# ON A NEW SPECIES OF *GAMMARUS* (AMPHIPODA, GAMMARIDAE) FROM ZUANYANKONG CAVE, GUIZHOU, CHINA

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#### ABSTRACT

*Gammarus translucidus*, a new species of cave amphipod from Zuanyankong cave in the north of Guizhou, is reported. A detailed description and illustrations of this freshwater amphipod are given and differences to related species are discussed.

## RÉSUMÉ

*Gammarus translucidus*, une nouvelle espèce d'amphipode souterrain, trouvée dans la grotte Zuanyankong, dans le nord de la province de Guizhou, est définie. Une description détaillée et des illustrations de cet amphipode d'eau douce sont données et les différences avec les espèces apparentées sont discutées.

## INTRODUCTION

In recent years, there has been a growing awareness of and concern about the biodiversity of caves and of other subterranean habitats worldwide. The number of papers on subterranean biodiversity of many groups of organisms has rapidly increased (Holsinger & Culver, 1988; Sket, 1999; Culver & Sket, 2000). The study of Chinese Amphipoda from karst caves, especially in the provinces of Guizhou, Yunnan, Guangxi, Sichuan, and Hubei, resulted in the identification of seven new species of amphipods in the last 15 years: *Bogidiella sinica* Karaman & Sket, 1990, found in a cave near Guilin City, Guangxi Zhuang Autonomous Region; *Sinogammarus troglodytes* Karaman & Ruffo, 1995 and *Sinogammarus chuanhui* 

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Hou & Li, 2002 from Sichuan province; *Gammarus xianfengensis* Hou & Li, 2002 and *Gammarus lichuanensis* Hou & Li, 2002 from Hubei Province; *Gammarus glabratus* Hou & Li, 2003 from Guizhou Province; and *Gammarus platvoeti* Hou & Li, 2003 from Yunnan province. In the present paper, the description of a new *Gammarus* species is presented based on specimens from Zuanyankong cave in Guizhou Province.

#### MATERIAL AND METHODS

Specimens were collected with a fine-mesh hand-net and then preserved in 75% ethanol. Prior to dissection, the body length was recorded by holding the specimen straight and measuring the distance along the dorsal side of the body from the base of the first antennae to the base of the telson. All dissected appendages were mounted on slides according to the methods described by Holsinger (1967). Appendages were drawn using an Olympus BX41 compound microscope equipped with a drawing-tube. All types are deposited in the Institute of Zoology, Chinese Academy of Sciences (IZCAS), Beijing.

#### DESCRIPTIVE PART

## Gammarus translucidus n. sp. (figs. 1-4)

Material. — Holotype male, 11.8 mm (IZCAS-I-A0113); Zuanyankong Cave, Anquancunminzu Village, Wenquan Town, Suiyang County (27.9°N 107.1°E), Guizhou Province, 18 February 2003; collected by the second author, Mr. Po Li. Paratypes: 6 males, all same data as holotype.

Description of male. — Head (fig. 2A): inferior antennal sinus deep, eyes absent.

Antenna 1 (fig. 1J): peduncular articles 1-3 with length ratio 1 : 0.68 : 0.4, with distal setae; flagellum with 26 articles, most of which with aesthetascs; accessory flagellum with 5 articles.

Antenna 2 (fig. 1K): peduncular article 4 about as long as article 5, with 2-4 groups of long setae along anterior and posterior margins; flagellum with calceoli. Upper lip convex (fig. 1A), with minute setae.

Mandibles (fig. 1G-I): left incisor with 5 teeth; lacinia mobilis with 4 weak dentitions; molar with 1 seta; article 2 of palp with 14 stiff setae, article 3 with 2 groups of A-setae, 2 groups of B-setae, a row of D-setae and 8 E-setae. Right incisor with 4 teeth; lacinia mobilis bifurcate, with weak dentitions.

Lower lip (fig. 1B): inner plate absent.

