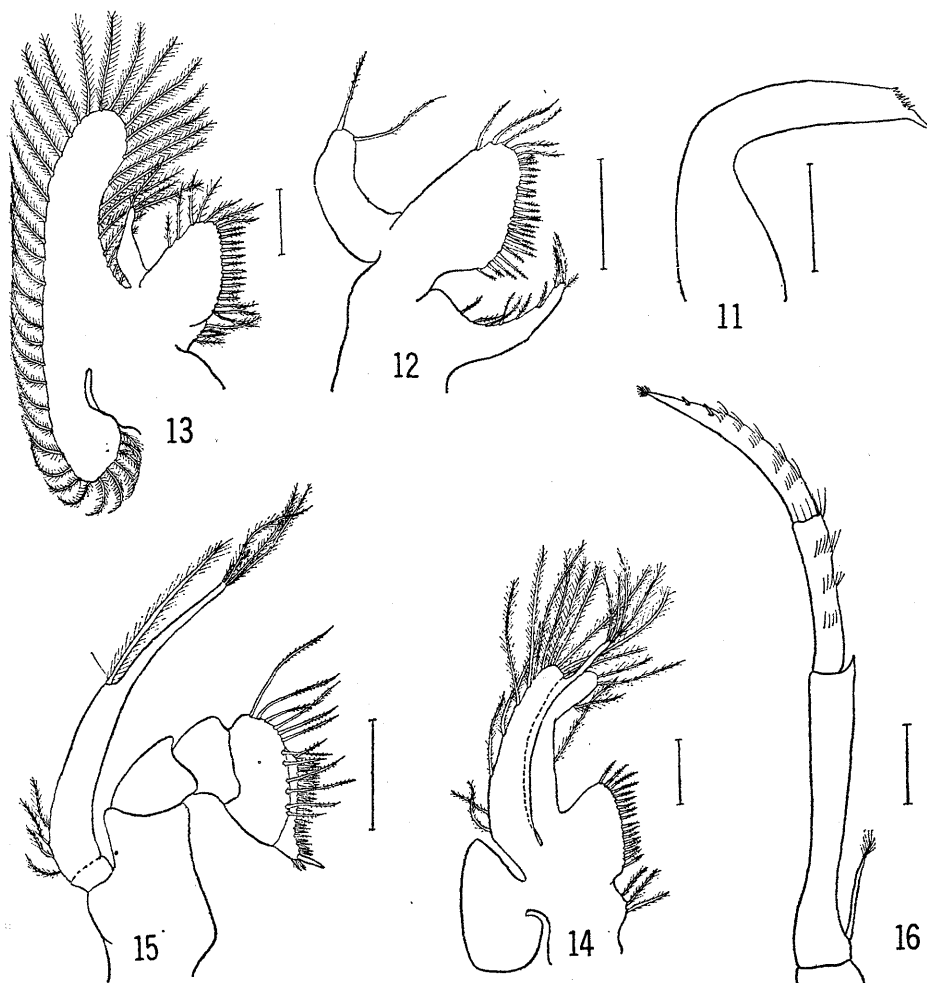
First pereiopods equal in shape and size, and reach the end of first segment of antennular peduncle; fingers about half as long as palm and have dark-coloured tips; carpus about half as long as chela; merus bears a stout process on distal extremity of dorsal surface. Second pereiopod much longer and more slender than first, and exceeds the end of the antennal scale by the chela and the distal four joints of the carpus; chela microscopically small, and shorter than distal joint of carpus; carpus of ten joints 3.4 times as long as merus. Merus considerably shorter than ischium. Third pereiopod over-reaches end of the scale by the dactylus and the distal third of the propodus; dactylus long and slender and about two-thirds the length of the propodus, without spinules on posterior margin; propodus bears a few short spinules on distal end and a short spinule at middle of posterior margin; carpus half as long as propodus; merus 2.5 times as long as carpus, its outer surface smooth. Fourth and fifth pereiopods generally resemble third pereiopod. These two pereiopods reach beyond the



FIGS. 2-10.—*Bathyhippolyte yaldwyni* n.gen., n.sp. 2, carapace of paratype; 3, telson of holotype; 4, antennule of allotype; 5, antennal scale of holotype; 6, first pereiopod of allotype; 7, second pereiopod of allotype; 8, dactylus and propodus of fourth pereiopod of holotype; 9, endopod of first pleopod of allotype; 10, appendix interna and appendix masculina of second pleopod of allotype. Scale for Figs. 2-8 represent 1.0mm; those for Figs. 9 and 10 represent 0.1mm.

antennal scale by each dactylus. Dactyli and propodi of last three pereopods increase in length with their order, while the meri decrease in length. The carpi of these pereopods are about equal in length.

