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Bogidiella sinica sp.n. (Crustacea: Amphipoda) from southern China

Bogidiella sinica sp. n. (Crustacea: Amphipoda) iz južne Kitajske

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Abstract. *Bogidiella sinica* sp. n. is described and compared to other Asian species. Its most evident character is a very long antenna I. Its subgeneric position could not be established. It was found in karstic hypogean waters near Guilin in southern China, accompanied by other stygobitic Crustacea.

Deskriptorji: Bogidiella sinica sp.n. / taksonomija / Kitajska
Ključne besede: *Bogidiella*, Amphipoda, Kitajska, jamska favna, taksonomija

Izvleček. Vrsta *Bogidiella sinica* sp. n. je opisana in primerjana z drugimi azijskimi vrstami. Njena najopaznejša posebnost so zelo dolge antene I. Kateremu podrodu vrsta pripada, ni bilo mogoče ugotoviti. Najdena je bila v kraških podzemeljskih vodah pri Guilinu, v južni Kitajski, v družbi drugih stigobiontskih rakov.

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Introduction

Very numerous taxa of bogidiellids have been found during last 50 years all over the world. The most intensive studies have been realized in Europe, Near East, in the Carribean region including Central America, in South America and some Atlantic and Pacific islands. The number of species known from Africa and Asia is still comparatively low due to limited efforts in stygobiological investigations in those regions.

From the Asian continent only 4 bogidiellid species are known, mostly from cave waters, and one (*B. ruffoi*) from a karstic spring. *Bogidiella (? B.) lindbergi* RUFFO 1958 was found in Afghanistan; *B. (B.) ruffoi* BIRŠTEJN & LJOVUŠKIN 1986 was described from the Turkmen SSR, USSR; from caves in Thailand *B. (B.) thai* BOTOSANEANU & NOTENBOOM 1988 and the representative of a new genus, *Aequigidiella aquilifera* BOTOSANEANU & STOCK 1989, were recently described. *B. (Medigidiella) sarawacensis* STOCK 1983 inhabits caves in Sarawak, Borneo, while *Bollegidia sootai* COINEAU & RAO 1972 inhabits the interstitial waters of the islands in the Bay of Bengal.

The discovery of the here described *B. sinica* sp. n. shows that it is necessary to take into account a wider distribution of bogidiellids also in the inner parts of the Asian continent.

Description

Bogidiella sinica sp. n.
(Figs. I—VII)

Material examined: Lower cave of Qixinyen, Guilin, Guangxi Zhuang A. R., southern China, 2 specimens.

Description of the holotype male(?), 2.4 mm.

Body relatively slender, smooth, head with a short rostrum, with short and broad lateral lobes, and with a very shallow ventroanterior sinus (Fig. I/7). Epimeral plates I—III with convex posterior margins and with slightly acute ventroposterior corners.

Telson wider than long, with a straight distal margin bearing 2 disto-lateral spines, which are longer than the telson itself; with 3 short plumose setae near each spine.

Antenna I (Figs. I/1—2) long, exceeding 70% of the body length. Its peduncular articles 1—3 progressively shorter, article 1 with 1 ventral spine. Main flagellum with 12 articles, most of distal ones with 1 aesthetasc each. Accessory flagellum shorter than the last peduncular article, consisting of 2 unequal articles.

Antenna II (Figs. I/3, 9) about 50% shorter than I. Penducular article 3 short, with 1 dorsal spine; articles 4—5 nearly equally long. Flagellum only slightly longer than the last peduncular article. Antennal gland cone reaching the tip of the third peduncular article.

Epistome angular in lateral projection (Fig. I/9). Labrum much wider than long, with a convex distal margin (Fig. I/8). Labium shallow, with well developed inner lobes (Fig. II/4), outer lobes entire, subrounded, with numerous long hairs on their inner surfaces.

Mandible (Figs. I/4—6) with a cylindrical, triturative molar bearing one subdistal seta. Article 2 of its palp dilated in the middle part nearly to a double width, with 1 seta on the bulge; article 3 shorter than 2, narrow, with only 2 distal setae. The left incisor and lacinia