Maxilla 1 asymmetrical (fig. 1D, E), inner plate with 14 plumose setae; outer plate with 11 serrated spines; article 2 of left palp with 10 slender spines



Fig. 1. Gammarus translucidus n. sp., holotype, male. A, upper lip; B, lower lip; C, maxilla 2; D, left maxilla 1; E, palp of right maxilla 1; F, maxilliped; G, left mandible; H, inner face of article 3 of left mandibular palp; I, incisor of right palp; J, antenna 1; K, antenna 2.

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accompanied by 3 stiff setae; article 2 of right palp with 6 blunt spines and 1 stiff seta.

Maxilla 2 (fig. 1C): inner plate with a diagonal row of 15 plumose setae; outer plate with apical setae and setules on outer margin.

Maxilliped (fig. 1F): inner plate with 1 subapical spine and 3 apical spines; outer plate with a row of spines on inner margin and several pectinate apical setae; palp with 4 articles.

Coxal plates: coxal plates 1-3 (figs. 2F, G, 3A) subrectangular, with 2-3 setae on anterior corner and 1 seta on posterior corner, lower margin with setules; coxal plate 4 (fig. 3B) excavated on posterior margin, with 3 setae on anterior corner and 6 setae on posterior margin; coxal plates 5-7 (fig. 3C-E) with 3-4 setae on posterior margins. Coxal gills 2-7 present (figs. 2G, 3A-E).

Gnathopod 1 (fig. 2F, H): basis with long setae on anterior and posterior margins; propodus ovoid, palm oblique, bearing 1 medial palmar spine, with 12 spines on posterior margin; dactylus with 1 seta on outer margin.

Gnathopod 2 (fig. 2G, I): basis similar to that of gnathopod 1; carpus with parallel margins; propodus subrectangular, palm transverse, with 1 medial palmar spine and 5 spines on posterodistal corner; dactylus with 1 seta on posterior margin.

Pereopod 3 slender (fig. 3A, F), basis with long setae on anterior and posterior margins; posterior margins of merus to carpus densely armed with long setae; dactylus with 1 plumose seta on outer margin and 1 seta at hinge of nail.

Pereopod 4 (fig. 3B, G) shorter than pereopod 3, posterior margins of merus and carpus with long setae, but more sparse than on pereopod 3.

Pereopods 5-7 progressively longer (fig. 3C-E, H-J). Anterior margin of bases with short spines; posterior margin nearly straight in pereopod 5, weakly sinuous in pereopod 6, weakly processed in pereopod 7, with a row of short setae; inner face of basis of pereopod 7 with 1 spine on posterodistal corner. Anterior margins of merus and carpus with 2-3 groups of spines accompanied by long setae; posterior margin of propodus with long setae; dactylus with 1 plumose seta on outer margin and 1 seta at hinge of nail.

Epimeral plates 1-3 progressively acuminate on posterodistal corners, with 3-4 short setae on posterior margins. Plate 1 (fig. 2B) with 5 setae on anteroventral corner; plate 2 (fig. 2C) with 1 spine on ventral margin; plate 3 (fig. 2D) with 2 spines on ventral margin. Pleopods 1-3 subequal in length (fig. 4F-H), peduncle bearing 2 retinacula accompanied by 2-3 setae; dorsal margin with some setae; outer ramus a little shorter than inner ramus, both rami armed with plumose setae.

Urosomites 1-3 dorsally flat (fig. 2E), with 2 spines on posterodorsal margins, respectively.

Uropod 1 (fig. 4A): peduncle with 1 basofacial spine, 1-1-2 spines on outer margin and 1-1 spines on inner margin; outer ramus with 1 spine on each side; inner ramus with 1 spine on inner margin.



Fig. 2. *Gammarus translucidus* n. sp., holotype, male. A, head; B, epimeral plate 1; C, epimeral plate 2; D, epimeral plate 3; E, urosomites 1-3 (dorsal view); F, gnathopod 1; G, gnathopod 2; H, propodus of gnathopod 1; I, propodus of gnathopod 2.



