Contributions to Zoology, 65 (3) 177-187 (1995)
SPB Academic Publishing bv, Amsterdam

Presence of troglobitized Janiridae (Isopoda: Asellota: Janiroidea) in anchihaline caves of the Balearic Islands (Mediterranean); description of *Trogloianiropsis lloberai* n. gen., n. sp.

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Keywords: Asellota, Janiridae, *Trogloianiropsis*, anchihaline waters, Balearic Islands, taxonomy, new genus, new species

Abstract

Trogloianiropsis lloberai n. gen., n. sp. is described from the flooded coastal karst of the Balearic Islands. It superficially resembles *Ianiropsis* Sars, 1897 and *Janaira* Moreira & Pires, 1977, but differs from both in some remarkable characters. It seems to be restricted to the deeper layers of anchihaline cave lakes, and shows a troglobitized morphology (i.e.: absence of eyes and body pigmentation, and extraordinary elongation of antennae). Since its phyletic affinities are not clear, its biogeographic significance and possible derivation from deep-sea or shallow-water ancestors cannot be established.

Resumen

Descripción de *Trogloianiropsis lloberai* n. gen., n. sp., poblador del karst costero de las Islas Baleares. Se trata de un taxón que recuerda a primera vista a *Ianiropsis* Sars, 1897 o *Janaira* Moreira & Pires, 1977, pero que difiere de ambos en importantes caracteres. Se halla localizado en las capas más profundas de los lagos anquihalinos, y muestra una morfología "troglobitizada" característica (ausencia de ojos y pigmentación corporal, así como las antenas de una longitud extraordinaria). Dado que sus afinidades filéticas no han podido ser clarificadas, no ha podido evaluarse su significado biogeográfico ni avanzar si se trata de un taxón con ancestros en el bentos profundo o en el de aguas superficiales.

Introduction

Twelve small, blind and unpigmented Asellota were caught using meat-baited traps which were left for several days in a small anchihaline lake on "Illa dels Conills", an islet of 1.37 km^2 forming part of the Cabrera Archipelago (Balearic Islands; Fig. 1: A). The lake lies at the bottom of "Cova de sa Llumeta", a fossil coastal cave excavated in Jurassic limestones that has a subaerial entrance at 18 m above sea level in a littoral cliff. The lake has a maximum depth of 3 m, although an impassable shaft appears to continue downwards. The bottom consists mostly of sand derived from a fossil cone deposited in the cave. The water table follows barometric tides, and a more or less direct subterranean connection to the open sea is suggested by the nature of some taxa accompanying the isopods (viz., *Palaemon serratus* (Pennant, 1777), *Heteromysis* cf. *formosa* Smith, 1874 and oculate copepods). However, despite the slight hydrodynamism perceptible at the surface, profiles of temperature, salinity and oxygen are all indicative of a clearly stratified water column (Fig. 2), and thus, of a restricted connection to the sea.

While upper layers were mixohaline when the isopods were collected, archaeological findings suggest that more limnic conditions prevailed some time in the past. Neolithic pottery and Roman amphoras and chandeliers all indicate that the lake was used by ancient navigators as a source of water (Trias, 1974). In addition, some specimens of the anchihaline amphipod *Salentinella angelieri* Delamare-Debouteville & Ruffo, 1952 were captured in the cave in 1976 (Dr. J. Armengol, pers. comm.), although this taxon now seems to be absent. Surface water salinity probably fluctuates sharply and may be dependent on some local variable factor, such as mean annual rainfall.

