



*This paper is dedicated to Prof. Dr. Eugen Kempf on the occasion of his 80<sup>th</sup> birthday (16 April 2012)*

**BATHYCONCHOECIA LIUI N. SP., A NEW SPECIES OF OSTRACOD  
(MYODOCOPA, HALOCYPRIDIDAE) FROM THE SOUTH CHINA SEA**

BY

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ABSTRACT

A new species of halocyprid ostracod, *Bathyconchoecia liui*, from the bathypelagic zone of the Nansha Trough (North-West Borneo Trough, southern South China Sea) is described and illustrated. It is compared with the closely similar species *B. angeli* George, 1977. The present species is easily distinguished from *B. angeli* by the structures of the toothed edges of the mandibular basis and coxa, and by the segmentation of the fifth limb.

Key words. — Pacific Ocean, zooplankton; deep sea, systematics, Bathyconchoeciinae

ZUSAMMENFASSUNG

Eine neue Art der Halocypriden (Ostrakoden), *Bathyconchoecia liui*, wird aus der bathypelagischen Zone des Nansha Trough (Nord-West-Borneo Trough) im südlichen Südchinesischen Meer beschrieben und dargestellt. Sie wird mit der ähnlichen Art *B. angeli* George, 1977 verglichen. Die vorliegende Spezies ist von *B. angeli* durch die Strukturen der gezähnten Ränder der Mandibelbasis und -coxa und durch die Segmentierung des fünften Extremität leicht zu unterscheiden.

Schlüsselworte. — Pazifischer Ozean, Zooplankton, Tiefsee, Systematik, Bathyconchoeciinae

INTRODUCTION

The genus *Bathyconchoecia* was established by Deevey (1968) to include six new species from the Gulf of Mexico and two species originally attributed to the genus *Euconchoecia*. Since then 15 more species have been described (Kornicker, 1969, 1981; Poulsen, 1969a, b, 1972; Angel, 1970, 1973, 1976; George, 1971, 1977; Deevey, 1975; Kornicker & Angel, 1975; Ellis, 1987, 1989; Kornicker &

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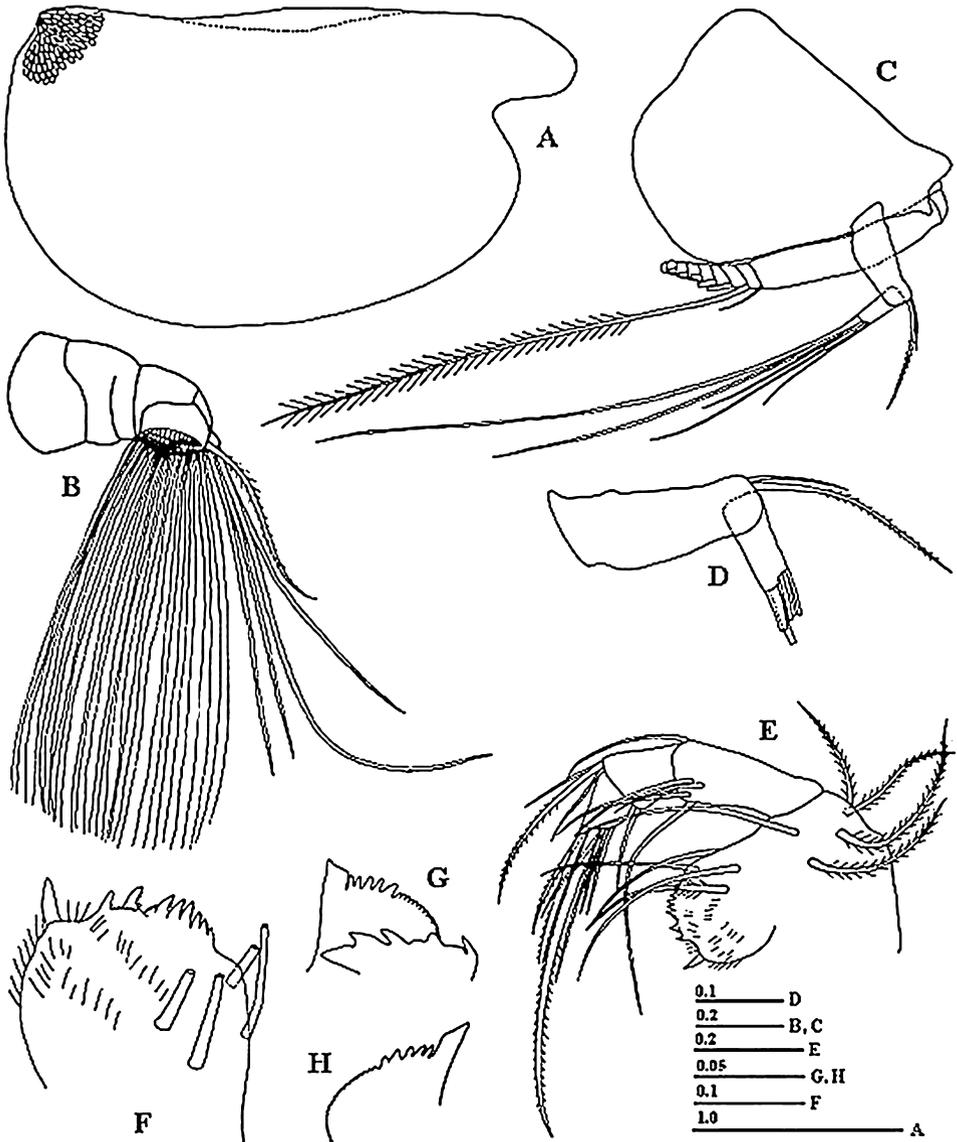


