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**Three new subterranean *Bogidiella* from Mexico
and Guatemala (Crustacea, Amphipoda)**

ESTRATTO DAL QUADERNO N. 171 «SUBTERRANEAN FAUNA OF MEXICO» - PART II - FURTHER
RESULTS OF THE ITALIAN ZOOLOGICAL MISSIONS TO MEXICO, SPONSORED BY THE NATIONAL
ACADEMY OF LINCEI (1969 AND 1971)



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ACCADEMIA NAZIONALE DEI LINCEI
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THREE NEW SUBTERRANEAN *BOGIDIELLA* FROM MEXICO AND GUATEMALA (CRUSTACEA, AMPHIPODA)

RIASSUNTO. — Vengono descritte tre specie nuove del genere *Bogidiella* HERTZOG (Crustacea, Amphipoda, Gammaridae) di acque sotterranee del Messico e del Guatemala. Due di esse (*sbordonii*, *arganoi*) sono state raccolte nel corso delle ricerche biospeleologiche in Messico (1969, 1971) promosse e finanziate dall'Accademia Nazionale dei Lincei. Durante tali ricerche è stata nuovamente rinvenuta anche l'unica specie fino ad ora conosciuta per il Centro America, la *B. tabascensis* Villalobos; essa è stata trovata sia nella località classica (Tabasco, Grutas de Coconá), sia in una nuova località dello stato del Chiapas (Grutas de Rancho Nuevo a 2275 m).

Delle tre nuove specie descritte *B. sbordonii* (Messico, Chiapas, Cueva de Cerro Brujo) e *B. holsingeri* (Guatemala, Alta Verapaz, Cueva Seamay e Cueva Sepacuite) sono cavernicole e di dimensioni relativamente grandi (rispettivamente fino a 7 e 4.5 mm); la terza specie, *B. arganoi* (Messico, Veracruz, pozzo a Paraje Nuevo), di 2 mm di lunghezza, è invece una forma freatica. Le differenze tra le quattro *Bogidielle* centroamericane sono riassunte nella tabella.

Alla fine del lavoro viene discussa la posizione sistematica di tali specie nell'ambito del genere *Bogidiella* e si conclude affermando che, allo stato attuale delle conoscenze, non è possibile individuare gruppi di specie a maggiore affinità sistematica, dato che le *Bogidielle* presentano un complesso di caratteri che ricorrono, combinandosi diversamente fra loro, nelle diverse entità descritte.

In the course of the biospeleological studies carried out in Mexico in 1969 and 1971, promoted and financed by the Accademia Nazionale dei Lincei and organised by prof. Pasquale Pasquini, in which took part our friends and colleagues dr. Roberto Argano and dr. Valerio Sbordonì, of the Institute of Zoology of Rome University, and prof. Vittorio Parisi and dr. Aldo Zullini, of the Institute of Zoology of Milan University, a fair number of freshwater Amphipods were collected and were entrusted to us for examination.

This material is the result of careful researches in subterranean waters; it was collected either directly in pools in caves or, with a modified Cvetkov net, in the phreatic waters of wells.

The subject of the present note is the study of the Mexican species of the genus *Bogidiella*, of which two new species have been collected, one cave-dwelling, in Chiapas, and one of phreatic waters, in the state of Veracruz:

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(**) Istituto di Zoologia, Rome University.

in Mexico a single species of the genus was known previously, a cave species in Tabasco, which was found in a second station in Chiapas as well as in the typical locality.

In the course of the study, our colleague dr. John R. Holsinger, of Old Dominion College, Norfolk (Virginia), kindly sent us a series of *Bogidiella* from two caves in Guatemala, which have also been found to belong to a new species. The present work therefore also includes the description and an account of our study of the new Guatemalan species.

***Bogidiella tabascensis* VILLALOBOS 1961.**

Bogidiella tabascensis, VILLALOBOS, 1961, "An. Ist. Biol.", Mexico, XXXI, p. 317. Type: Gruta del Coconà, Teapa, Tabasco.

MATERIAL EXAMINED. Mexico, Tabasco, Teapa, Grutas de Coconà, m 65, 7.IV.1971, V. Sbordoni leg., 1 ♂ (prep. 328), 1 ♀ (327), 1 ♀ (326), 18 ♀♀; id. id., A. Zullini leg. 1 ♀.

Mexico. Chiapas, San Cristobal de las Casas, Grutas de Rancho Nuevo, m 2275, 19.III.1971, R. Argano leg., 1 ♀ (prep. 325).

OBSERVATION. As regards the first collecting station a fairly numerous series of topotypical material was found, corresponding perfectly with the excellent description given by VILLALOBOS (1961), to which we refer for the figures and the discussion of the characteristics. However, since it is useful for a discussion of the affinities with the new species, we consider it as well to give the figures of the gnathopods of the female, not illustrated and only briefly described by the author, and the oostegites and branchial appendages (figs. 1 *a, b, c*). In this respect it is necessary to note that, from the description given by VILLALOBOS, the branchial appendages would seem to be present on pereopods 3, 4, 5, whereas in reality, as in all the genus, they are on nos 4, 5, 6 (i.e. 2, 3, 4 according to the terminology adopted by the author), though the number and arrangement of the oostegites is accurate. In addition, the figure of the mandibular palpus is seen to be wrong, since the third article is inclined and seems much shorter than the second, whereas it is actually subequal.

The other collecting station represents the second known locality for the species and is quite far from the first station; about 100 Km in a straight line and with a difference in level of nearly 2200 m; however, the only specimen collected, a female 2.5 mm in length, corresponds well to the topotypical material, also in the more characteristic details, such as the form and armature of the telson (fig. 1 *d*).

Unlike the specimens of the typical locality, which are found in a small stream, this one was found in rimstone dams. In the same cave, in large pools, in association with external aquatic fauna (Coleoptera Dytiscidae,

Ephemeroptera), 4 ♂♂ and 1 ♀ of *Hyaletta* were also found; in the present state of our knowledge of the systematics of this genus, these can be related to *H. azteca* (SAUSSURE).

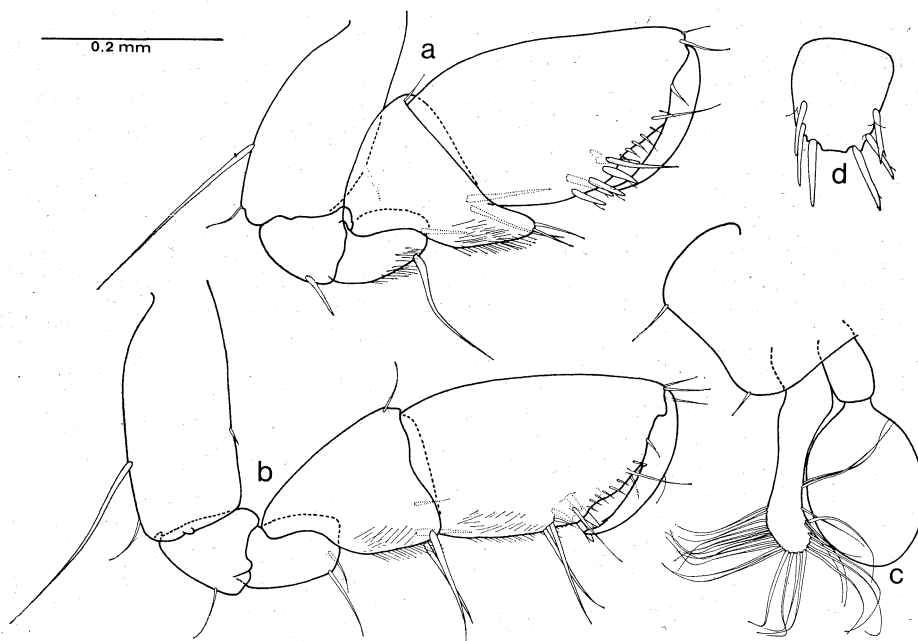


Fig. 1. — *Bogidiella tabascensis* VILLALOBOS:

a) right gnathopod I, and b) right gnathopod II of a topotypus ♀, from Grutas de la Cocona, 7.IV.1971, V. Sbordoni leg. (327); c) oostegite and branchial appendage of the left pereopod IV of a topotypus ♀ (326); d) telson of the specimen ♀ from Grutas de Rancho Nuevo, 2275 m, 19.III.1971, R. Argano leg. (325).

***Bogidiella sbordonii* n. sp.**

DIAGNOSIS. A large (5–6 mm) cave-dwelling *Bogidiella*, with mesosomites higher than their length, with maxilla I with outer lobe provided with unidenticulate spines (except the inner one) and inner lobe with 2 setae; antenna I with flagellum of 10–11 articles and accessory flagellum 2-articulate; gnathopods short, pair II more elongated, with ovoidal I propod, and subtrapezoidal II, larger in the male, and posterior edge of the basipodite with 1 seta; pereopods without lenticular organs and with short dactylus; pleopods with vestigial endopodite, with differentiated setae in the male; telson distally sunken, with 2 spines per side, without sexual dimorphism; branchial appendages on pereopods 4–6 and oostegites only on pereopods 3–5.

MATERIAL EXAMINED. Holotypus: ♂, Mexico, Chiapas, Ocozocoautla, Rancho del Cielito, Cueva de Cerro Brujo, m 1320, 22.III.1971, V. Sbordoni leg., preserved in alcohol (80°) in the Ruffo–Vigna Taglianti Collection at the Museo Civico di Storia Naturale in Verona; the preparations obtained

by partial dissection of the holotype, mounted in polyvinyl lactophenol with methylene blue on three slides, are preserved in the same Museum (nos 329, 330, 331). Paratypes: 4 ♂♂, 11 ♀♀, same locality, date and collector; of these, 3 ♂♂ and 10 ♀♀—1 ♂ (slide 336) and 1 ♀ (slides 332, 333, 334) being partly dissected—are preserved in the same collection as the holotype, and 1 ♂ and 1 ♀ are preserved at the U. S. National Museum of Natural History in Washington; 1 ♂ and 5 ♀♀, same locality and date, R. Argano leg., are preserved in the same collection as the holotype, 1 ♀ (slide 335) being partly dissected.

DESCRIPTION. The description is based on the dissection of the holotype and of one ♂ and two ♀♀ paratypes, together with the direct examination of the other paratypes. The nomenclature adopted (as for the descriptions of the following species) is, generally speaking, that chosen at the Meeting for the Study of the Amphipods of the Mediterranean Fauna, held in Verona in April 1971.

♂: Body slender and elongated (fig. 2 a); total length 5–7 mm (holotypus about 7 mm). Shape of body, pereon, pleon and coxal plates without parti-

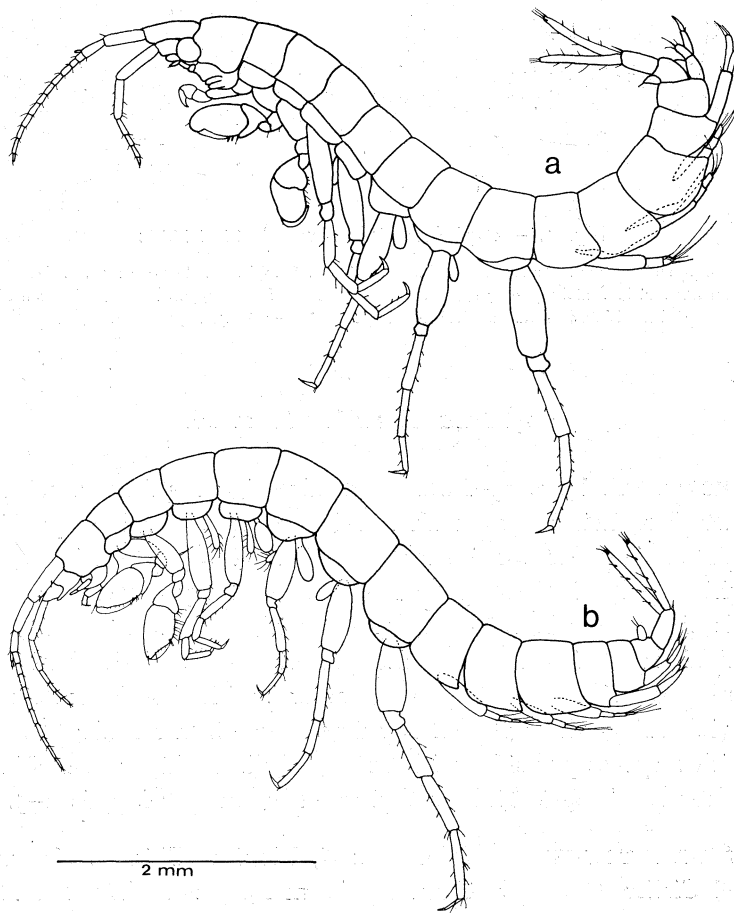


Fig. 2. — *Bogidiella sbordonii* n.sp., habitus:

a) paratypus ♂; b) paratypus ♀.