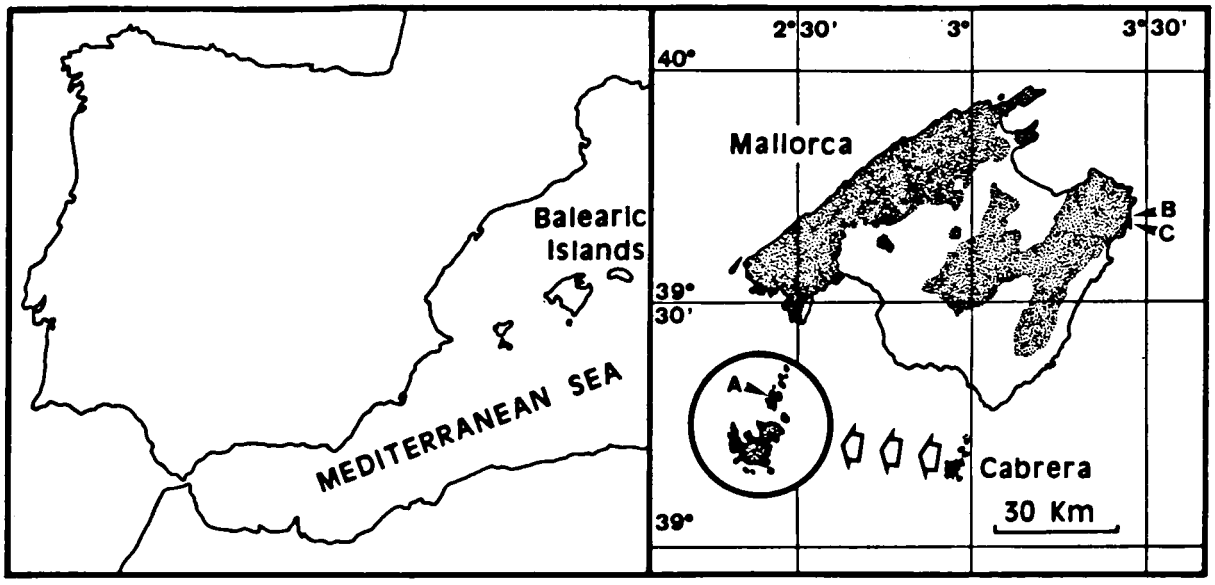


Fig. 1. Map of the Balearic Islands showing the distribution of *Trogloianiropsis*. A: Cova de sa Llumeta; B: Cova de na Barxa; C: Cova de na Mitjana. Dotted areas correspond to fissured limestones more than 10 mY old; light zones correspond mainly to upper Miocene (< 10 mY) porous calcarenites in the S. and S.E. of Mallorca, while in the central plains they correspond mainly to Quaternary alluvial sediments.

The asellote from Cova de sa Llumeta seems to be restricted to the deeper layers of the lake, below the pycnocline, as it was not caught in the upper layers. It should be considered a thalassostygobiont (sensu Notenboom, 1991). Yet, many asellotes, especially abyssal forms, show a troglobitized morphology similar to that shown by the new taxon (i.e., elongated antennae and pereiopods, absence of eyes, body almost colourless). So, it is possible that it was an epigean marine form which penetrated into the cave with other accompanying marine taxa. However, it was not found in epigean samples taken in the vicinity of the cave.

Only 12 females were collected in Cova de sa Llumeta. No males were captured in any of six surveys of the cave and this precluded a complete description of the species. Fortunately, males and additional females of this assellote were gathered recently in two N.E. Mallorcan caves (Fig. 1: B, C).

Cova de na Barxa is a fossil littoral cave excavated in Triassic fissured limestone, with a subaerial entrance at 3 m above sea level. The cave harbours a marine lake, an anchihaline lake, and also some pools ("gours") of fresh water. The asellotes were captured in the anchihaline lake (1.5 m maximum depth). The accompanying fauna consisted of the stygobiont amphipods *Pseudoniphargus mercadali* Pretus, 1988 and *Metacrangonyx longipes* Chevreux, 1909, copepods, both blind and oculate, and oculate mysids and amphipods. No chemical analysis of the water was made, but it was fresher and warmer than the neighbouring marine lake.

Cova de na Mitjana is physiographically similar to Cova de na Barxa. It has a subaerial entrance at 7 m above sea level and harbours a shallow lake (depth < 0.5 m) subjected to direct marine influence, with a sandy bottom, a slight swell, and a clearly marine fauna (Chaetognatha, *Palaemon serratus* (Pennant, 1777), crabs, Cumacea).

These two caves and Cova de sa Llumeta on Cabrera are all located on fissured limestones of an age of > 10 mY. Curiously, the asellote seems to be absent from the intensively sampled coastal caves of S.E. Mallorca, excavated in coral reef-derived porous calcarenites with an estimated age of 6–10 mY.

The new taxon conforms to the diagnosis of the family Janiridae Sars, 1897 (sensu Wilson &

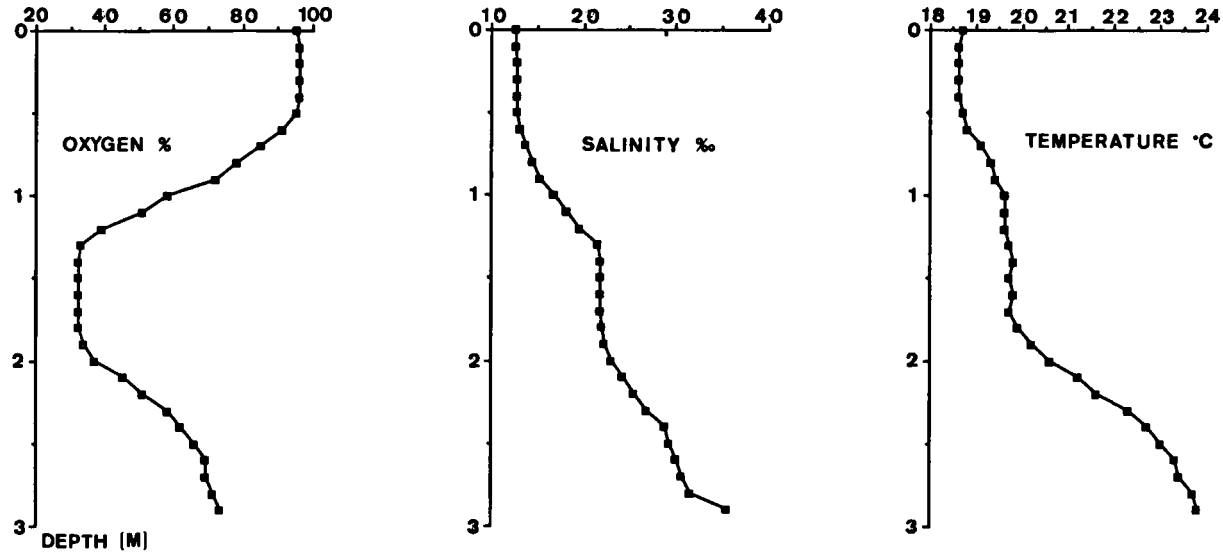


Fig. 2. The water column at the Cova de sa Llumeta anchihaline lake on 10 August 1993. Profiles were determined with an oxymeter WTW OXY-196 and a salinometer ANDERA-3017.