Fig. 1. *Bathyconchoecia liui* n. sp., female, holotype. A, carapace viewed laterally; B, first antenna; C, second antenna; D, endopodite of second antenna; E, basis and endopodite of mandible; F, toothed edge of basis of mandible; G, toothed edge and tooth list of coxa of left mandible; H, toothed edge of coxa of right mandible. Scale bars in mm.

Rudjakov, 2004). Recently, Angel (2012) has established a new genus *Scottoecia* to include a new species, *S. arabica* (= *B. lacunosa* sensu James, 1973), and other four species formerly assigned to the genus *Bathyconchoecia*. Angel & Graves (2013) have established a new subfamily, Bathyconchoeciinae, to include

the genera *Bathyconchoecia* and *Scottoecia*. Most species of *Bathyconchoecia* have been recorded from the Atlantic, and few species have been found in the Pacific (Kornicker, 1969, 1991; Poulsen, 1969a). However, this is unlikely to be representative of the true zoogeographical distribution of the genus (Angel, 1973). Yin & Chen (1991) described three new recorded species of *Bathyconchoecia* from the South China Sea, and Angel (personal communication) believes that the specimen identified as *B. paulula* is a new species. In the 1980s, the expedition of the Multidisciplinary Oceanographic Expedition Team of the Academia Sinica to the Nansha Islands collected a number of bathypelagic, vertical trawl samples from the southern South China Sea. In one of these samples, an adult female specimen of a previously undescribed *Bathyconchoecia* species was found; it is described as a new species of *Bathyconchoecia* below.

#### MATERIAL AND METHODS

The carapace length (CL) and height of the specimen were measured under a stereomicroscope at 25× magnification using a calibrated eyepiece micrometer. The specimen was dissected, and the limbs were placed on a series of slides under a stereomicroscope. The limbs and setae were measured using a microscope and an eyepiece micrometer. These measurements were standardised by expressing them as percentages of the carapace length (% CL). The complete animal and the limbs were drawn using camera lucidas. The figures for publication were inked from the pencilled camera lucida drawings.

#### DESCRIPTION

##### Systematics

Class OSTRACODA Latreille, 1802

Subclass MYODOCOPA Sars, 1866

Order HALOCYPRIDA Dana, 1853

Suborder HALOCYPRIDINA Dana, 1853

Family HALOCYPRIDIDAE Dana, 1853

Subfamily BATHYCONCHOECIINAE Angel & Graves, 2013

Genus *Bathyconchoecia* Deevey, 1968

##### ***Bathyconchoecia liui* n. sp. (figs. 1 and 2)**

Holotype.— Unique specimen, adult female, has been deposited in the South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, China. Reg. number SCSIOCAS-B001.

Type-locality.— Southern South China Sea, 6°04.55'N 113°35.83'W; June 5, 1985; sounding 2626 m; vertical haul from 2600 to 1500 m, 0.505 mm mesh net.