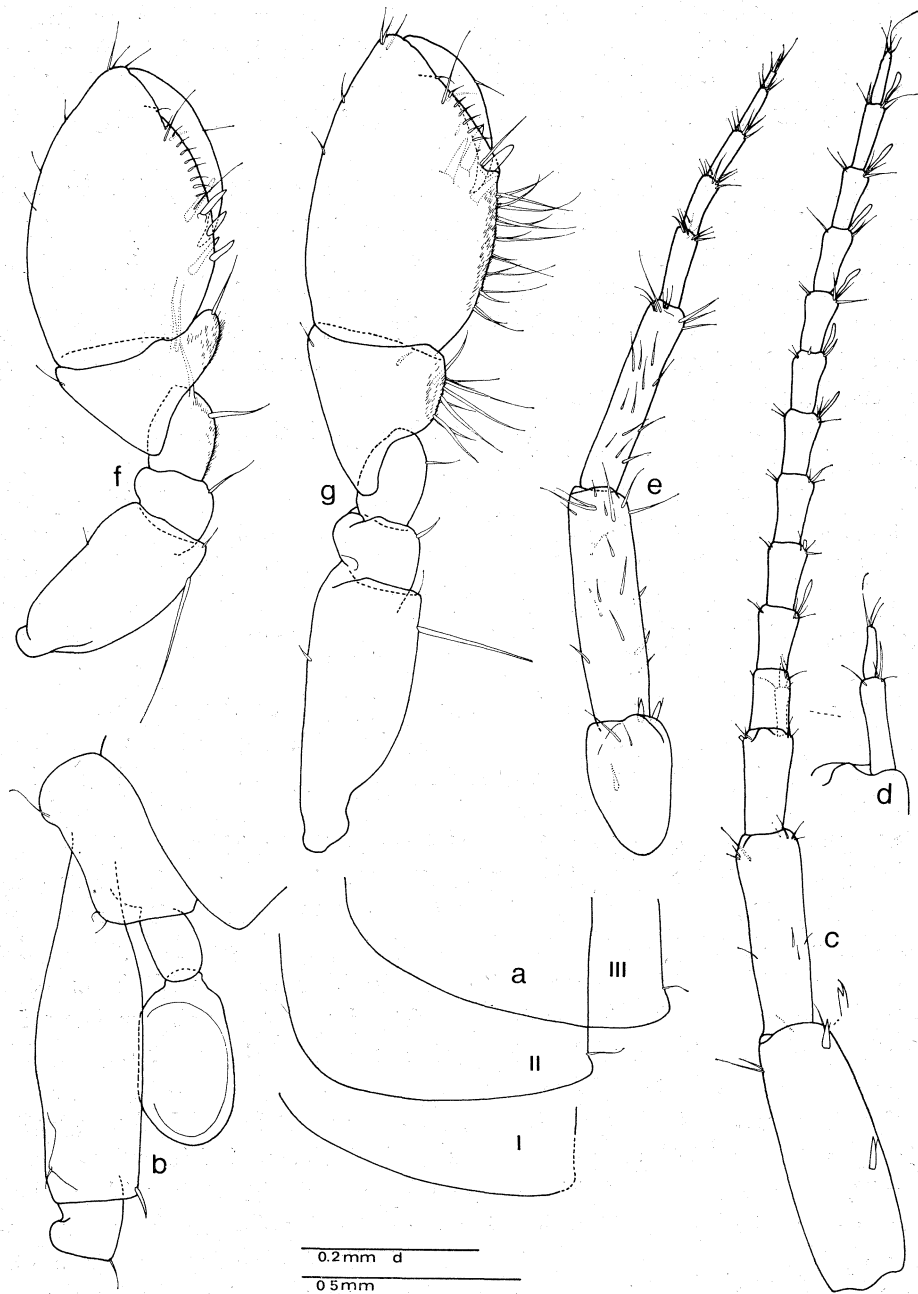


Fig. 3. — *Bogidiella sbordonii* n.sp., right appendages of the holotypus (exc. *a*, *b*):
a) pleonal epimera, left side (paratypus ♂, 336); *b*) coxa, basis and branchial appendage of the left pereopod IV (paratypus ♂, 336); *c*) antenna I; *d*) magnified accessory flagellum of the same; *e*) antenna II; *f*) gnathopod I; *g*) gnathopod II.

cular characteristics. Pleonal epimera (fig. 3 *a*) with ventral edge regularly arcuate, posterior margin slightly concave, postero-ventral angle dentate and prominent, with one seta on the posterior margin. Branchial appendages (figs. 3 *b*; 7 *i*) subcylindrical, elongated, present on the coxopodites of the appendages of the IV–VI segment (apparent) of the pereon (pereopods IV, V, VI).

Antennae I (fig. 3 *c*) short, slightly more than $1/3$ length of body, with flagellum of 10–11 subcylindrical articles, all provided with an elongated aesthetasc and with short apical setae; accessory flagellum (fig. 3 *d*) with 2 articles, reaching the middle of the second article of the flagellum.

Antennae II (fig. 3 *e*) with flagellum of 5 articles; excretory cone slightly shorter than the third article of the peduncle; fifth article slightly shorter than the fourth.

Labrum rounded; labium (fig. 4 *a*) with much incised anterior lobe, with setulae on the sides of the incisure.

Mandibles (figs. 4 *b*, *c*) with small molar process, pars incisiva pluridenticate, lacinia mobilis well developed and dentate; inner edge, near the lacinia, provided with 4–5 subconical appendages, ciliate; palpus with the second article provided with 1 subapical seta, and the third, almost as long as the second, with 3 long apical setae and a series of setulae on the outer side.

Maxillae I (fig. 4 *d*) with subrectangular inner lobe that reaches $2/3$ of the outer lobe, with 2 apical setae; outer lobe with 6–7 unidentate spines, except for the innermost, which is pluridentate; palpus short, with 3 apical setae.

Maxillae II (fig. 4 *e*) with subequal lobe, provided with 5–7 apical setae.

Maxillipeds (fig. 4 *f*) with inner lobe about half as long as the outer one, with 2 short stout spines and 3 setae at the apex and 2 setae on the inner edge; outer lobe with 3 short stout spines and 3 setae at the apex and 3 setae on the inner edge; palpus with second article barely broadened, with inner edge regularly convex and provided with a series of 10 setae; third article with subapical setae and fourth with apical spine, 1 seta on the outer edge and 1 on the inner and a series of lateral setulae.

Gnathopods I and II large, short and stumpy; gnathopod I (fig. 3 *f*) with basis very short, with 1 long seta on the posterior edge; ischius with 1 seta; merus short, with 1 seta and thick setulae; carpus subtriangular, with marked lower prolongation, provided with thick setulae and 1 seta at the apex; propodus much rounded, suboval, with much inclined convex palmar margin (palm index = 0.50⁽¹⁾), with a regular series of 10–12 setae and with 5 stout spines at the outer corner (2 on the inner side, 3 on the outer) and with very short lower edge lacking in setae, dactylus with 1 seta on the outer side. Gna-

(1) It has been thought fit to introduce the evaluation of the palm index according to RUFFO (1973).

thopod II (fig. 3 *g*) narrower and more elongated; basis with only 1 long seta on the posterior edge; ischius and merus with 1 seta, without setulae; carpus subtriangular, without prolongation at outer corner, with setulae and 8 setae on the lower edge; propodus trapezoidal, with upper and lower edges subparallel and palmar margin slightly inclined and almost rectilinear (palm