Wägele, 1994). It superficially resembles *Ianiropsis* Sars, 1897 (sensu Wilson & Wägele, 1994) and *Janaira* Moreira & Pires, 1977, but differs in some remarkable characters. The erection of a new genus is necessary to accommodate this new species.

Descriptions below apply to both males and females unless otherwise stated. Most of the type material is deposited in the collection of the "Museu de la Naturalesa de les Illes Balears" (MNCM) of Palma de Mallorca.

Taxonomic part

ISOPODA Latreille, 1817
Asellota Latreille, 1803
Janiroidea Sars, 1897
Janiridae Sars, 1897 emend. Wilson & Wägele, 1994

Trogloianiropsis n. gen.

Diagnosis. – Body flattened, oblong (length/width ratio 3.5), with cephalon and pleotelson as broad as pereion. Cephalon with deep, rounded notches in zone of insertion of antennules. Rostrum lacking. Antennules sexually dimorphic. Squama present on antenna. Molar process of mandible with middorsal sclerotized plate pointed distally, forming large crest; distal part of molar branch truncate, bearing grinding sclerotized surface. All pereiopods subsimilar, ambulatory, with biunguiculate dactylus; coxae of first 5 pereiopods free, not fused to corresponding sternites, 1 to 4 visible in dorsal view. Last pereional somite with lateral margins produced posteriorly as acute process. One free pleonite. Male pleopod 1 not laterally expanded distally, with trilobed tip; inner and outer lobes, plus dorsal lobe derived from fold in dorsal surface of pleopod; fold bearing lateral sclerotized crest proximally. Exopodites of pleopods 3 and 4 unsegmented, long and narrow, situated along margin of endopodite and not overlapping it; both sickle-shaped, that of Pl. 4 surpassing endopodite, with filiform distal part. Uropods biramous, with cylindrical peduncle. Anus not opening in pleopodal chamber but subterminally, between uropods.

Type species. – *Trogloianiropsis lloberai* n. sp., by monotypy.

Etymology. – The generic name is derived from the prefix *troglo-*, referring to its underground habits,

and *Ianiropsis*, whose representatives superficially resemble the new taxon.

Trogloianiropsis lloberai n. sp. (Figs. 3–44)

Material examined. – Cova de sa Llumeta (Illa dels Conills, Cabrera Archipelago, Balearic Islands). UTM coordinates: 496.60; 4337.35. Topographic profile of the cave published by Trias (1993). Collected by author, 10 August 1993. Holotype: female of 1.44 mm (registration number: MNCM-224). Paratypes: 5 females of 1.15, 1.38, 1.60, 1.37, and 1.36 mm (MNCM-222, 223, 225, 226, and 233). Moreover 6 females, more or less damaged, are retained in author's personal collection.

Cova de na Barxa (Capdepera, Mallorca, Balearic Islands). Coordinates: 539.30; 4393.10. Topographic profile published by Andrews et al. (1989). Collected by author, 17 July 1994; 3 ovigerous females of 1.8, 1.6, and 2.1 mm (MNCM-241), 2 females of 1.4 and 1.3 mm (MNCM-237), 5 males of 0.9, 1.0, 0.9, 1.1, and 0.9 mm (MNCM-235, 236, 238, 239, and 240), and 14 juveniles (MNCM-234). Additional male of 1.1 mm retained in author's personal collection.

Cova de na Mitjana (Capdepera, Mallorca, Balearic Islands). Coordinates: 539.10; 4390.95. Topographic profile published by Ginés et al. (1975). Collected by author, 17 July 1994; 9 females of 0.6, 1.4, 1.2, 1.4, 1.4, 1.5, 1.3, 1.2, and 1.3 mm (MNCM-242).

Description. – Body (Figs. 3–4) almost colourless. Cephalon subrectangular, broader than long, with anterolateral processes weak; frontal margin straight. Eyes absent.

Female antennule (Fig. 10) short, 7-segmented. Segment 1 largest, more than twice as long and broad as remaining segments, armed distally with several brush-like and simple setae; 1 short, lanceolate spine inserted about at midlength of medial margin. Segments 2, 4, and 7 bearing both simple and brush-like setae. Segment 7 smallest, with long apical aesthetasc subequal in length to distal four segments combined. Male antennule similar (Fig. 5), but with 6th segment bearing additional aesthetasc implanted distolaterally on outgrowth.

Antenna (Figs. 3 and 11) squama on peduncle segment 3 with short and acute distal process, and 3 subdistal setae; peduncle segments 5–6 very elongate. Flagellum extraordinarily long, of up to 57 segments, proximal segment longest. Entire antenna almost 3 times as long as body.