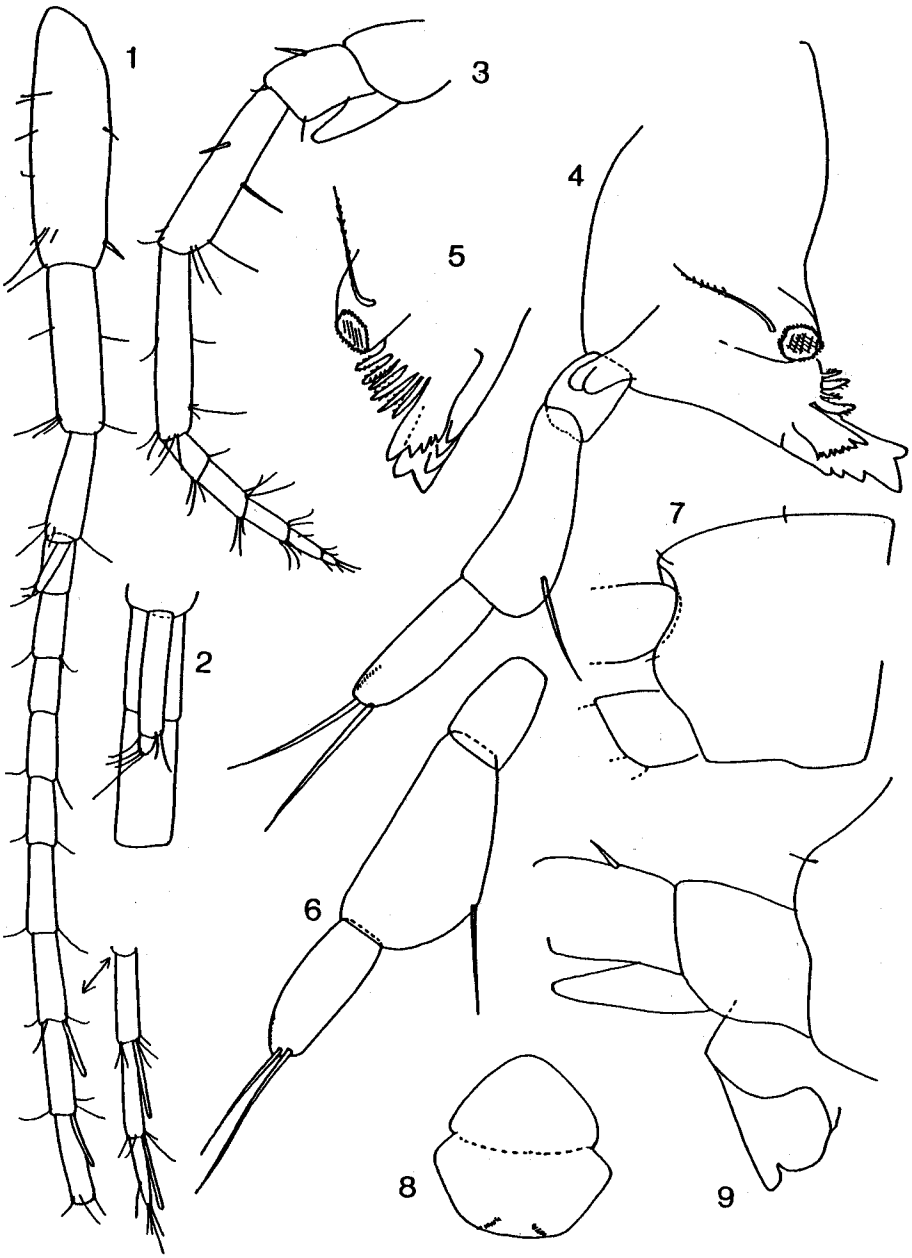

Figure 1. Bogidiella sinica *sp. n. cave Qixinyen, Guilin, China. Holotype male, 2.4 mm: 1—2, antenna I and its accessory flagellum; 3, antenna II; 4, right mandible; 5—6, left mandible; 7, head; 8—9, labrum in dorsal and lateral projection.*