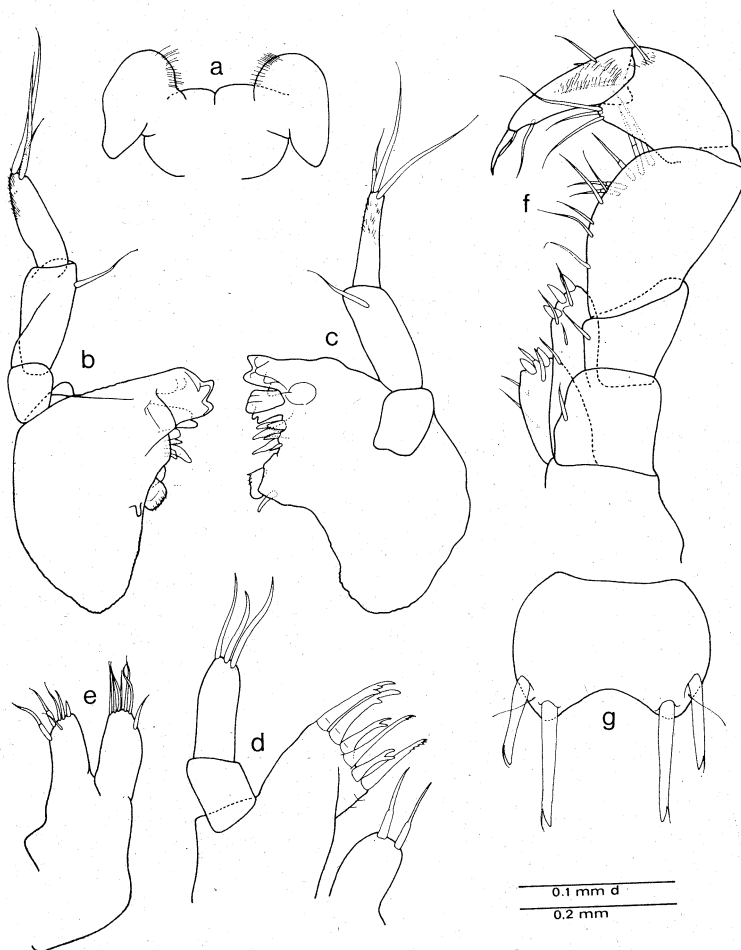


Fig. 4. — *Bogidiella sbordonii* n.sp., holotypus (exc. *a*, *d*):
a) labium (paratypus ♀, 334); *b*) and *c*) mandibles; *d*) maxilla I (paratypus ♀, 334);
e) maxilla II; *f*) maxilliped; *g*) telson.

index = 0,34), with a row of 8–9 setae on the outer side and 2–3 on the inner side; lower corner with 4 spines (3 on inner side, 1 on outer); lower edge subrectilinear, with thick setulae and 8 tufts of 2–3 setae; dactylus longer than the palmar margin, with 1 seta on the outer edge.

Pereopods III and IV (figs. 5 *a*, *b*) without lenticular organs, elongated, with narrow basis; coxal plates with concave lower edge.

Pereopods V, VI, VII (figs. 5 *c*, *d*, *e*) without lenticular organs, similar, of increasing length. Pereopod VII is about 2/5 the length of the body. Pro-

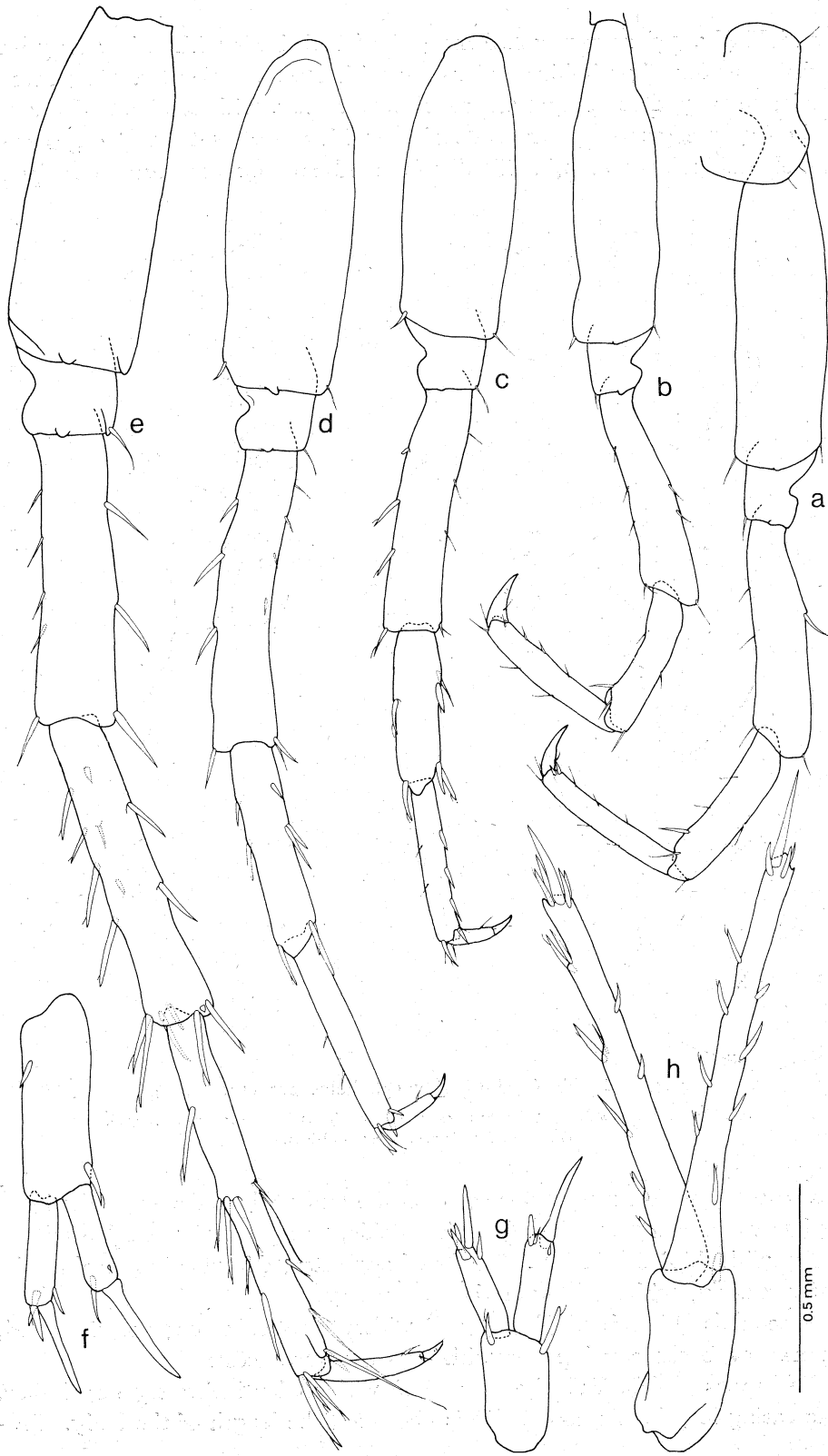


Fig. 5.

podus of the VII pair with 3–6 setae and spines on the anterior side, slightly elongated in comparison with the congeneric species; dactylus about $\frac{1}{3}$ the length of the propodus, with a small spine on the inner side, at $\frac{1}{2}$ or $\frac{2}{3}$ of the length.

