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A new species of *Cancricepon* Giard & Bonnier, 1887 (Isopoda: Bopyridae) from China

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Abstract Specimens of the genus *Cancricepon* Giard & Bonnier, 1887 are recorded for the second time from China, and a new taxon, *Cancricepon multituberosum* n. sp., is described based on specimens parasitising the xanthid crab *Liomera laevis* (A. Milne-Edwards). Females of the new species can be distinguished from the other seven species of *Cancricepon* by the presence of mid-dorsal projections on all pereomeres and the absence of a palp on the maxilliped. *Merocepon knudseni* Danforth, 1970 is transferred to *Cancricepon* as *C. knudseni* (Danforth, 1970) n. comb. A table of the eight described species of *Cancricepon* is provided.

Introduction

Giard & Bonnier (1886) described *Cepon elegans* Giard & Bonnier, 1886 as a parasite of the crab

Pilumnus hirtellus (Linnaeus) from France. Following this work, Giard & Bonnier (1887) erected *Cancricepon* Giard & Bonnier, 1887, moving *Cepon elegans* to this genus and describing a new species, *Cancricepon pilula* Giard & Bonnier, 1887, also from France. Richardson (1910) described *C. xanthi* (Richardson, 1910) (originally attributed to *Merocepon* Richardson, 1910) infesting *Phymodius ungulatus* (H. Milne Edwards) in the Philippines, a parasite subsequently found in Japan (Shiino, 1936) and Palau (Shiino, 1942). Nierstrasz & Brender á Brandis (1925) described *C. choprae* (Nierstrasz & Brender á Brandis, 1925) (originally allocated to *Grapsicepon* Giard & Bonnier, 1887) infesting *Paraliomera dispar* (Stimpson), which has also been recorded infesting seven species of hosts, including a goneplacid crab (Markham, 1975). In contrast to many bopyrid isopods, hosts of *Cancricepon* species are regularly found with double infections, i.e. c.10–18% of parasitised hosts have parasites in both gill chambers (Bourdon, 1968; Markham, 1975).

Bourdon (1968, 1971) redescribed *C. elegans* and *C. pilula* from France, reviewed the genus (as well as related genera within the Ioninae H. Milne Edwards, 1840), incorporated *Merocepon* into *Cancricepon*, transferred *Grapsicepon choprae* to *Cancricepon* and described a new species, *Cancricepon anagibbosus* Bourdon, 1971, as a parasite of *Micropanope melanodactyla* (A. Milne-Edwards) from the Republic of Benin, West Africa. However, Bourdon was apparently not aware of Danforth's (1970) descriptions of

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Table 1 Differential features of the eight species of *Cancricepon* Giard & Bonnier, 1887*

Species	Type-host	Type-locality	Female			Male
			Maxilliped	Mid-dorsal projections	Pleopod	
<i>C. anagibbosus</i> Bourdon, 1971	<i>Micropanope melanodactyla</i> (Xanthidae)	Dahomey	With palp	Last four pereomeres	Biramous, endopodites small globose	All pereomeres
<i>C. choprae</i> (Nierstrasz & Brender à Brandis, 1925)	<i>Paralomera dispar</i> (Xanthidae)	Curaçao	With palp	Last three pereomeres	Uniramous	All pereomeres and first three pleomeres
<i>C. elegans</i> (Giard & Bonnier, 1886)	<i>Pilumnus hirtell</i> (Pilumnidae)	N.W. France	With palp	Last four pereomeres	Biramous, endopodites much smaller than exopodites, spade-shaped	All pereomeres and first pleomere
<i>C. garthi</i> Danforth, 1970	<i>Dacryopilumnus eremita</i> (Dacryopilumnidae)	Eniwetok	–	Last four pereomeres	Biramous, endopodites oval swellings	All pereomeres and first three pleomeres
<i>C. knudseni</i> (Danforth, 1970) n. comb.	<i>Eriphia sebana</i> (Eriphiidae)	Eniwetok	–	Last three pereomeres	Biramous, endopodites irregular or oval swellings	All pereomeres and first pleomere
<i>C. pilula</i> Giard & Bonnier, 1887**	<i>Xantho incisus</i> (Xanthidae) <i>Xantho floridus</i> (Xanthidae)	W. France	With palp	Last four pereomeres	Biramous, endopodites much smaller than exopodites, spade-shaped	All pereomeres
<i>C. xanthi</i> (Richardson, 1910)	<i>Phymodius unguilatus</i> (Xanthidae)	Philippines	–	Last three pereomeres	Biramous, endopodites small and difficult to see	All pereomeres
<i>C. multituberosum</i> n. sp.	<i>Liomera laevis</i> (Xanthidae)	China	Without palp	All pereomeres	Biramous, endopodites smaller than exopodites, lobate	All pereomeres and first two pleomeres