Endopod of first pleopod reduced to a small triangular lobe, about one-third the length of the exopod. Second to fifth pleopods equally biramous; the endopods of these pleopods bear a short appendix interna. Uropod slightly shorter than telson. Outer margin of exopod bears a small fixed spine near the base; outer distal margin not armed with any spinules and surrounded by fine setae only as in the outer distal margin of the endopod of uropod.



FIGS. 11-16.—Mouth-parts of *Bathyhippolyte yaldwyni* n.gen., n.sp., holotype. 11, mandible; 12, maxillule; 13, maxilla; 14, first maxilliped; 15, second maxilliped; 16, third maxilliped. Scales represent 0.5mm.

Eggs few, seven in number, and large, 1.1×1.5 mm in diameter.

DESCRIPTION OF ALLOTYPE: The allotype, male, is much smaller than the holotype, 13.5mm in body length, but does not show any significant differences from the holotype. The rostrum bears eleven teeth on the upper margin, of which the posterior eight are placed on the carapace and no tooth on the lower margin. These rostral teeth are about equal size and rather larger than those of the holotype. The telson is armed with a series of 15 spinules on the left and 13 on the right, all the spinules being close to the lateral margin. The stout setae on the posterior margin of the telson are longer than in the holotype.

The first pleopod has a well-developed endopod, narrowed in the distal part to a slender appendix interna, of which the inner margin is rough but without any distinct retinacula. The

second pleopod bears a large appendix masculina, which is stouter and longer than the appendix interna. Several strong setae are present at the tip of the appendix masculina and some small retinacula are on the appendix interna.

PARATYPE: The paratype is rather larger than the allotype but smaller than the holotype, 17mm in body length. It is essentially similar to the specimens described above.

The rostrum bears ten teeth on the upper margin, of which the last six are situated on the carapace. A single tooth is present on the lower margin, just below the foremost one of the upper series.

Colour in life. The following notes on the colour of the holotype were made by Dr Baba who found and sorted out this interesting specimen.

Body wholly pale yellowish brown; eyes orange; cardiac region of carapace and eggs yellow; contents of stomach visible as a black mass. This agrees with a short colour note made on the original label of the paratype by Dr Elizabeth Batham of the Portobello Marine Station as: "Warm yellow".

RELATIONSHIP. Although the toothed rostrum, the subdivided carpus of the second pereopod and the dark coloured tip of the chela of the first pereopod indicate that *Bathyhippolyte* gen.nov. belongs to the family Hippolytidae, it is not easy to find the related genera within the family. According to Holthuis's keys (1947 and 1955), the new genus falls into the genus *Hippolysmata*, especially into subgenus *Lysmatella*, since it has a simple mandible, a multi-articulated carpus in the second pereopod, a smooth carapace and abdomen, the presence of an exopod on the third maxilliped and no epipods on the pereopods. However, it is readily distinguished from this littoral genus by the reduction of eyes, by the small spine on the first segment of the antennular peduncle, by the length of the antennular flagellum, by the spination of the telson, by the entire distal endite of the maxilla and by the well-developed endopod and caridean lobe of the first maxilliped.

The reduced eyes, which are one of the most peculiar characters of the new genus, recall an abyssal form. *Bythocaris* and *Cryptocheles* are known to be the deep sea genera of the family Hippolytidae. Six species of *Bythocaris*, however, have developed and pigmented eyes (Sars, 1912, and Holthuis, 1951), while the genus *Cryptocheles*, containing only one species, *C. pygmaea* G. O. Sars, reported from the west coast of Norway, has rather small and non-pigmented eyes (Sars, 1912), but its shape is entirely different from that of the new genus. The small spine on the first segment of the antennular peduncle is another peculiar character of the new genus, it is unique in the family. The spine is not placed on the base of the stylocerite, as in some species of *Thor* and *Merhippolyte*, but on the outer margin of the peduncle proper just behind the stylocerite. The tail fan is different from the usual form. The telson bears a series of the lateral spinules, and the spine on the outer margin of the exopod of the uropod is situated near the proximal end. These features somewhat resemble those of *Cryptocheles*.

Turning to the characters of the mouth-parts and gill formula, the distal endite of the maxilla is entire as in Sars's (1912) figure of *C. pygmaea* and not cleft into two lobes. As far as we know, this is the second record of a maxilla with an entire distal endite in the family Hippolytidae. Kemp (1914) described it as a peculiar feature of *Merguia oligodon*, but later (1925) he reported that this had been only an individual abnormality. The gills are rather reduced and show the same formula as in *Bythocaris* (Holthuis, 1951) and probably in *Cryptocheles*. In the latter, however, five pleurobranchs are placed on the third maxilliped and first four pereopods, and the presence of the epipod on the third maxilliped is uncertain (Sars, 1912).

From the above discussion, the new genus superficially resembles the North Atlantic genus *Cryptocheles*, though it differs from this in having no incisor process on the mandible, a normally shaped chela on the first pereopod, a slender and long second pereopod, reduced eyes and a small spine on the first segment of the antennular peduncle.

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