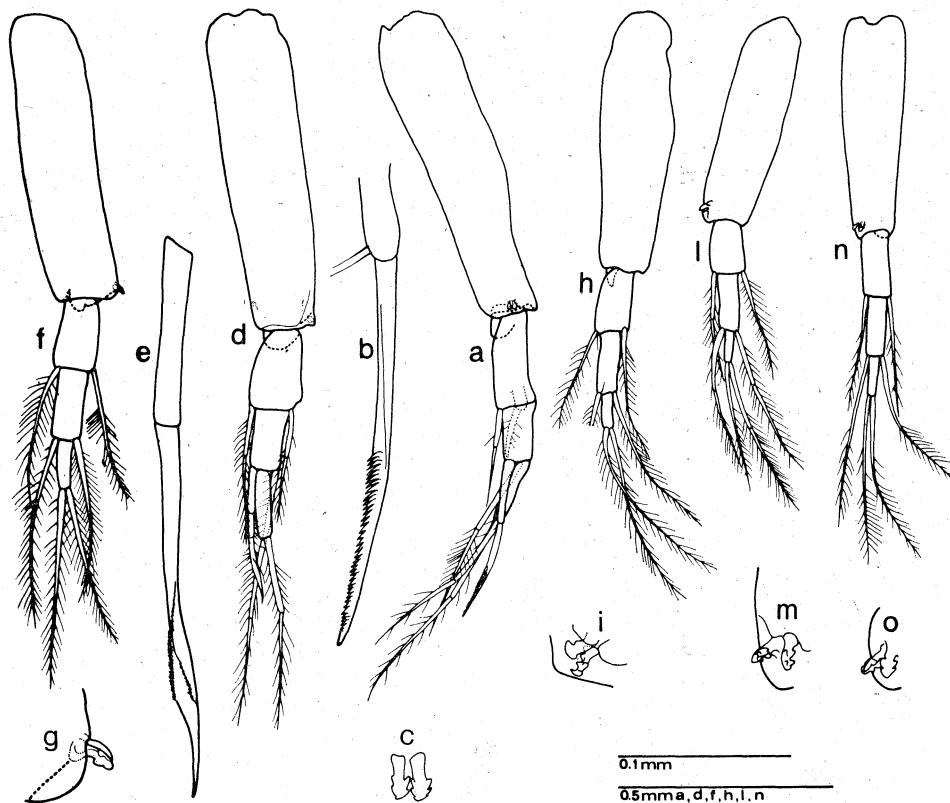


Fig. 6. — *Bogidiella sbordonii* n.sp., right appendages:

a) pleopod I of the holotypus; b) magnified differentiated seta of the same; c) magnified retinaculum of the same; d) pleopod II of the holotypus; e) magnified differentiated seta of the same; f) pleopod III of the holotypus; g) magnified retinaculum of the same; h), l), n) pleopods I, II, III of a paratypus ♀, 333; i), m), o) magnified retinacula of the same.

Pleopods with endopodite reduced to a vestigial scale. Pleopod I (figs. 6 a, b) with outer seta of the second article of the exopodite differentiated, stiff, articulate, pointed and saw-toothed on the dorsal side; pleopod II (figs. 6 d, e) with the same seta differentiated, articulate, with distal joint broadened and concave, spoon-shaped, with saw-toothed edges; pleopod III (fig. 6 f) with normal setae. All the normal setae, pinnate, have a whip-like appearance. On all the pleopods there are 2 retinacula, harpoon-shaped, with two or three denticulations per side (figs. 6 c, g).

Fig. 5. — *Bogidiella sbordonii* n. sp., right appendages of the holotypus:

a) pereopod III; b) pereopod IV; c) pereopod V; d) pereopod VI; e) pereopod VII; f) uropod I; g) uropod II; h) uropod III.

Uropod I (fig. 5 *f*) with subequal rami, about half as long as the peduncle; peduncle with 1 proximal spine on the lower side and 1 distal spine on the upper side; rami with a group of 4–5 apical spines, one of which is as long as the rami themselves.

Uropod II (fig. 5 *g*) shorter, with rami about as long as the peduncle and the rami of uropod I; peduncle with 2 subapical spines, an inner one and an outer one; rami terminating in 4 spines, one of which is as long as the rami themselves.

Uropod III (fig. 5 *h*) with equal rami, over 2 1/2 times the length of the peduncle; peduncle with 1 subapical spine; rami with a series of marginal spines, 4–8 per side, and an apical group of 4–5 spines, one or two of which are longer.

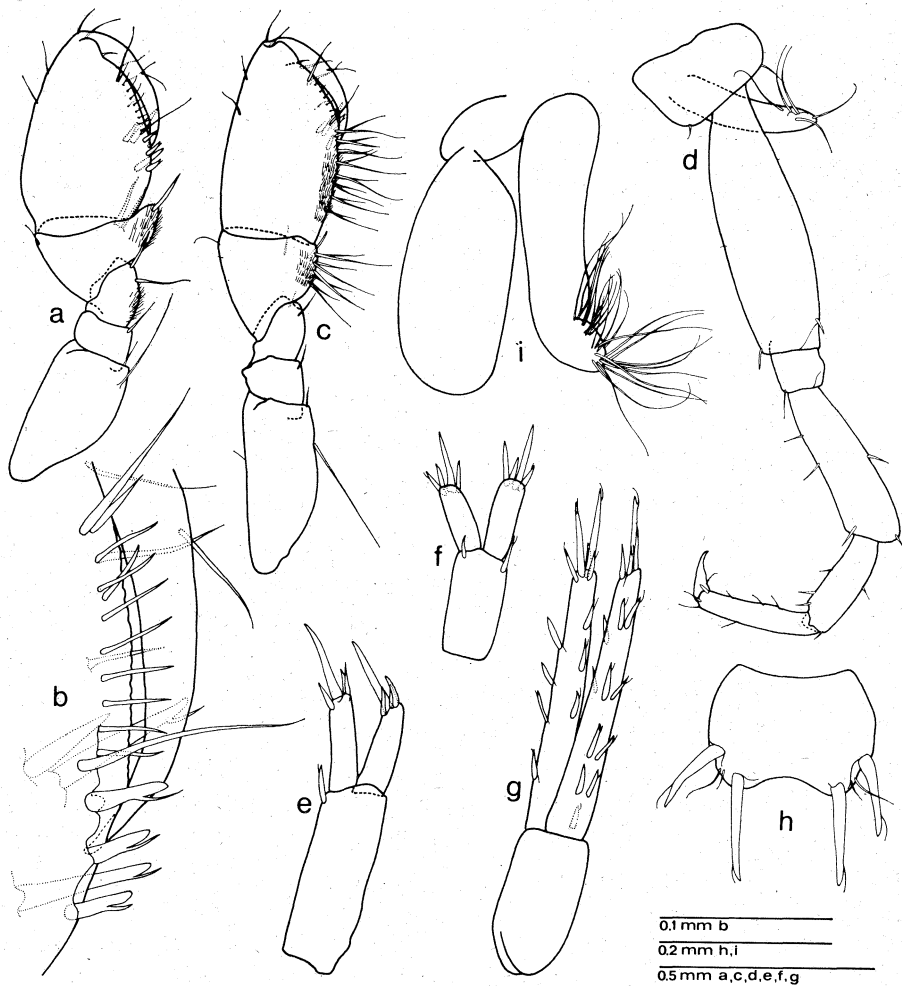


Fig. 7. — *Bogidiella sbordonii* n.sp., right appendages of a paratypus ♀ (332) (exc. *i*):

a) gnathopod I; *b*) magnified palmar margin of the same; *c*) gnathopod II; *d*) pereopod III, with oostegite; *e*) uropod I; *f*) uropod II; *g*) uropod III; *h*) telson; *i*) oostegite and branchial appendage of the left pereopod IV of a paratypus ♀ (335).