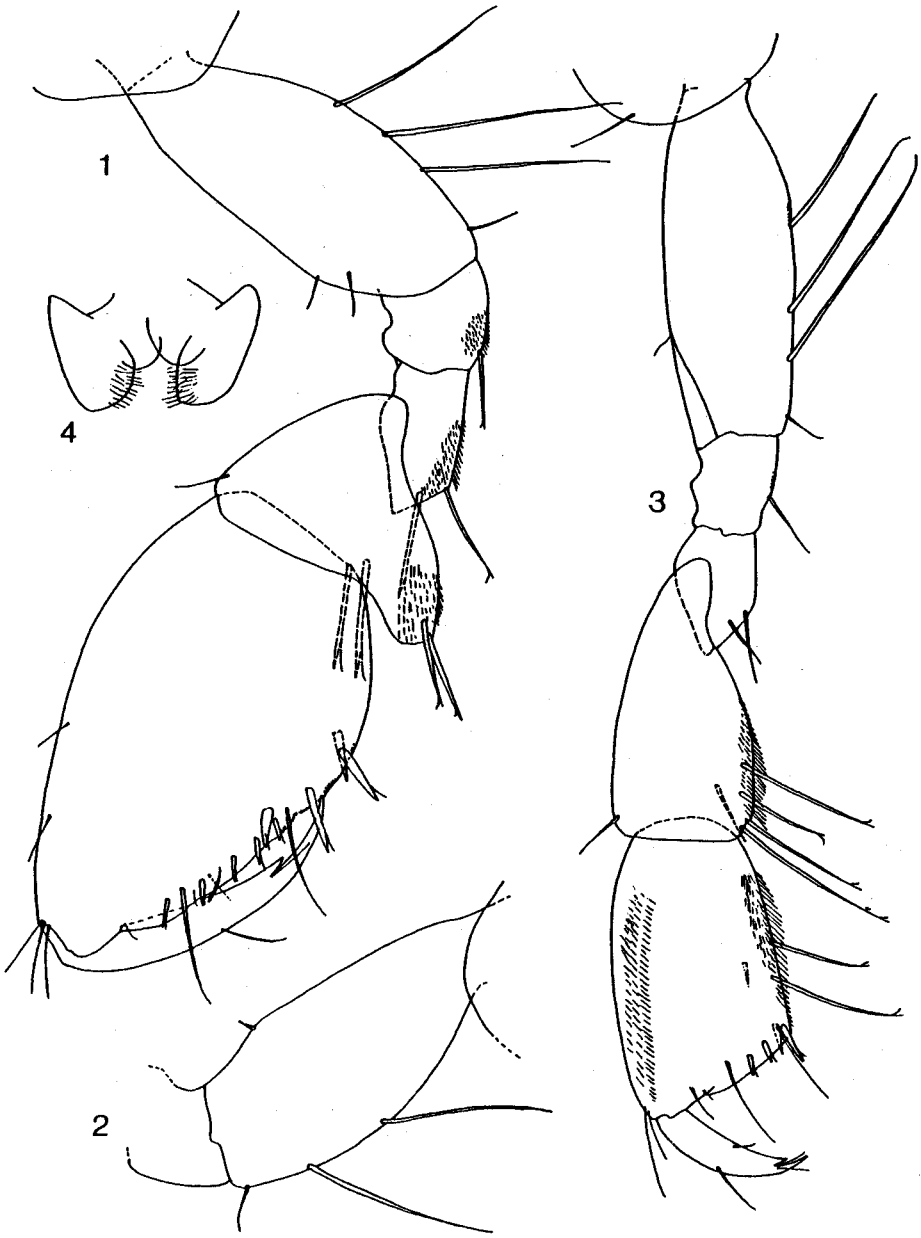

Figure II. Bogidiella sinica *sp. n. cave Qixinyen, Guilin, China. Holotype male, 2.4 mm: 1, right gnathopod I; 2, article 2 of left gnathopod I; 3, gnathopod II; 4, labium.*