*In addition to these described species, Stebbing (1910) recorded an unidentified species of *Cancricepon* on *Pilumnus longicornis* Hilgendorf from the Seychelles area

**Mouchet (1932), Bourdon (1968) and Danforth (1970) questioned whether *C. pilula* is distinct from *C. elegans*

C. garthi Danforth, 1970 infesting *Dacryopilumnus eremita* Nobili and *Merocepon knudseni* Danforth, 1970 from *Eriphia sebana* (Shaw & Nodder) from the Pacific island of Eniwetok. The latter species is herein transferred to *Cancricepon* as *C. knudseni* (Danforth, 1970) n. comb. Consequently, in total, seven species of *Cancricepon* have been described (Table 1).

An (2009) recorded specimens of *Cancricepon* from China for the first time, finding *C. choprae* infesting *Scalopidia spinosipes* Stimpson (Ocypodidae) from the Beibu Gulf. As reviewed by Markham (1975), *C. choprae* has been found by several researchers from localities along the Atlantic coast of North America and Curaçao. Although specimens from the Atlantic and Pacific Oceans appear, based on their morphology, to be very close to the original description, molecular data should be used to establish whether the specimens from China represent a possible introduction or a potential new, cryptic species. Such studies need also to be carried out on other species which have been reported from China and other disparate localities (e.g. *Dactylokepon caribaeus* Markham, 1975, as reported in An et al., 2007). At present, the hosts of *Cancricepon* species belong to six families of brachyurans (Xanthidae, Goneplacidae, Pilumnidae, Dacryopilumnidae, Ocypodidae and Eriphiidae) (Table 1). The present study reports a new species of *Cancricepon* and its host *Liomera laevis* (A. Milne-Edwards) (Xanthidae), the first parasitic isopod to be recorded from this host.

Materials and methods

Materials for this study originated from the China Comprehensive Oceanographic Survey (1980). Specimens were fixed in formalin (40% aqueous solution of formaldehyde) and preserved in 75% alcohol. All of the material examined has been deposited in the Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China (IOCAS). Specimens were viewed and drawn using a Zeiss Stemi SV Apo.

Family Bopyridae Rafinesque-Schmaltz, 1815 Subfamily Ioninae H. Milne Edwards, 1840 Genus *Cancricepon* Giard & Bonnier, 1887

Cancricepon multituberosum n. sp.

Type-host: *Liomera laevis* (A. Milne-Edwards) (Brachyura: Xanthidae).

Type-locality: Yongxing Island, Xisha, China, 16°45'N, 112°15'E.

Type-material: All deposited in IOCAS. Ex *Liomera laevis* (A. Milne-Edwards) (Fig. 1A).

Holotype: Yongxing Island, Xisha, 16°45'N, 112°15'E, 11 June 1980, CIEX800602, ♀ (Fig. 1B).

Allotype: Yongxing Island, Xisha, 16°45'N, 112°15'E, 11 June 1980, CIEX800603, ♂. *Paratype*: Yongxing Island, Xisha, 16°45'N, 112°15'E, 11 June 1980, CIEX800601, ♀ (immature) (Fig. 1C).

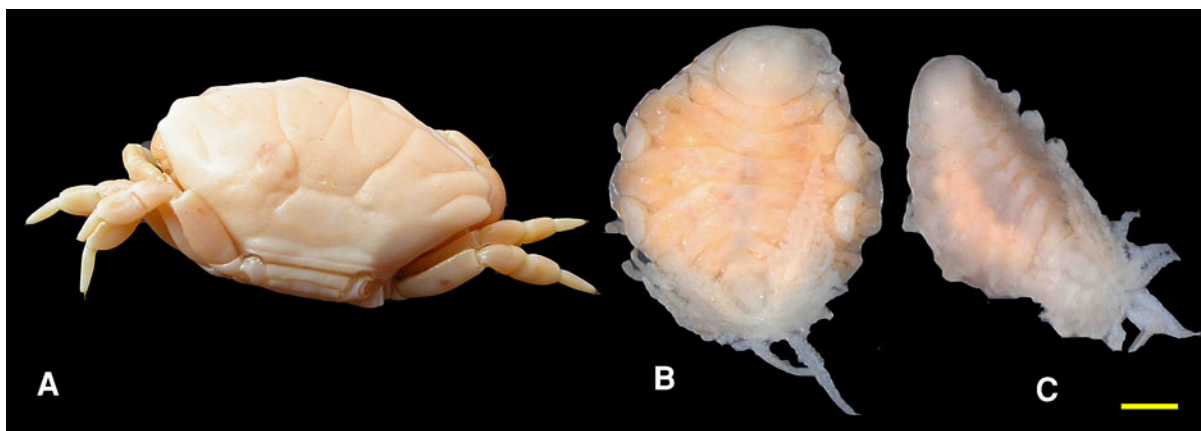


Fig. 1 *Cancricepon multituberosum* n. sp. and its host: A. The host *Liomera laevis* (A. Milne-Edwards), left branchial chamber swollen, bearing parasitic isopod; B. Dorsal view of the holotype female (CIEX800602); C. Dorsal view of the immature female (CIEX800601). Scale-bars: A, 0.08 mm; B, 0.58 mm; C, 1 mm