Telson (fig. 4*g*) with concave posterior margin and with 2 spines on each side, the median ones being longer.

♀: similar to the ♂ in the general shape of the body (fig. 2*b*), generally of smaller size and differs markedly in the dimensions of gnathopods I and II (figs. 7*a, b, c*), which are decidedly smaller in proportion, though of similar form, compared with those of the ♂; appendages and telson (figs. 7*d, e, f, g, h*) very similar; rami of uropod III slightly shorter and only twice as long as the peduncle; oostegites (fig. 7*i*) present on the appendages of the III–V segment (apparent) of the pereon (i. e. on pereopods III, IV, V), unlike most of the congeneric species; moreover, the pleopods (figs. 6*h–o*) are all equal and are lacking in differentiate setae.

DERIVATIO NOMINIS. We dedicate the new species to our friend and colleague dr. Valerio Sbordoni, who collected it during the expedition to Mexico and entrusted it to us for examination.

ECOLOGICAL NOTES. All the specimens of this species were collected in rimstone dams, containing large quantities of guano, inside the Grutas de Cerro Brujo. For the data and observations on this interesting cavity, we refer to the work by SBORDONI, ARGANO and ZULLINI (1973).

OBSERVATION. The new species can be easily distinguished from the similar *B. tabascensis* VILLALOBOS by its decidedly greater stature, its less accentuated sexual dimorphism, the different form of the differentiate setae of pleopods I and II of the males, the shorter dactylus of the pereopods (compared with the other articles of the pereopods themselves), the less apical position of the spine of the dactylus, and the form and armature of the telson, which is decidedly shorter and broader, without sexual dimorphism, with a more incised posterior edge and only 2 lateral spines per side, instead of 3–5.

***Bogidiella arganoi* n. sp.**

DIAGNOSIS. A *Bogidiella* of phreatic waters, of small dimensions (2 mm), with mesosomites higher than their length, with stumpy body, maxillae I with outer lobe provided with spines all pluridentate and comb-like and inner lobe with 2 setae; maxilliped with second article of the palpus very short and broad; antennae I with flagellum of 8 articles and accessory flagellum of 3; gnathopods I and II with subquadrangular propodus, elongated, and posterior edge of the basis with 1 seta; pereopod VII with long slender setae on the anterior edge of the propodus and slender dactylus, half as long as the propodus; pleopods without endopodite; uropod I with rasp-like apical spines; telson incised, with 2 spines per side.

MATERIAL EXAMINED. Holotypus: ♂?, Mexico, Veracruz, Cordoba, Paraje Nuevo, well no. 1, 9.IV.1971, R. Argano leg., preserved, completely dissected, on five slides (nos 337-341), in the Ruffo-Vigna Taglianti Collection at the Museo Civico di Storia Naturale in Verona.

DESCRIPTION. Body somewhat stumpy and compact (fig. 8 *a*); total length about 2 mm. Head short, with buccal appendages shifted forward; form of the body, pereon, pleon and coxal plates without particular characteristics. Pleonal epimera (fig. 9 *a*) with barely arcuate ventral edge, almost rectilinear, and posterior margin slightly convex, with postero-inferior angle dentate and markedly prominent, with one seta in the incisure of the posterior margin. Branchial appendages (fig. 9 *d*) oval, elongated, present on segments IV-VI (apparent) of the pereon (pereopods IV, V, VI).

Antennae I (fig. 9 *b*) decidedly longer than half the body, with flagellum of 8 articles, provided (from the fourth to the seventh) with an elongated aesthetasc and short apical setae; accessory flagellum of 3 articles, longer than the first two articles of the flagellum.

Antennae II (fig. 9 *c*) with flagellum of 5 articles; fifth article of the peduncle slightly shorter than the fourth.

Labrum (fig. 8 *b*) rounded; labium (fig. 8 *c*) with anterior lobe deeply and widely incised, with setulae on the sides.

Mandibles (figs. 8 *d*) with molar process large and very pronounced, pars incisiva very narrow, elongated and pluridentate, lacinia mobilis highly developed and dentate; on the concave edge between the lacinia and the molar process there is a series of 4-5 ciliate subconical appendages; palpus with second article without setae and third article, almost as long as the second, with 4 long apical setae and a series of setulae on the outer edge.

Maxillae I (fig. 8 *e*) with subrectangular inner lobe, about half as long as the outer lobe, with 2 apical setae; outer lobe narrow and elongated (compared with the previous species) with 7 spines, all pluridentate, with highly developed and sharp denticles, and with a characteristic tuft of setulae at the apex of the inner edge; palpus with second article elongated, with 3 apical setae.

Maxillae II (fig. 8 *f*) with subequal lobes, narrow and elongated, with 7 apical setae.

Maxillipeds (fig. 8 *g*) with inner lobe over 3/4 the length of the outer one, with 2 short apical spines and 2-3 apical setae; outer lobe with 3 short spines and 3 apical setae, and 2 setae on the inner edge; palpus with second article very short and broad, with the inner edge almost straight and then sharply bent at a right angle, with a series of 3 setae on the proximal straight edge and 2 on the inner side of the distal part, third article with subapical setae

Fig. 8. — *Bogidiella arganoi* n.sp., holotypus:

a) habitus; *b*) labrum; *c*) labium; *d*) left mandible; *e*) maxilla I; *f*) maxilla II; *g*) maxilliped;
h) left gnathopod I; *i*) left gnathopod II; *l*) telson.