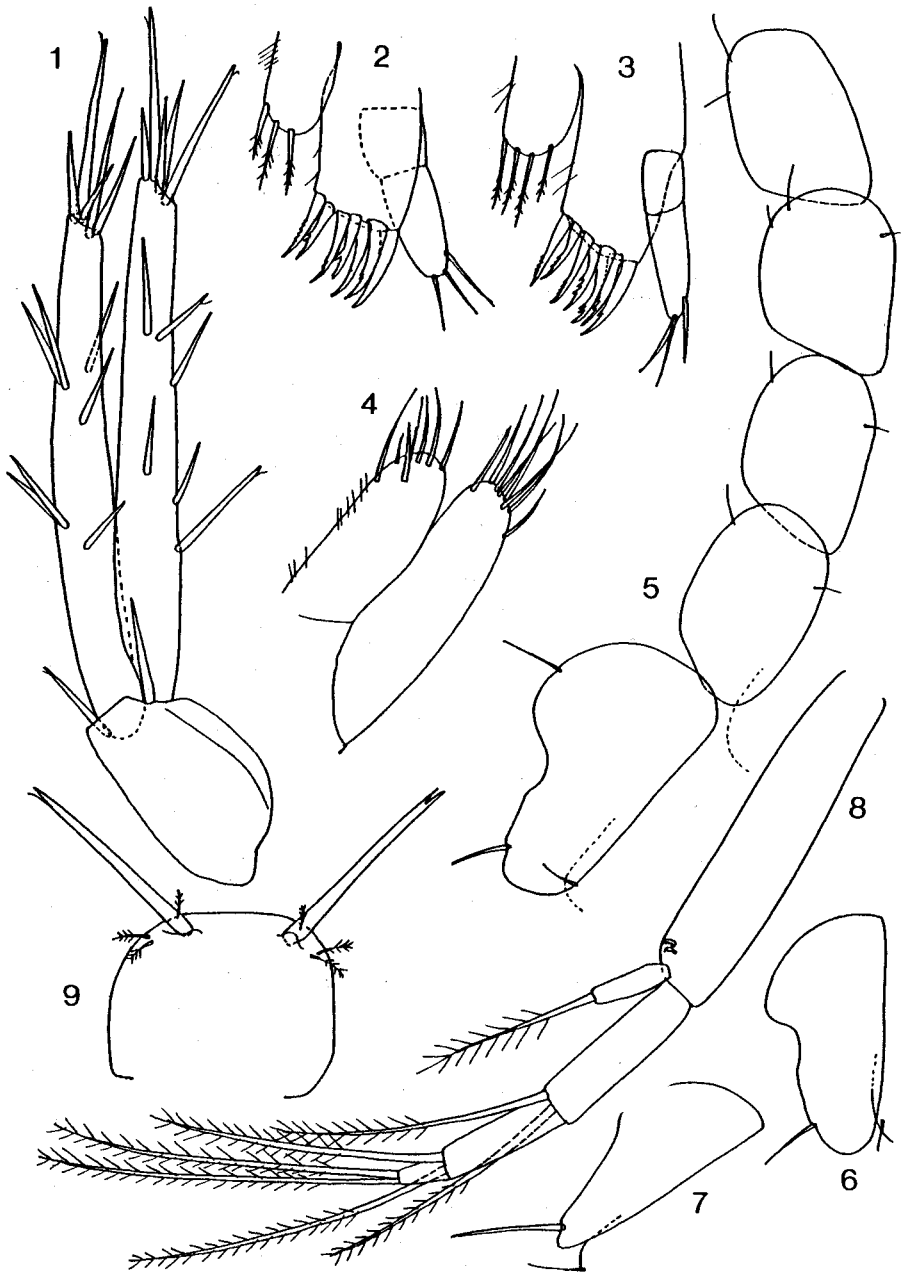

Figure III: Bogidiella sinica *sp. n. cave Qixinyen, Guilin, China. Holotype male, 2.4 mm: 1, uropod III; 2—3, maxilla I; 4, maxilla II; 5, coxae I—V; 6—7, coxae VI—VII; 8, pleopod III; 9, telson.*

mobilis with 5 teeth each, accompanied with 6 rakers. The right lacinia is multidentate and accompanied by only 4 rakers.

Maxilla I (Figs. III/2—3), the inner lobe with 3—4 setae, the outer lobe with 7 spines bearing 1—6 lateral teeth. The palps of both maxillas are similar (they are differently positioned on drawings), relatively short, not reaching the tips of the spines, biarticulated and with 3 distal setae.

Maxilla II (Fig. III/4) with both lobes narrow, the outer one with 8 distal setae, the inner with 6 marginal and 1 strong facial setae.

Maxilliped (Fig. IV/6), the inner plate reaching the inner tip of the first palp article, with 2 distal bicuspidate spines. The outer plate short, reaching only slightly beyond the outer tip of the proximal palp article, bearing 2 strong and 1 weak distal spines. The palp's distal article with the nail much shorter than its socle.

Coxae (Figs. III/5—7) I—VII shallow, much wider than long (= high). Coxa V longer and larger than IV, coxae V—VII with a ventroposterior spine each.

Gnathopod I (Figs. 1/1—2) with article 2 short and wide, with 1 short subdistal seta and with 2—3 long setae along the median part of its posterior side. Articles 3—5 short, 5 with a long posterior lobe bearing 2 distal setae. Article 6 pear-shaped, large, longer than wide, with a very steep palm, reaching approximately half the length of the artice; there is a row of several slender and bicuspidate spines along the outer face of the palma, concluded by one corner spine with another spine below it; on the inner face 2 submarginal spines appear; the palmar margin crenellated only in its proximal (angular) part. Dactylus with 2 teeth along its inner margin and with 1 median seta at the outer margin.

Gnathopod II (Fig. II/3), article 2 narrower than that in gnathopod I, but with a similar setation. Article 5 narrow, without a lobe, and equally long as article 6, with 4 posterior setae. Article hardly half as long as that in gnathopod I, less than twice as long as wide, with almost parallel longitudinal margins and with 2 long setae in the middle part of the posterior margin; palm only slightly oblique, not crenellated, with 2—3 slender bicuspidate spines and a corner spine along its outer side and with 1 subcorner spine on the inner side. Dactylus reaching the palmar corner, with 2 teeth along its inner margin.