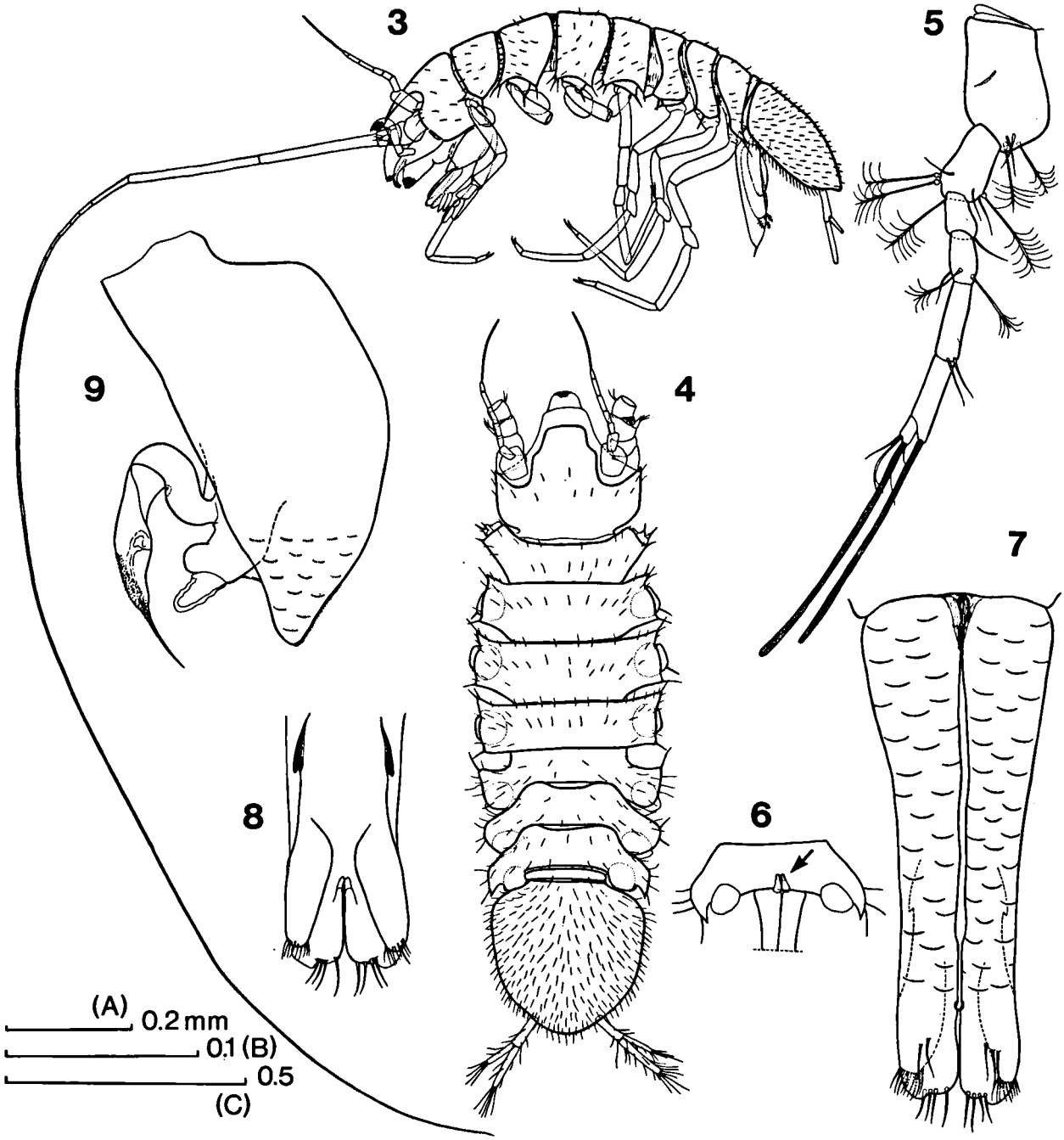
Labrum (Fig. 12) normal, with ventrodistal rim densely covered by short setules. Labium (Fig. 13) normal, armed with many stout apical setae.

Left mandible (Fig. 14) with 5-dentate, heavy incisor; 5-dentate lacinia mobilis; 1 simple and 6 serrate spines between incisor and molar process; sclerotized distal end of latter armed with denticles and 2 setae; mandibular palp (Fig. 15) 3-segmented, segment 1 with 1 simple distolateral spine; segment 2 almost twice as long as first, with 2 heavy tricuspidate spines implanted about at midlength of anterior margin; patch of bristle rows covering zone closer to these spines on lateral side of segment; segment 3 falcate, with row of up to 9 strong denticulate spines and 3 longer, simple ones inserted distally on anterior margin; patch of bristle rows covering great part of lateral side of segment. Right mandible (Fig. 16) similar to left, but lacking lacinia mobilis; incisor 5/6-dentate.

Maxillule (Fig. 17): Outer lobe armed distally with up to 11 strong denticulate spines; row of 6 simple setae implanted subdistally on ventral side; row of 7 simple setae on lateral margin, and another of 9–10 along medial margin. Inner lobe shorter; ventral side densely covered by long setules distally; also 1 barbed seta implanted proximally; dorsal side with longitudinal row of 7–9 setules inserted dorsally; apex bearing 7 simple setae; row of 9–10 simple setae along lateral margin; medial margin bearing only 1 stout denticulate spine inserted subdistally.

Maxilla (Fig. 18): Outer and central lobes similar, armed with 4 pennate spines distally; row of short simple spines inserted along medial margin; several transverse rows of short setules inserted ventrally; inner lobe (Fig. 19) longer than other two lobes, with 4 stout simple apical setae; 2 stout feathered setae inserted subdistally on medial margin; many thin, simple setae covering medial and lateral margins, as well as distal zone.