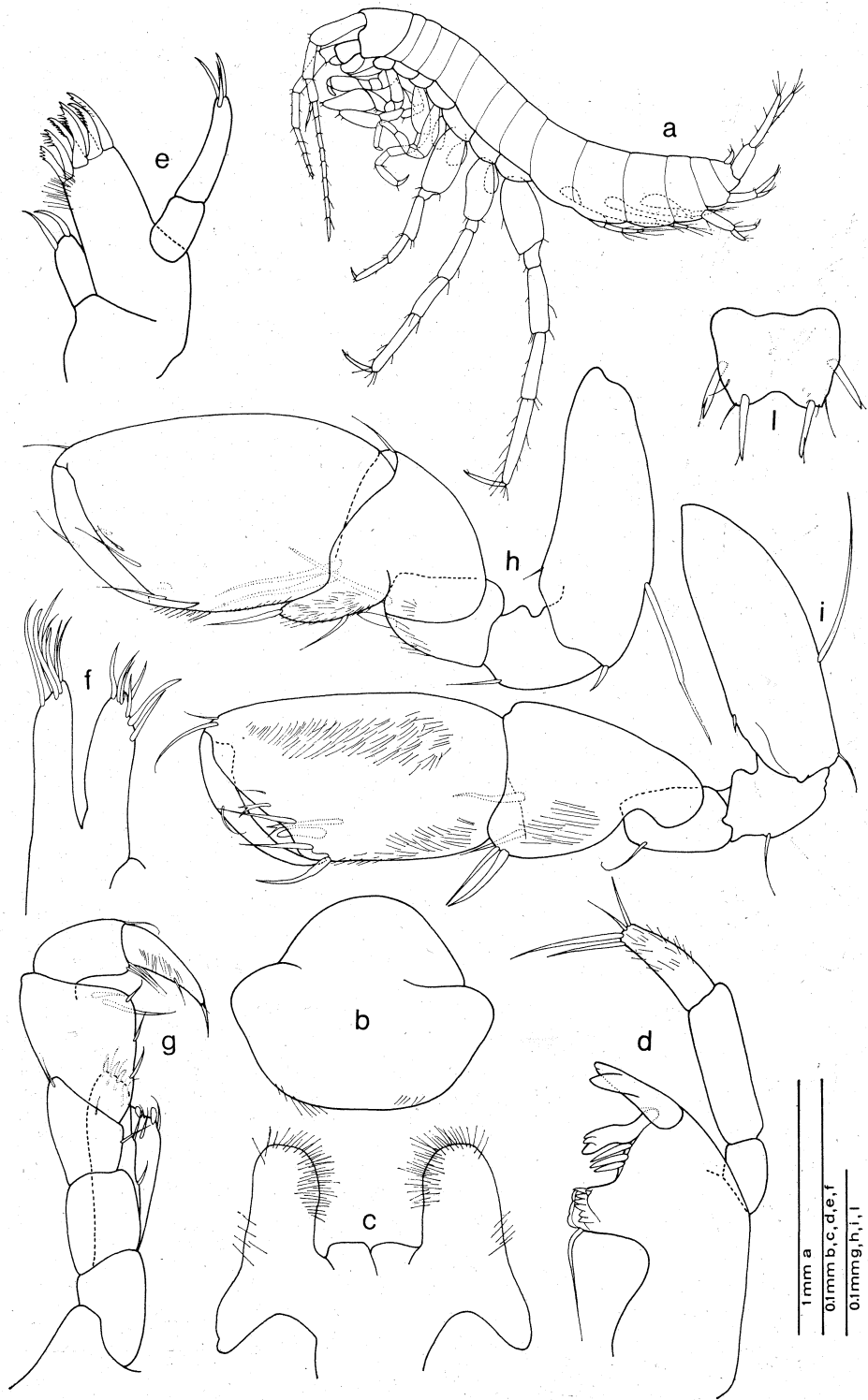


Fig. 8.

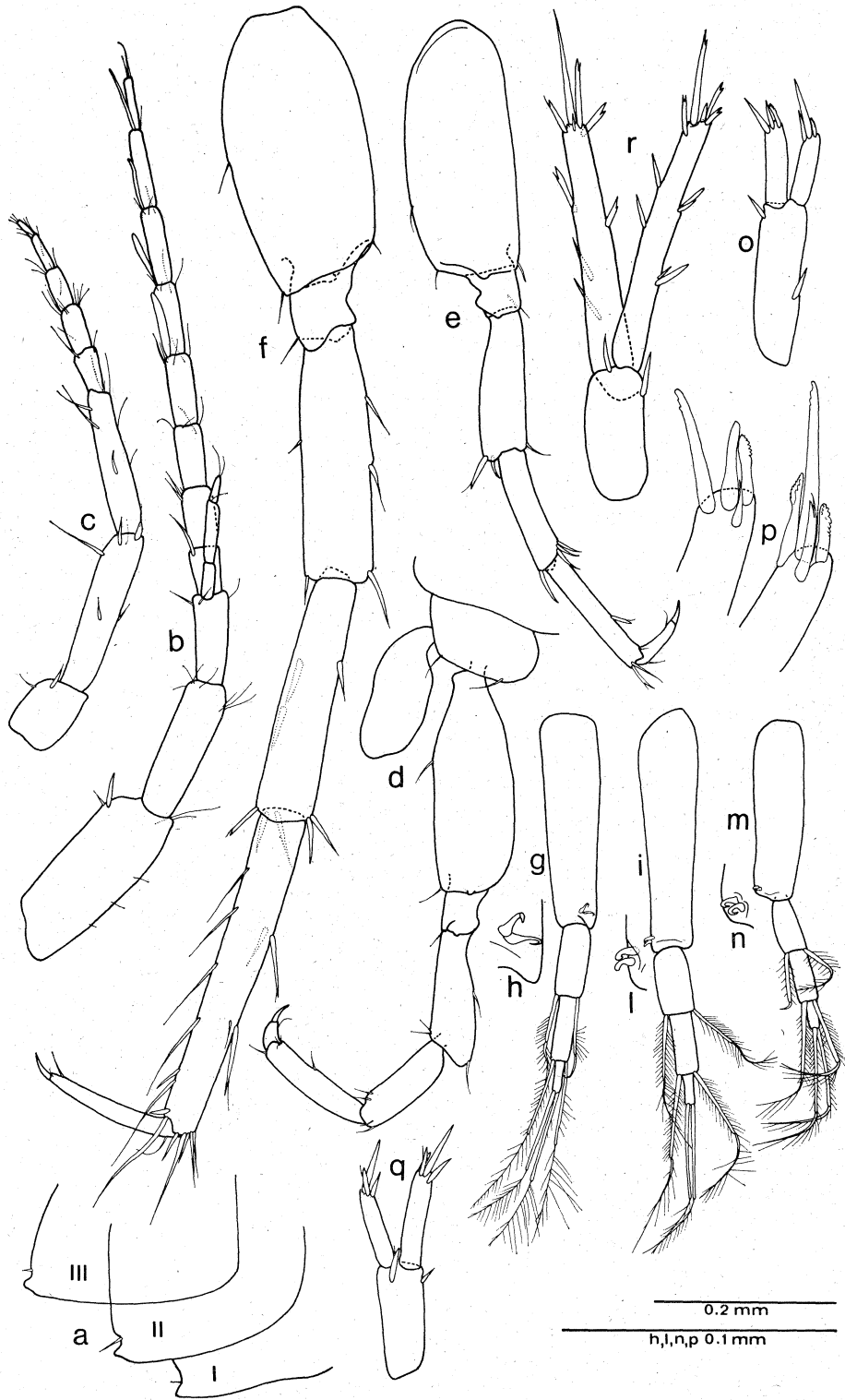


Fig. 9.

and the fourth with a slender apical spine, 1 seta on the inner edge and 1 at the base of the outer edge, and a series of lateral setulae.