Pereiopods III—IV (Figs. IV/1—4) similar to each other, with linear articles 2 and slender articles 3—6. Dactyli nearly reaching half the lengths of articles 6, with 1 longer seta at their inner margins; nails slightly longer or shorter than socles.

Pereiopods V—VII (Figs. V/1—6) slender and relatively long. Pereiopod V article 2 is slightly dilated but linear, with 3—4 setae along each margin; dactylus slender, nearly reaching half the length of article 6, its socle with 1 long inner seta subapically and a small one at the nail. Pereiopod VI similar to V but longer, article 2 with 2 posterior setae, dactylus exceeding half the length of the article 6, its nail much shorter than socle. Pereiopod VII, article 2 somehow wider than those in V—VI, with 2 strong spines on the posterior margin; articles 4—6 along both sides with strong and long spines, there are only 3 long setae along the inner side of 6; dactylus reaching half the length of 6, the nail occupying less than 25% of the article's length, its setation like that in V.

No lenticular organs could be perceived with certainty. Ovoid and pedunculate coxal gills (Fig. V/1) on pereionites IV—VI.

Pleopods I—III (Fig. III/8) similar to each other, unmodified, with smooth peduncles bearing 2 retinacula each. Endopodite short, with a long and plumose distal seta. The outer ramus 3-articulate, as long as the protopodite, each article with 2 long, plumose setae which are longer towards the tip of the ramus.