Maxilliped (Figs. 20–22) with elongate and distally tapering epipodite; proximal 2/3 of lateral margin ciliate. Protopodite less than twice as long as wide, adorned with ventral row of 5 setae running close to medial margin, and with 2 patches of long setules disposed dorsally near lateral margin. Endite twice as long as wide, subrectangular, armed with 2–3 coupling hooks on medial margin; distal margin truncate, with 3 robust pectinate lanceolate spines, 4 long simple setae, and row of 6 short lan-



Figs. 3–9. Trogloaniropsis lloberai n. gen., n. sp. (3, female paratype 1.63 mm; 4, female paratype 1.37 mm; 5–9, male of 1.1 mm from Cova de na Barxa): 3, habitus, lateral view (scale C); 4, habitus, dorsal view (C); 5, antennule (B); 6, penile papillae (A); 7, pleopod 1, ventral view (B); 8, pleopod 1, dorsal view of distal part (B); 9, pleopod 2 (B).

ceolate simple setae; pointed process on distomedial corner, with 5–6 short feathered setae and many setules on ventral side, and robust pectinate spine and many long setae on dorsal side. Distomedial dorsal surface of endite densely covered by long setules. Mid-dorsal patch of long setules present on distal half of endite, and transverse row of simple setae disposed subdistally. Palp 5-segmented, segments 1–3 expanded, bearing several simple setae along medial margin and ventral side; segments 4 and 5 slender.

All pereionites with well-developed and very characteristic lateral expansions (lappets); those of pereionite 1 (Fig. 23) with only posterodistal lobe (slightly) developed. Those of pereionite 2 (Fig. 24) with acute, clearly protruding anterodistal corner; posterodistal lobe slightly developed. Those of pereionite 3 (Fig. 25) with clearly protruding, wide anterodistal lobe; posterodistal lobe slightly developed. Those of pereionite 4 (Fig. 26) with well-developed anterodistal lobe; posterodistal lobe slightly developed. Those of pereionite 5 (Fig. 27) with only anterodistal lobe developed, in form of anteriorly-directed wide plate. Those of pereionite 6 (Fig. 28) with no lobes clearly developed; no traces of coxae in pereiopods 6, coxae probably fused to pereionite forming true coxopodial plates. Those of pereionite 7 (Fig. 29) with well-developed, pointed posterodistal lobe, directed posteriorly; no anterodistal lobe; as in former case, coxae are not discernible in pereiopods 7, as these probably constitute true lateral coxopodial expansions.

Pereiopods 2 to 7 (Figs. 32–39; pereiopods 2 and 7 not illustrated) subsimilar (except for presence of differentiated coxae, see above), slender and elongate. Dactylus elongate, subrectangular, with 2 mediodistal and 4 medial setae, bearing 2 distal claws, one large and simple, the other smaller and with stout spine on concave margin. Pereiopod 1 non-prehensile (Figs. 30 and 31), differing from other pereiopods in having propodus shorter and also in some minute details of dactylus and unguis: Former bearing additional mid-marginal seta, while latter bearing 3–4 spines instead of only 1 on smaller claw. Coxae of pereiopods 1–5 differentiated, sclerotized to variable degree. That of pereiopod 1 (Fig. 23) with 2 sclerotized lobes, one directed anteriorly, the other posteriorly, each armed with stout apical seta. Those of pereiopods 2–4 (Figs. 24–26) with only 1, posteriorly-directed, sclerotized lobe, armed with stout seta. Coxa of pereiopod 5 (Fig. 27) with anteriorly-directed sclerotized lobe, armed with 1 seta.

Male pereionite 7 ventrally with pair of contiguous penile papillae, scarcely visible, and implanted very close to base of pleopod 1 (Fig. 6). Oostegites on female pereionites 1–4. An ovigerous female of 2.1 mm from Cova de na Barxa carried 9 eggs of 0.18 mm mean diameter, while another one of 1.6 mm carried 4 embryos.