Etymology.— The species is named in honour of Rui-Yu Liu, Institute of Oceanology, Chinese Academy of Sciences, Qingdao, P.R. China, who was a famous marine biologist and carcinologist.

Female. Carapace (fig. 1A).— The carapace length (CL) is 2.46 mm with a height 1.41 mm. The anteroventral and posteroventral corners are well rounded. The posterodorsal corner is bluntly rounded. The anterior, ventral and posterior margins are rounded. The dorsal margin is slightly curved, and there is a shallow sulcus on the hinge line at about mid-length. The rostrum is large, straight, rounded, and accounts for 14.2% of the total length beyond the anterior margin. The incisure is shallow and open (14.3% CL from the tip of the rostrum to the inner margin). The asymmetrical glands open symmetrically at posterior margin close to the posterodorsal corner. The sculpturing of carapace is distinct. The entire surface of carapace is entirely covered with tiny pits, but otherwise there are no striations or reticulations.

Frontal organ.— Frontal organ is absent.

First antenna (fig. 1B).— The limb is short and bare (approx. 21.1% CL), and its segmentation is indistinct. The fourth segment (but see Poulsen, 1969a) ventrally carries a cluster of 200-240 sensory filaments, which are arranged in 10-12 rows, each row consisting of about 20 filaments. The fifth segment carries a plumose distodorsal seta that is about half the lengths of the sensory filaments. The terminal segment carries 4 setae. The principal seta is slightly longer than the sensory filaments, and remaining 3 setae are almost subequal and shorter than the sensory filaments. The sensory filaments are about 38.2% CL, the distodorsal seta is 19.1% CL, the principal seta is 46.3% CL and other three terminal setae are 31.7, 30.5 and 31.7% CL respectively.

Second antenna (fig. 1C, D).— The protopodite is pear-shaped (30.5% CL), and is only slightly more long than broad. The exopodite is 9-segmented. The first exopodite segment (19.1% CL) is straight and is twice as long as segments 2-9. It carries a small terminal seta just reaching to the fourth segment. Segments 2-8 each carry a long swimming seta. The terminal segment carries 3 spinose setae of different lengths (not shown). The endopodite is 2-segmented. The first endopodite segment is almost rectangular and one-third of the length of the protopodite (10.1% CL). It carries 2 distodorsal setae. The a-seta (4.9% CL) is bare and slightly less than half of the length of the b-seta (11.0% CL). The length of the b-seta is approximately equal to length of the segment, and distally has marginal spinules. The second endopodite segment carries 5 setae. The f-, g-, h-, i- and j-setae are 38.6, 54.5, 17.9, 25.2 and 12.6% CL, respectively. They all are longer than the

b-seta of the first endopodite segment, the longest one of which is a little longer than the swimming setae. The swimming seta of the second exopodite segment is 48.8% CL.

Mandible (fig. 1E-H).— The toothed edge of the coxal endite has 5 roughly even blunt teeth on the ventral edge, and the anterior edge is serrated. The proximal and distal tooth lists are fused into a single list of about 5 uneven teeth. The basal endite is broad and robust. The toothed edge has 2 spine teeth, 6 triangular cutting teeth armed with secondary serrations, and an “outer tooth” (outermost one, see Angel & Graves, 2013). The first spine tooth is stout, pointed, and well offset from all other teeth. The second spine tooth is short and blunt. The basis has 4 plumose and 1 bare setae near the insertion of the endopodite, and 4 bare setae on the anterior edge and lateral surface of the endite. The first endopodite segment has 1 distodorsal seta and 4 ventral setae. The second endopodite segment has 3 distodorsal setae and 1 distoventral seta. The end-segment has 7 terminal setae, and one of them is extremely long (24.8% CL) and exceeds the length of the endopodite.

Maxilla (fig. 2A, B).— The precoxal endite has 6 plumose setae. The coxal endite has a total of 22 setae of these 11 are slender and bare, and the others are stout and spinose. The basis has 2 plumose seta. The anterior margin of the first endopodite segment has a group of 4 plumose setae proximally and one distally; the posterior margin has 4 plumose medial setae. There are short hairs on the anterior face. The second endopodite segment has 2 stout claws and 4 slender setae.