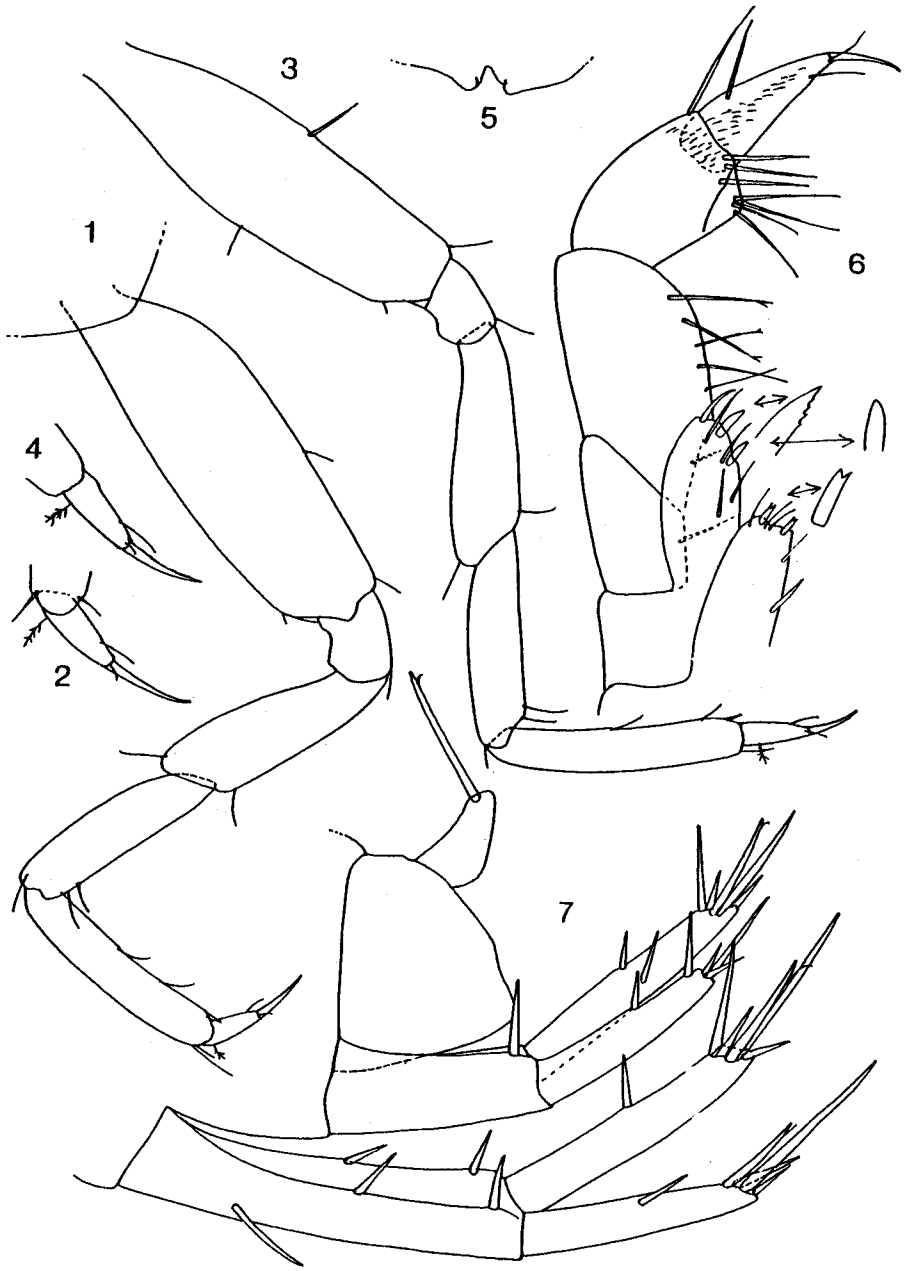

Figure IV: Bogidiella sinica *sp. n. cave Qixinyen, Guilin, China. Holotype male, 2.4 mm: 1—2, pereiopod II; 3—4, pereiopod IV; 5, ventral face of mesosomal segment VII; 6, maxilliped; 7, urosoma with uropods I—II.*

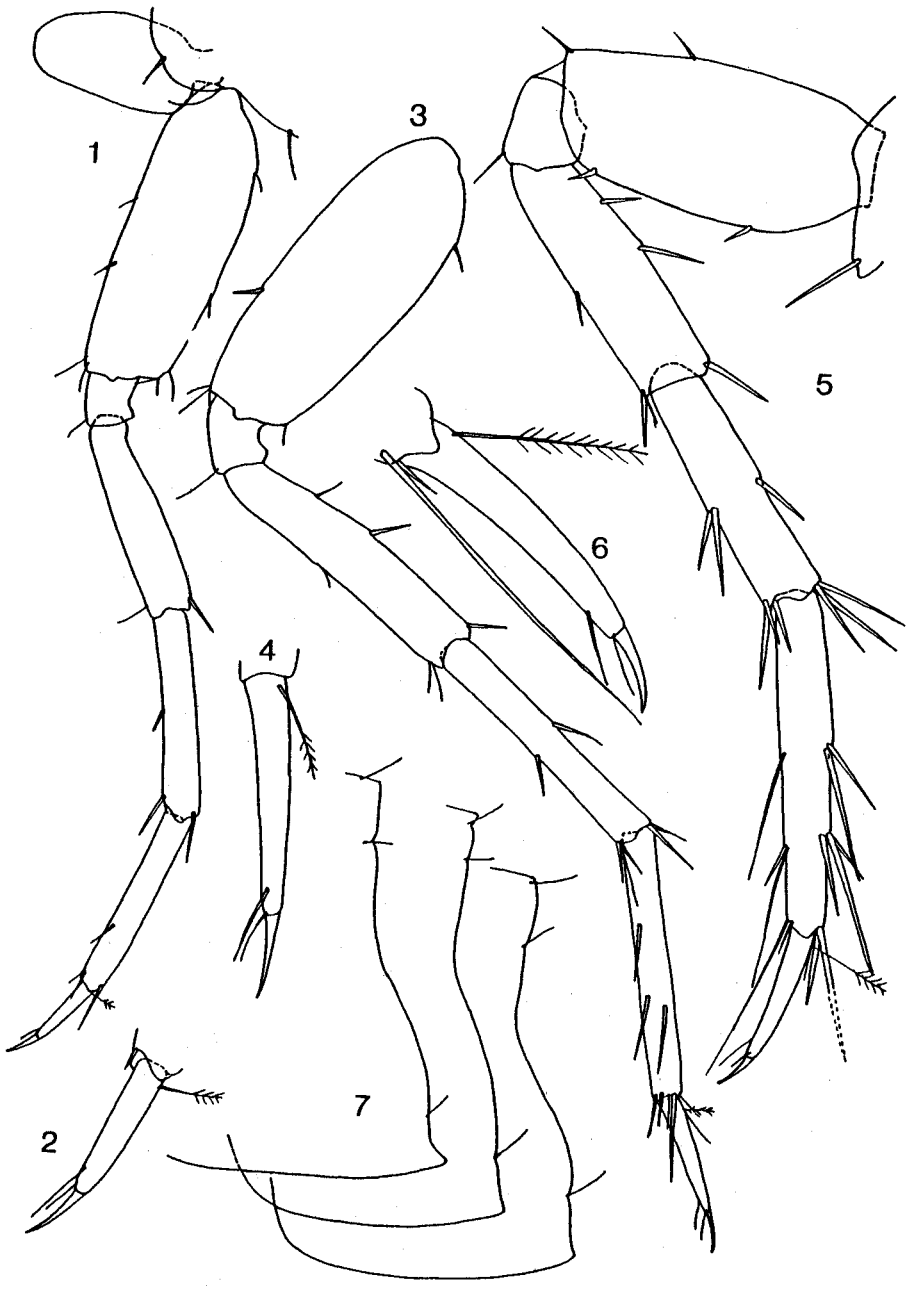

Figure V: Bogidiella sinica *sp. n. cave Qixinyen, Guilin, China. Holotype male, 2.4 mm: 1—6, pereiopods V—VII and their dactyli, 7, epimera I—III.*