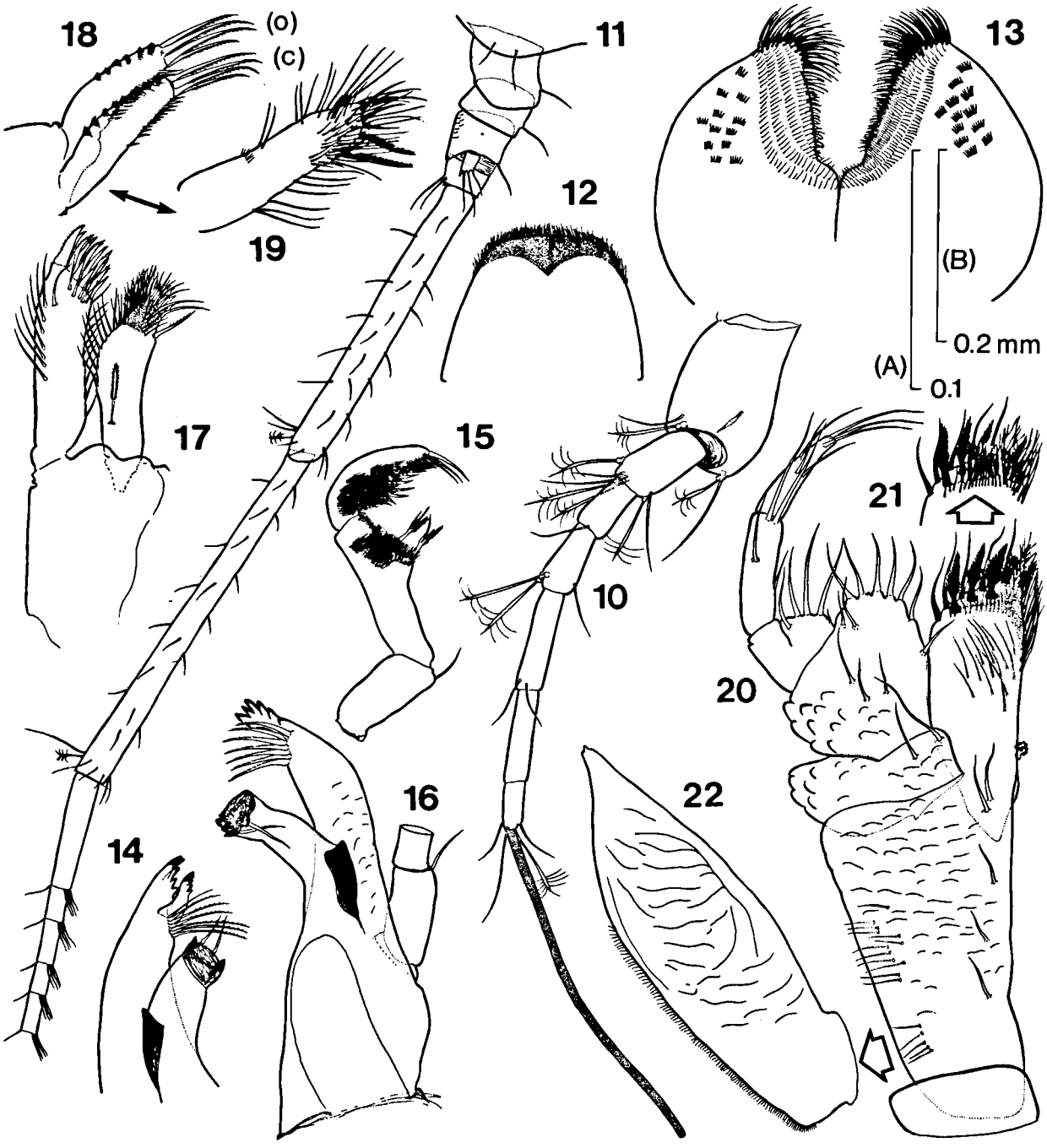
Pleon (Figs. 3 and 4) with free pleonite visible in dorsal view, bearing 2 setules, but covered laterally by pereionite 7. Pleotelson (Fig. 4) shield-shaped, with smooth margins, longer than wide, covered by rather long setules, which are more densely implanted than those on cephalon and pereionites; posterior margin rounded.

Male pleopod 1 (Figs. 7 and 8) long and narrow, widest proximally, narrowest about at 3/4 of total length. Orifice close to distal tip. Two or 3 smooth setae implanted ventrally halfway between them. Outer lobe evenly rounded, smooth, surpassing inner lobe distally. Inner lobe hardly developed, bearing subdistal row of 4 smooth setae implanted dorsally. Dorsal side of pleopodal central fold extending along distal half; distal lobes of this fold not surpassing distal margin of pleopod, and covered by small setae.

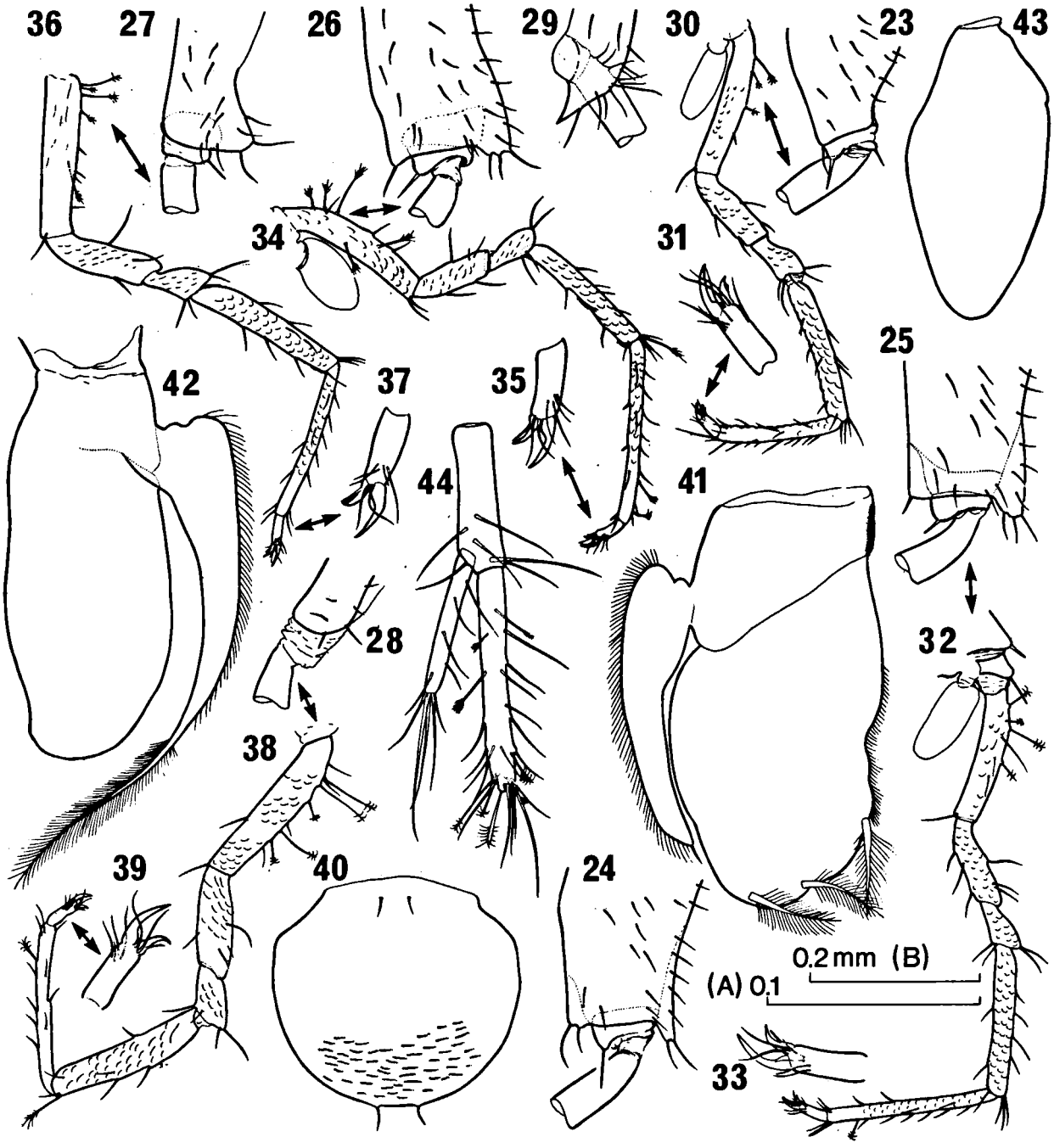
Male pleopod 2 (Fig. 9) endopodite inserting about at 3/4 of length from limb origin; medial margin of swollen distal portion covered by small granules distally; stylet slightly surpassing tip of protopodite. Exopodite smooth, without traces of setae.