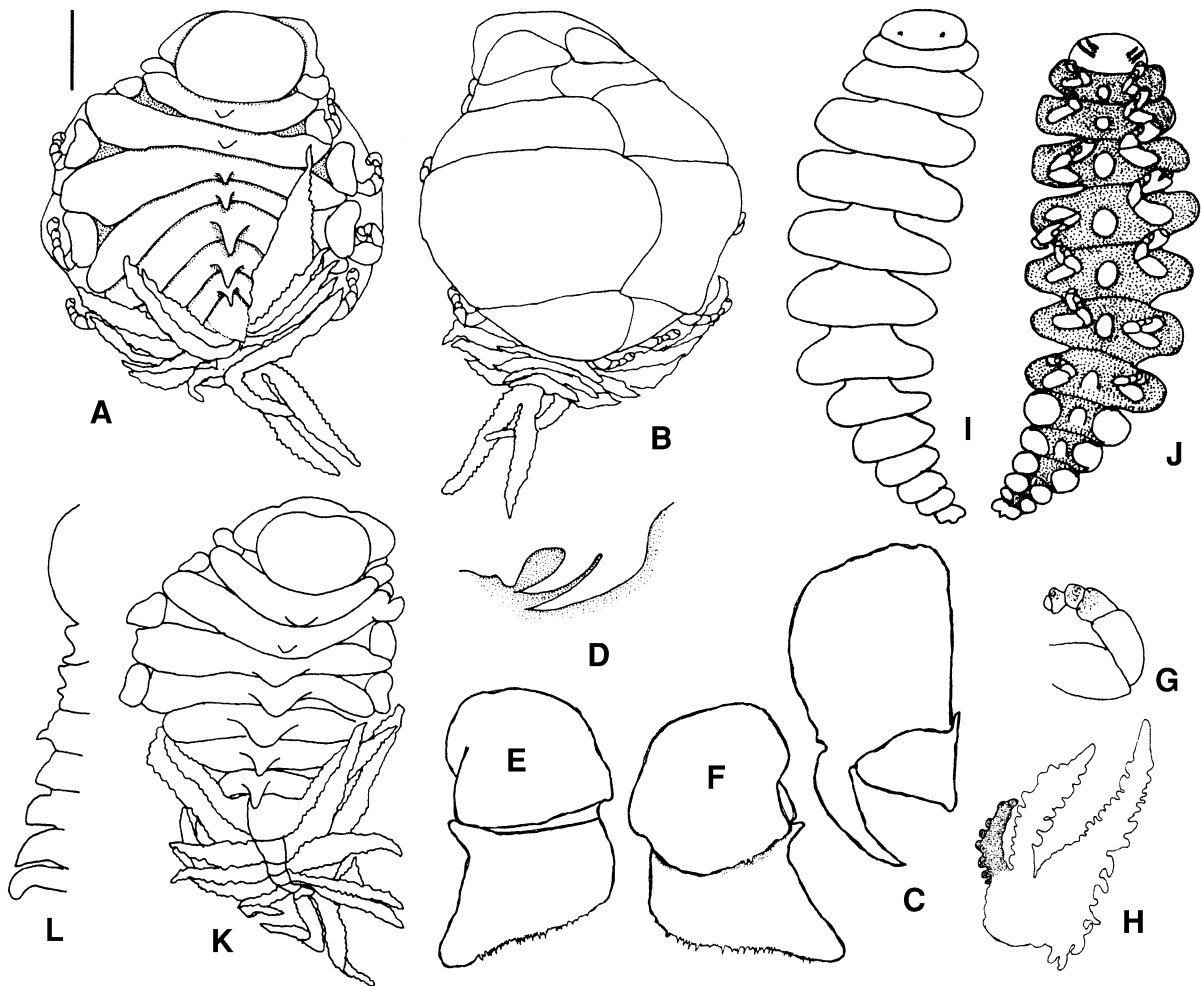


Fig. 2 *Cancricepon multituberosum* n. sp. Female (A–H) (CIEX800602): A. Dorsal view; B. ventral view; C. Barbula, left side; D. Right maxilliped, external view; E. Right oostegite 1, external view; F. Right oostegite 1, internal view; G. Right pereopod 7; H. Left pleopod 1. Male (I, J) (CIEX800603): I. Dorsal view; J. Ventral view. Immature female (K, L) (CIEX800601): K. Dorsal view; L. profile view of head and pereon. Scale-bars: A,B,H,K, 1.00 mm; C,D,G, 0.37 mm; E,F, 0.65 mm; I,J, 0.30 mm; L, 0.69 mm

Etymology: The specific name *multituberosum* refers to the fact that all pereomeres of the holotype female bear mid-dorsal projections.