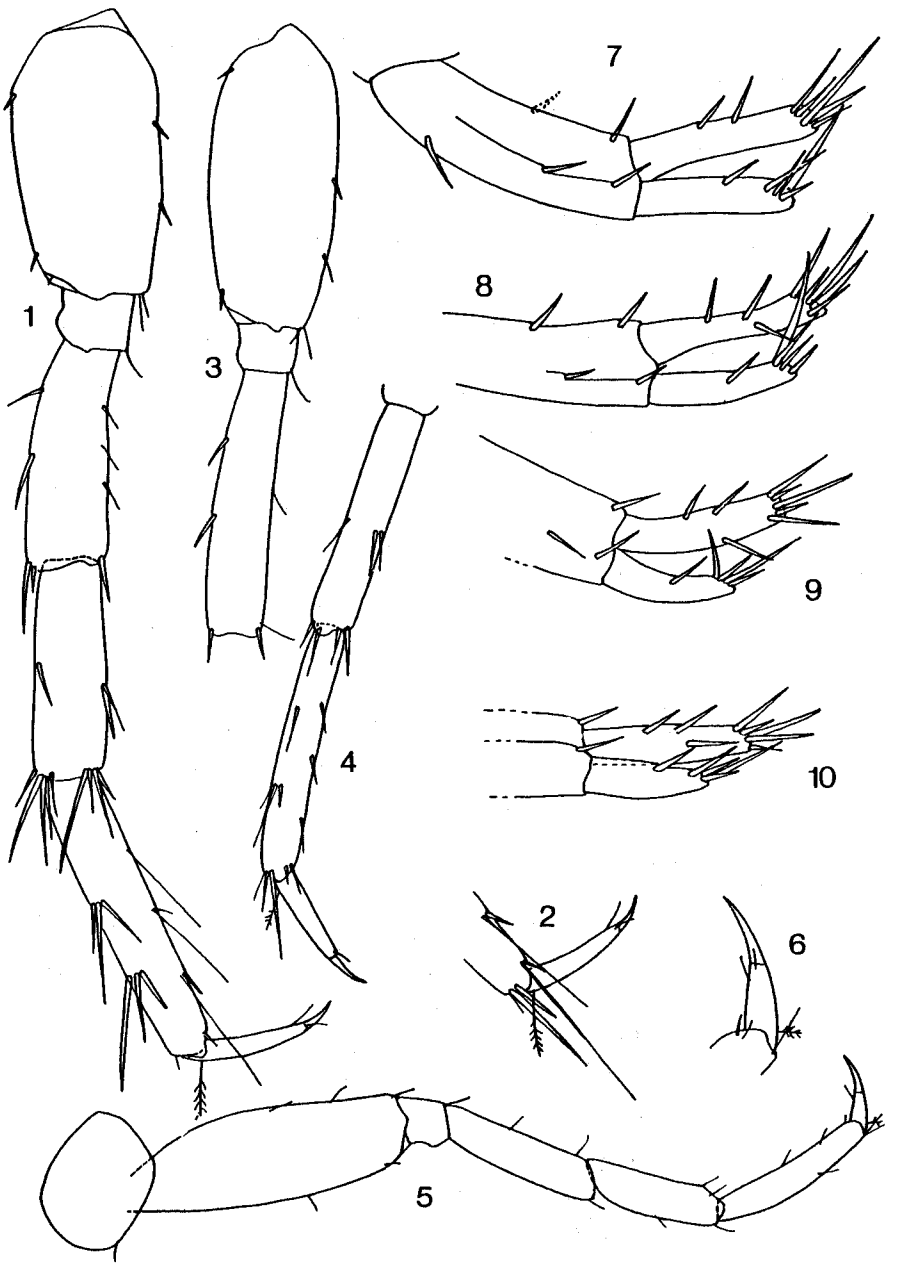

Figure VI: Bogidielia sinica *sp. n. cave Qixinyen, Guilin, China. 2.5 mm: 1—2 pereiopod VII; 3—4, pereiopod 6; 5—6, pereiopod 3; 7—8, uropod I; 9—10, uropod II.*

Figure VII: Bogidiella sinica *sp. n. cave Qixinyen, Guilin, China. 2.5 mm: 1—2, both gnathopods I; 3—4, both gnathopods II; 5, tip of the mandibular palp; 6, pleopod; 7 telson; 8, uropod III.*

Uropod I (Fig. IV/7) without a spine at its basis. Peduncle with a strong basifacial spine, with 2 dorsoexternal and 2 dorsointernal spines. The outer ramus slightly shorter than the inner one, with 1 median and 4 unequal distal spines, the longest reaching 80% of the ramus length. The inner ramus similarly armed, the longest of its 5 distal spines 60% of the ramus length.