Female pleopod 2 (Fig. 40) forming wide operculum covering remaining pleopods completely; no traces of medial suture; pair of short setae implanted mediodistally, and 2 others implanted medioproximally; surface sculpture formed by numerous rows of transverse setules.

Pleopod 3 (Fig. 41) basipodite trapezoidal, with medial margin covered by short spinules. Endopodite unsegmented, subrectangular, with 3 feathered setae on distal margin, and row of setules distally



Figs. 10–22. Trogloianiropsis lloberai n. gen., n. sp. (female paratype 1.38 mm): 10, antennule (scale A); 11, peduncle and first flagellum segments of antenna (B); 12, labrum, dorsal view (A); 13, labium, ventral view (A); 14, left mandible, medial view, palp not represented (A); 15, left mandibular palp, lateral view (A); 16, right mandible, medial view, palp not represented (A); 17, maxillule, dorsal view (A); 18, maxilla, outer (o) and central (c) lobes, medial view (A); 19, maxilla, inner lobe, dorsal view (A); 20, right maxilliped, ventral view (A); 21, distal part of endite of right maxilliped, dorsal view (A); 22, right maxilliped epipodite, ventral view (A).



Figs. 23–44. Trogloianiropsis lloberai n. gen., n. sp. (female paratype 1.38 mm): 23–29, right lateral expansions of pereionites (prn.), and coxa-basis of the corresponding pereiopods (scale A): 23, prn. 1; 24, prn. 2; 25, prn. 3; 26, prn. 4; 27, prn. 5; 28, prn. 6; 29, prn. 7; 30, pereipod 1 (P1) (A); 31, detail of dactylus-unguis of P1 (B); 32, P3 (A); 33, dactylus-unguis of P3 (B); 34, P4 (A); 35, dactylus-unguis of P4 (B); 36, P5 (A); 37, dactylus-unguis of P5 (B); 38, P6 (A); 39, dactylus-unguis of P6 (B); 40, pleopod 2 (A); 41, right pleopod 3 (B); 42, left pleopod 4 (B); 43, pleopod 5 (B); 44, left uropod, ventral view (B).

on medial margin. Exopodite not surpassing endopodite, with lateral margin covered by row of setules; 1 short spinule implanted distally.

Pleopod 4 (Fig. 42) lacking closed sutures between basipodite and rami. Endopodite subrectangular. Exopodite with filiform distal part covered by long marginal setules.

Pleopod 5 (Fig. 43) reduced to uniramous, unsegmented, oval plate.

Uropods (Fig. 44) shorter than pleotelson; exopodite about as long as basipodite, and both more than half as long as endopodite; both peduncle and rami richly setose.

Etymology. – Named after Pere Llobera, who accompanied me repeatedly to Illa dels Conills in search of anchihaline crustaceans.

Discussion

This new taxon resembles *Ianiropsis* Sars, 1897 (sensu Wilson & Wägele, 1994) in general body shape and antennae. The concave profile of the lateral margins of pereionites 2–4 makes the coxae visible from the dorsal aspect in both taxa. They also have in common the basic ambulatory nature of all pereiopods in both sexes, and the presence of a sclerotized crest on the lateral margin of the dorsal fold of male pleopod 1.