Description (Figs. 1, 2)

Holotype female (Fig. 2A–H) (CIEX800602). Length (not including uropods) 4.60 mm; maximum width (across pereomere 3) 3.44 mm. Head length 1.15 mm; head width 1.48 mm. Pereon length 2.35 mm. Pleon length 1.10 mm. Length of uropods 1.58 mm. Pereomeres distinct. Body axis distortion 33° (Fig. 2A,B).

Head subquadrate; frontal lamina extend beyond sides of head; medial part short, not visible in dorsal

view. Eyes absent. Antennae obscure. Maxilliped with anterior segment rounded anteriorly, with long sharply pointed extension on postero-lateral margin (outer projection of barbula), without palp; posterior segment triangular with short digitate spur (Fig. 2C). Barbula with 2 falcate pointed lateral projections on each side; outer projections larger than inner ones; middle region with pair of blunt projections (Fig. 2D).

Pereon broadest across pereomere 3, gradually tapering on each side (Fig. 2A,B). Coxal plates absent. All pereomeres with mid-dorsal triangular projections, of which first 2 small and last 5 prominent; largest on pereomere 5 then diminishing in size on pereomeres 6 and 7 (Fig. 2A,L). Dorso-lateral bosses on pereomeres

1–4; tergal projections rudimentary. Oostegites completely enclose brood pouch; oostegite 1 rounded anteriorly, with unornamented internal ridge, setose posterior margin and blunt postero-lateral point (Fig. 2E,F). Pereopods with blunt dactyli, essentially similar except progressively longer posteriorly (Fig. 2G).

Pleon segments indistinct, bearing 5 pairs of biramous pleopods and lateral plates; all digitate but endopodites and exopodites with more pronounced digitation (Fig. 2A, H); surface without tubercles. Endopodites shorter than respective exopodites and lateral plates (Fig. 2H). Terminal pleomere with long uniramous uropods, similar in structure to pleopods, 3 times larger than lateral plates of pleomere 5 (Fig. 2A).

Allotype male (Fig. 2I, J) (CIEX800603). Length 1.98 mm; maximum width (across pereomere 4) 0.56 mm. Head length 0.12 mm; head width 0.29 mm. All body regions and segments distinct (Fig. 2J).

Head suboval, distinctly separated from first pereomere. Eyes small (Fig. 2I). Antennae articles 2 and 3 slightly setose.

Pereomeres 3–5 almost equally wide, with sub-rounded margins. All pereomeres with mid-ventral tubercles, increasing in size to pereomere 4, diminishing in size posteriorly. All pereopods relatively similar in size and structure.

Pleon with 6 pleomeres; tuberculiform pleopods on first five pleomeres; first 2 pleomeres with mid-ventral tubercles, similar in size to tubercles on pereomere 7; last pleomere with anal cone on median portion; uropods absent (Fig. 2J).

Immature female (Fig. 2K) (CIEX800601). Slightly narrower than adult specimen; segments of pleomeres less distinctly separated. Head suboval; frontal lamina well developed, trilobate and extending beyond sides of head. Mid-dorsal projections in all pereomeres; first 2 smaller than others. Pleopods and uropods similar to holotype female.

Discussion

Cancricepon multituberosum n. sp. can be distinguished from the other recorded species of the genus by the shape of the maxilliped and the mid-dorsal

projections of the female (Table 1). It most closely resembles *C. elegans* (Giard & Bonnier, 1887) morphologically. However, females of *C. elegans* have a maxilliped with a setose palp and mid-dorsal projections on the last four pereomeres, and the males have a mid-ventral tubercle on only the first pleomere. In contrast, females of the new species lack a palp on the maxilliped and have mid-dorsal projections on all pereomeres, and males have mid-ventral tubercles on all pereomeres and the first two pleomeres. The new species is also similar to *C. pilula* Giard & Bonnier, 1887, which is very similar to *C. elegans*. Whether or not *C. pilula* is distinct from *C. elegans* is open to question, based on their very similar morphologies, overlapping geographical ranges and host utilisation (Mouchet, 1932; Bourdon, 1968; Danforth, 1970).

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