Fifth limb (fig. 2C).— The epipodial setae are in three groups of 4, 4, 5 (dorsally). The precoxa and coxa are covered with short fine spinules on the ventral face. The precoxa has 2 plumose ventral setae. The coxa has total of 10 setae (4 plumose, 6 bare) and 2 claws on the ventral face. The basis has 5 ventral setae (3 plumose, 2 bare), 1 pair of plumose lateral setae, and 1 very long distodorsal seta (a remnant of exopodite, see Angel, 2012) that extends past the end of the limb. The endopodite appears to consist of 3 segments. The first endopodite segment is short, with 1 pair of ventral setae and 1 lateral seta. The second endopodite segment has 1 dorsal seta, 1 ventral seta and 1 pair of lateral setae. The third endopodite segment has 3 terminal setae, and two of which are claw-like and stout. The dorsal seta is a little longer than the central and ventral setae (10.2% CL).

Sixth limb (fig. 2D).— The epipodial setae arranged in three groups of 5, 5, 6 (dorsally). The coxa has 6 plumose and 1 bare setae ventrally. The basis has 4 plumose ventral setae, 1 plumose lateral seta, and 1 extremely long distodorsal seta (a residual exopodite, see Angel, 2012) that extends beyond the end of the limb. The endopodite is 3-segmented. The first endopodite segment has 5 ventral setae. The second endopodite segment has 4 ventral setae and 1 dorsal seta. The third endopodite segment has terminally 2 claw-like and 1 slender setae of which the dorsal one is the longest (12.2% CL).