Other features differ greatly. In contrast to *Ianiropsis*, the new taxon has a deeply incised frontal margin of the cephalon in the zone of insertion of the antennules. The pointed, posteriorly produced, lateral margin of pereionite 7 is also a character state not found in *Ianiropsis*. With regard to the mouthparts, the new taxon bears a mid-dorsal sclerotized crest on the molar of the mandible, which is absent in *Ianiropsis*; a somewhat similar structure has been described in *Janthura abyssicola* Wolff, 1962 and in some representatives of the eurycopid genus *Munneuricope* Stephenson, 1913 (sensu Wolff, 1962). The number of elements and type of armature on the second segment of the mandibular palp is also distinctive. In the new taxon there are 2 heavy, tricuspidate spines, whereas *Ianiropsis* bears 2 long, denticulate setae separated by a smaller, strongly curved denticulate seta. The 3 proximal segments of the maxillipedal palp are laterally expanded in both taxa, but in the new species the third segment is less than half the width of the second. In *Ianiropsis* both segments are approximately equal in width.

There are additional differences in the pereiopods. In *Ianiropsis* the dactyli of P2 to P7 are triunguiculate, but those of the new taxon are biunguiculate. Most important, the P1 of adult males is shorter than the remaining pereiopods in the new species, whereas it is longer than the body and slightly prehensile in males of *Ianiropsis*.

Pleopodal morphology is also characteristic. The first male pleopod of the new taxon differs from that of *Ianiropsis* in that its apex is not laterally expanded and the distal margin of the dorsal fold forms a subterminal bulge adorned with setae. In comparison, *Ianiropsis* has a laterally expanded apex and the dorsal fold does not form a distal bulge, but terminates as a diagonal, unadorned margin. The exopodite of the 4th pleopod is also diagnostic. This appendage is reduced in *Ianiropsis*. This contrasts with the long, narrow sickle-shaped exopodite of the new taxon, which, with its distally styliform apex extends beyond the endopodite.

In 1952, when only 12 species of *Ianiropsis* were known, Menzies commented on the morphological homogeneity of the group. This comment has proved to be correct when additional new species were described (Menzies, 1961; Kussakin, 1962; Kussakin & Mezhov, 1979; Sivertsen & Holthuis, 1980; Carvacho, 1982; Nunomura, 1985; Jang & Kwon, 1990). The genus appears to be very conservative in morphology, embracing species which differ mainly in the structure of the maxillipedal palp and in minute details of the distal part of male pleopod 1. The new taxon described in the present study differs considerably from known *Ianiropsis* species and consequently should be placed in a separate genus.

According to the key to Janiroidean genera recently presented by Wilson & Wägele (1994), the new taxon from the Balearic Islands would fall to be identified as *Janaira* Moreira & Pires, 1977. Nevertheless, based on the original description of this monotypic taxon by Moreira & Pires (1977) it

differs from *Trogloianiropsis* n. gen. in several remarkable characters, viz.: The male pereiopod 1 of *Janaira* is slightly prehensile and has the carpus slightly swollen; the male pleopod 1 has a different distal part and lacks the sclerotized crest on the lateral margin of the dorsal fold that is present in *Trogloianiropsis*; there are no notches in the frontal margin of the cephalon near the zone of insertion of the antennules; the lateral margins of pereionite 7 are not produced posteriorly in an acutely pointed process; the mid-dorsal sclerotized crest on the molar of the mandible is absent; the type of armature and the number of elements on the second segment of the mandibular palp are different; the dactyli of pereiopods 2–7 are triunguiculate; and the exopodite of pleopod 4 is reduced. All these differences justify the allocation of the new janirid from the Balearics to a different genus.

Trogloianiropsis n. gen. does not appear to be closely related with any of the known janirid genera. Its affinity with the two genera cited above is based only on superficial resemblance, and not on shared derived characters forming part of a complex system. A similar situation is evident for other endemics of the flooded coastal karst of the Balearic Islands; the stygobiont mysid *Burrimysis palmeri* Jaume & García, 1993, for example, cannot be directly related with any of the known genera in the Heteromysini (Jaume & García, 1993).

The absence of known close relatives and its restriction to the hypogean environment might indicate an ancient relict condition for *Trogloianiropsis*, but does not allow biogeographic conclusions. In the same way, its derivation from deep-sea or shallow-water lineages cannot be clarified at present.

Trogloianiropsis n. gen. and *Mackinia* Matsumoto, 1956 are the only genera of Janiridae known to be restricted to groundwater crevicular environments (Coineau, 1986). They share a morphology characterized by the elongation of pereiopods and antennae, contrasting with the more or less vermiform body plan characteristic of other Janiridae living in interstitial (non consolidated) substrata.

Acknowledgements

The fieldwork was sponsored by both the ICONA-CSIC project "Estudio de la fauna endémica y singular del Parque Nacional Marítimo-Terrestre del Archipiélago de Cabrera" and the DGICYT project PB91-0055. I thank the staff of the Cabrera National Park for logistic support during my visits to the archipelago, and also to J. Ginés, A. Ginés, M. Fiol, G. Pons, J.A. Alcover, and M. McMinn for their support during fieldwork on Mallorca. Antoni Martínez (UIB) determined the water column oxygen, salinity, and temperature profiles. Prof. Dr. J.H. Stock (Serooskerke, The Netherlands) and Dr. T.E. Bowman (Washington, U.S.A.) critically read the manuscript.

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Received: 30 November 1994
Revised: 8 June 1995