Fig. 3. *Gammarus translucidus* n. sp., holotype, male. A, pereopod 3; B, pereopod 4; C, pereopod 5; D, pereopod 6; E, pereopod 7; F, dactylus of pereopod 3; G, dactylus of pereopod 4; H, dactylus of pereopod 5; I, dactylus of pereopod 6; J, dactylus of pereopod 7.



Fig. 4. *Gammarus translucidus* n. sp., holotype, male. A, uropod 1; B, uropod 2; C, uropod 3; D, terminal article of uropod 3; E, telson; F, pleopod 1; G, pleopod 2; H, pleopod 3.

Uropod 2 (fig. 4B): peduncle with a group of long setae on dorsal margin, outer margin with 2 spines; outer ramus a little shorter than inner one, with 2 spines on outer margin; inner ramus with 2 spines on inner margin.

Uropod 3 (fig. 4C, D): peduncle with long setae on dorsal margin and 9 distal spines; inner ramus about 0.85 times as long as outer ramus, with 1 lateral spine and 2 distal spines; article 1 of outer ramus with 2 groups of spines on outer margin and 5 distal spines, article 2 shorter than adjacent spines; both rami densely armed with simple and plumose setae.

Telson deeply cleft (fig. 4E), each lobe with 3 distal spines and long dorsal setae, left lobe with 1 distolateral spine.

Etymology. — The specific name "*translucidus*" alludes to the species' transparent appearance. It is an adjective, agreeing in gender with the masculine generic name.

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Habitat. — Specimens of this species were found in Zuanyankong cave, formed from the doeomite of the Cambrian era. The cave's entrance is 60 m from the western shore of Chiwuxi River. In the cave, there is a crystal-clear underground river running ceaselessly throughout the year. *Gammarus translucidus* n. sp. was found in this river, but appeared very rare.

Remarks. — *Gammarus translucidus* n. sp. is characterized by the following troglobitic characters (Culver et al., 1995): eyes absent; pereopods 5-7 slender, with long setae on anterior margins; armature of urosomites 1-3 weakly degenerate; article 2 of uropod 3 shorter than adjacent spines.

*Gammarus translucidus* is similar to *G. glabratus* Hou & Li, 2003 (also from Guizhou Province, about 175 kilometers away from the type locality of the present new taxon) in (1) slender pereopods 3-7, (2) epimeral plates 2 and 3 with blunt posterodistal corners, and (3) armature of urosomites 1 and 2 degenerate. *G. translucidus* differs from *G. glabratus* (character states in parentheses) by (1) eyes absent (present), (2) flagellum of antenna 2 with calceoli (without), (3) pereopods 3 and 4 with long setae on posterior margins (a few long setae), (4) pereopods 5-7 with long setae along anterior margins (without setae), (5) peduncle of uropod 2 with a group of long setae on dorsal margin (without), (6) both rami of uropod 3 densely beset with long simple and plumose setae (outer margin of outer ramus with simple setae), and (7) urosomites 1-2 with 2 spines on posterodorsal margins (without setae and spines).

*Gammarus translucidus* n. sp. is also similar to *G. platvoeti* Hou & Li, 2003 in (1) peduncular articles 4 and 5 of antenna 2 with long setae along anterior and posterior margins, (2) slender pereopods 3-7, and (3) urosomites 1-2 weakly degenerate. *G. translucidus* can be distinguished from *G. platvoeti* (character states in parentheses) by (1) eyes absent (present), (2) anterior margin of pereopods 5-7 with groups of spines accompanied by long setae (without setae), (3) peduncle of uropod 2 with a group of long setae on dorsal margin (without), and (4) urosomites 1 and 2 with 2 spines on posterodorsal margins (urosomites 1-2 with 2 setae on medial-dorsal margins).

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