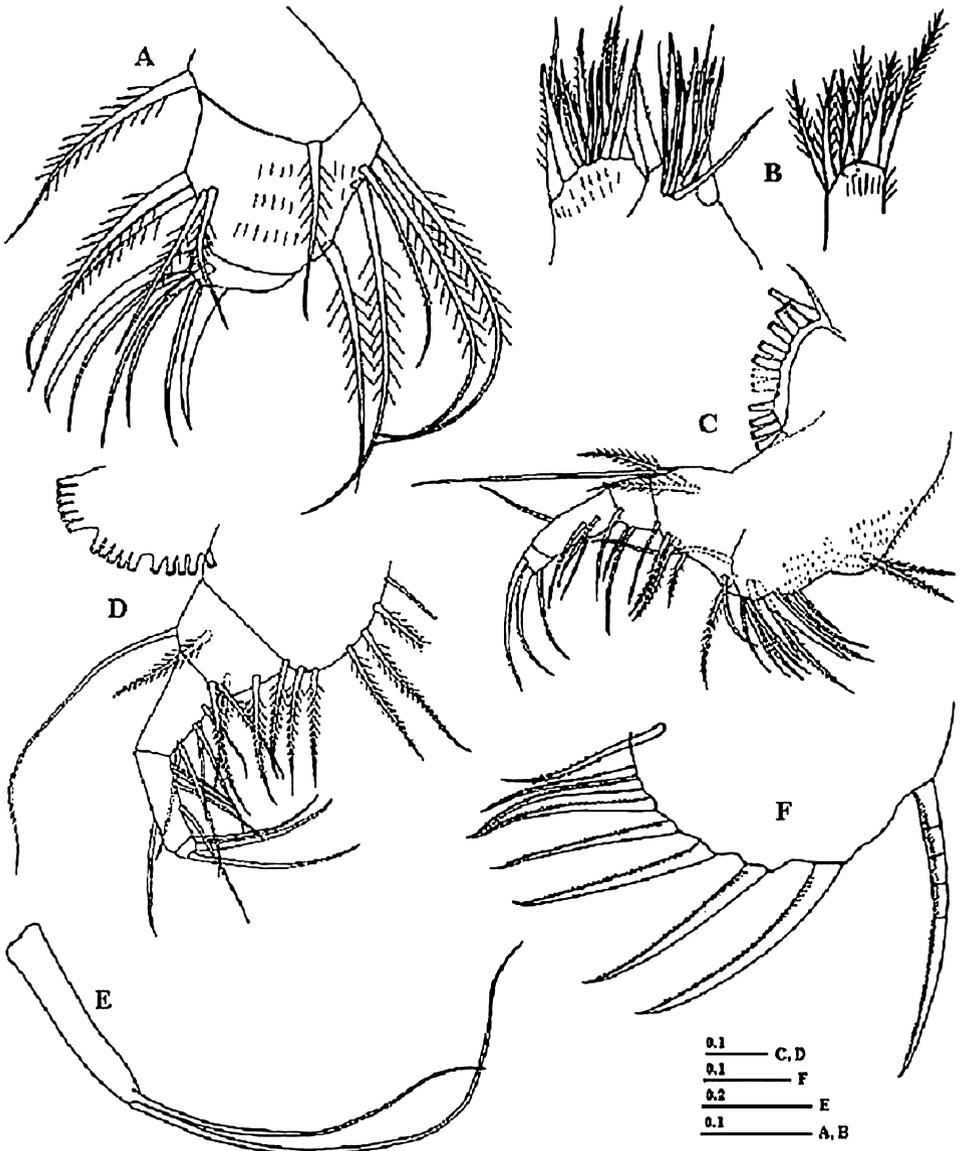


Fig. 2. *Bathyconchoecia liui* n. sp., female, holotype. A, basis and endopodite of maxilla; B, precoxal endite (right) and coxal endite (left) of maxilla; C, fifth limb; D, sixth limb; E, seventh limb; F, caudal furca. Scale bars in mm.

Seventh limb (fig. 2E).— The limb is slender and the suture between the two segments is very indistinct. The terminal segment bears 2 unequal and bare setae terminally.

TABLE I

Comparison of the morphologic characteristics between females *B. liui* n. sp. and *B. angeli* George, 1977 and the depths where these were found

Character	<i>B. liui</i>	<i>B. angeli</i>
Carapace length (mm)	2.46	2.5
Height/length (%)	57.3	54.0
Rostrum length/ carapace length (%)	14.2	16.0*
Carapace, posterior margin	Rounded	Straight
Rostrum tip	Well rounded	Slightly rounded
A2, first endopodite segment	B-seta equal in length to segment	B-seta longer than segment
Mandible basal toothed edge	1 <sup>st</sup> spine tooth > 2 <sup>nd</sup> one	2 spine teeth equal
Mandible coxal toothed edge	Anterior edge serrated	Anterior edge smooth
Fifth limb	3 endopodite segments	2 endopodite segments
Sixth limb, 1 <sup>st</sup> and 2 <sup>nd</sup> endopodite segment setae	5 + 5	4 + 3
Seventh limb, 2 terminal setae	Unequal	Equal
Depth of net/sounding (m)	2600-1500/2626	200-0/230

\* Indicates data derived from measuring drawings in the original description.

Caudal furca (fig. 2F).— Each lamella has 8 long, slim and weak claws all with 2 rows of spines on the posterior edge. The first claw is 5-jointed. There is a long unpaired seta behind claws.

#### DISCUSSION

The present species belongs to the genus *Bathyconchoecia* rather than to *Scottoecia*, based on its features of the locations of the asymmetrical glands opening and the structures of the toothed edges of the mandible. Angel (2012) has made a comprehensive summary of the characters of carapace of all species described as *Bathyconchoecia*. *B. liui* can be easily distinguished from all other species, except *B. angeli*, *B. arctica* and *B. latirostris*, by the lack of spines or serrations on the carapace and its open incisure. However, its rostrum is very different in form from *B. arctica* and *B. latirostris*. *B. arctica* at the moment is a unique *Bathyconchoecia* species in having a frontal organ. The novel species is most similar to *B. angeli* in the size and shape of the carapace, and also in the locations at which the asymmetrical glands open. The morphological characteristics and the depths where these two species were found are compared in table I. Nevertheless, there are differences between them notably the structures of the toothed edges of the mandibles and the segmentations of the fifth limbs are particularly significant.

The depths at which *B. angeli* and the present species have been taken are also observably different. George's specimen was collected in the epipelagic zone of Malacca Strait, Indian Ocean (George, 1977), while the present specimen was collected in the bathypelagic zone of Nansha Trough (North-West Borneo Trough, southern South China Sea). Most species of *Bathyconchoecia* had been collected in the bathypelagic, abyssopelagic and benthopelagic zones (>1000 m) (Deevey, 1968, 1975; Poulsen, 1969a, 1972; Angel, 1970, 1973; Kornicker & Angel, 1975; Ellis, 1987, 1989; Kornicker & Rudjakov, 2004).

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