Uropod II, its peduncle with 1 dorso-distal spine. The exopodite remarkably shorter than the endopodite, both are similarly armed as in uropod I, but with shorter apical spines.

Uropod III (Fig. III/1) long, its penducle short and with 2 distal spines. The rod-shaped rami slightly unequally long, with groups of long lateral and distal spines, the longest of each 5 distal ones not reaching 40% of the ramus length.

Female unknown.

Remarks, variability

The second specimen of 2.5 mm (sex unknown) agrees in most characters with the holotype, but it differs in others.

Telson with 2 long distal and 2 shorter facial spines, its distal margin probably slightly concave. The main flagellum of antenna I with 14 articles. Mandibular palp with 1—2 distal setae (Fig. VII/5). The number of long setae along the posterior sides of article 2 in both gnathopods (Figs. VII/1—4) may reach up to 5. Article 5 of gnathopod II slightly shorter and stouter than that in the holotype and provided with 5 posterior setae; article 6 of the same also shorter than that in the holotype, but longer than the corresponding article 5, with 3 long posterior setae. There are some small differences in spinulation of uropods I—II (Figs. VI/7—10; appendages were artificially flattened and widened) whose apical spines are somehow shorter.

The setation of gnathopods and spinulation of telson are usually stable taxonomic characters, which could mean that the second specimen belongs to another species. However, either the long setae on gnathopod articles 2 may have been broken in most cases, or the elevated number on one side of one specimen is a rare deformity. Anyway, the characteristic length of the antennae, the shape of the mandible's palp, and the shape of both gnathopods is so peculiar that the conspecificity of both specimens is highly probable.

Taxonomical position

Bogidiella sinica sp. n. agrees generally with the subgenus *Bogidiella* Hertzog 1933, as much as the characteristics of mouthparts, antennae, gnathopods, pereiopods, and uropods are concerned. As the holotype is probably a male, and females are unknown, the real subgeneric status of the new species was not possible to establish.

The most universally differentiating character of *B. sinica* is (1) its very long and multiarticulated antenna I. Of all or most of the previously known species from Asia it differs also by (2) a dilated article 2 of the mandibular palp (the situation in *B. ruffoi* is unclear), (3) the article 6 of gnathopod I which is nearly twice as long as in II (with regard to the absence of these articles in the only known specimen, they could be similar to those in *B. ruffoi*), (4) the very little inclined palma of gnathopod II, (5) uropods I—II with spines in the middle of

their rami. *B. ruffoi, B. lindbergi,* and *B. thai* have pleopods without endopodites, whose rudiments are in *B. sarawacensis* smaller than in *B. sinica*. At least in *B. sarawacensis* and *B. ruffoi* the ungues of hind pereiopod dactyli are shorter. Small lenticular organs are developed in *B. ruffoi* and *B. lindbergi. B. sarawacensis* has 4 distal setae on palpus mandibularis. There are also some less remarkable differences in chaetotaxy and shape of gnathopods and some other appendages.

Some of the major characters of *B. sinica* occur in more remote species, but in other combinations. Median spines on uropod rami occur in *B. (Mexigidiella) hamatula* Stock 1985 from Haiti, *B. (Xystrogidiella) capricornea* Stock 1984 from Pacific, *B. (Guagidiella)f holsingeri* RUFFO & VIGNA-TAGLIANTI 1973 from Guatemala, and *B. (? B.) niphargoides* RUFFO & TAGLIANTI 1973 from Mexico, but all of them have 3 *(B. niphargoides)* to 4 (all others) distal setae on mandibular palps and many other peculiar characters.

Ecology and distribution

The only known locality of *B. sinica* is the lower story of the cave system Qixinyen (= "Untere Hoehle von Tsisinjien", BALAZS, 1962), developed in the karst cone at Guilin in the waste karstic region of southern China. The cave is a hydrologically active corridor, which in rainy periods evidently transfers surface waters through the massif. Also in the dry period in November, a brook was flowing from the cave. Far inside the cave, the brook was still inhabited by normally pigmented fishes and shrimps (Atyidae). Amphipods were found further inside, in a periodically isolated pool, accompanied by quite numerous blind Cyclopoida and by some specimens of evidently troglobitic Atyidae and Calanoida. Thus, the cave is evidently in connection also with the hypogean waters of the karstic plain.

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