Gnathopods I and II more elongated than in the previous species, relatively similar to each other; gnathopod I larger than II. Gnathopod I (fig. 8 *h*) with short basis, with 1 long seta on the posterior edge; ischius with 1 seta on the outer edge; merus with 2 setae and thick setulae; carpus triangular, with very pronounced lower prolongation, with 1–2 setae at the apex and thick setulae, and 2 long setae on the inner distal edge, concave; propodus subtrapezoidal, with upper and lower edges subparallel and lacking in setae, but with a thick series of setulae on the lower edge; palmar margin inclined and almost straight (palm index = 0.28), with 3–4 short bifid spines per side; outer corner projecting, provided with 1 spine on the inner side and 1 seta on the outer side; dactylus longer than the palmar margin, with 1 seta on the outer edge. Gnathopod II (fig. 8 *i*) narrower and more elongated; basis with 1 long seta on the posterior edge; ischius and merus with 1 single seta on the outer edge; carpus subtriangular and elongated, with 2 setae at the distal corner, slightly prolonged, and a thick series of setulae, and with 2 setae on the inner distal edge; propodus narrow with upper and lower edges parallel and straight, lacking in setae but with thick setulae on the lower edge; palmar margin slightly inclined and concave (palm index = 0.32), with 3 bifid spines per side; lower corner projecting, with 1 single spine on the inner side and 2 setae on the outer side; dactylus as long as the palmar margin, with 1 seta on the outer edge.

Pereopods III and IV (fig. 9 *d*) without lenticular organs, with characteristic basis, somewhat broadened and pear-shaped and with strongly convex anterior edge; dactylus fairly short and with 1 seta on the inner edge, halfway along.

Pereopods V, VI, VII (figs. 9 *e, f*) similar and of increasing length, without lenticular organs. Pereopod VII is over 2/3 the length of the body. Basis somewhat short and broad, compared with the other species; propodus of the VII pair with 5–7 long setae; dactylus very slender and elongated, about half as long as the propodus, with a distal seta very close to the claw.

Pleopods (figs. 9 *g, i, m*) with endopodite not visible, similar to each other, lacking in differentiate setae but with whip-like setulae as in the previous species, with proximal part having more slender setulae and the distal part, which seems articulate, regularly pinnate. Retinacula (figs. 9 *h, l, n*), on all the pleopods, consisting of two simple hooks, either not denticulate or with a single denticle.

Uropod I (figs. 9 *o, p*) with unequal rami, the outer one shorter than the inner, which is half as long as the peduncle; peduncle with 1 spine in the

Fig. 9. — *Bogidiella arganoi* n.sp., holotypus:

a) pleonal epimera, right side; *b*) right antenna I; *c*) left antenna II; *d*) right pereopod IV, with branchial appendage; *e*) left pereopod V; *f*) left pereopod VII; *g*) left pleopod I; *h*) magnified retinaculum of the same; *i*) left pleopod II; *l*) magnified retinaculum of the same; *m*) left pleopod III; *n*) magnified retinaculum of the same; *o*) left uropod I; *p*) magnified apex of the rami of the same; *q*) left uropod II; *r*) right uropod III.

middle of the outer side and 1 at the distal inner corner; rami with 4 apical spines, 3 of them differentiate and rasp-like; the outer ramus, shorter, has one rasp-like apical spine almost as long as the ramus itself.

Uropod II (fig. 9 *q*) with unequal rami, the outer one slightly shorter than the inner, the latter being almost as long as the peduncle; the inner ramus is slightly longer than the inner ramus of uropod I; peduncle with 2 distal spines; rami with 3–4 apical non-differentiate spines, half as long as the rami themselves, at the most.

Uropod III (fig. 9 *r*) with equal rami, twice as long as the peduncle; peduncle with 2 distal spines, rami with 2–3 tufts of 1–2 spines on the sides and an apical group of 4 spines, all with bifid apex, the largest of which may reach nearly half the length of the ramus itself.

Telson (fig. 8 *l*) short and transverse, with posterior margin decidedly incised, with 2 spines (and 2 slender setae) per side, of subequal length, the median ones in apical position, the lateral ones halfway along.

The absolute absence of oostegites and the presence of differentiate spines on uropod I prompt us to maintain that this specimen is in all probability a male. Its size (2 mm) is consistent with the normal dimensions of the adult specimens of the other species of *Bogidiella* of phreatic waters; in addition, the morphological peculiarities—for example, the spinulation of the appendages—are absolutely similar to those of the adult forms of the other species. For this reason, although we had only a single specimen at our disposal, we considered that it was adult and, consequently, that we could describe it and compare it with the other species.

DERIVATIO NOMINIS. We dedicate the new species to our friend and colleague dr. Roberto Argano, who collected it during the expedition to Mexico, in which he was particularly concerned with studies on subterranean aquatic fauna, including that of interstitial and phreatic waters.

ECOLOGICAL NOTES. The new species is represented by a single specimen collected in a well near Paraje Nuevo, Cordoba (Veracruz), using the modified Cvetkov net (VIGNA TAGLIANTI, COTTARELLI and ARGANO 1968), at a very short distance from another well, then almost dried up, where, in the previous expedition (1969), a new species of Isopod Asellota, *Mexistenasellus magniezi* (ARGANO, 1973) had been collected.

OBSERVATIONS. *Bogidiella arganoi* is distinguished from the two previous species by its smaller size, by the short stumpy body, by the antennae I half the length of the body, with accessory flagellum 3-articulate, longer than the first two articles of the flagellum, by the broadened and angular form of the second article of the palpus of the maxillipeds, by the narrow and elongated form of the two pairs of maxillae (these last two characteristics are similar to what is observed in *B. holsingeri*, described below), by the form of the propodus of gnathopods I and II, by the dactylus of pereopod VII, slender

and more than half the length of the propodus, which is provided with a series of long setae, by the apparent absence of the endopodite of the pleopods, and by the presence of rasp-like spines on the rami of uropod I. Moreover, it is distinguished from *B. tabascensis* by the less spiny telson and subcylindrical gills and from *B. sbordonii* by the armature of the outer lobe of maxilla I.

In view of the small stature and the environmental characteristics, we maintain that *B. arganoi*, unlike the other Central American species, may be considered a phreatic waters dwelling form.

***Bogidiella holsingeri* n. sp.**

DIAGNOSIS. A cave-dwelling *Bogidiella* of medium size (3.5–4.5 mm), with mesosomites higher than their length, maxillae I with outer lobe provided with pluridentate comb-like spines and inner lobe with 2 setae; antennae I with flagellum of 7–9 articles, and accessory flagellum of 2; gnathopods short, gnathopod I with propodus trapezoidal and palmate, capable of being folded into an anterior groove of the basis, gnathopod II more elongated and with a row of setae on the lower edge of the propodus; posterior edge of the basis with a row of 5–6 long setae; the gnathopods are similar in the ♂ and in the ♀ and there is a single palmar spine; pereopods without lenticular organs; pleopods I and II with vestigial endopodite, III without endopodite, lacking in differentiate setae; uropod I differentiate in the ♂, with very small outer ramus, with a rasp-like spine; telson with concave posterior margin, without sexual dimorphism; branchial appendages on pereopods IV–VI and oostegites on gnathopods II and pereopods III–V.

MATERIAL EXAMINED. Holotypus: ♂, Guatemala, Alta Verapaz, Senahu, Finca Seamay, Cueva Seamay, 24–26.VIII.1969, S. and J. Peck leg., preserved in alcohol (80°) in the Ruffo-Vigna Taglianti Collection at the Museo Civico di Storia Naturale in Verona; the preparations obtained by partial dissection of the holotype, mounted in Faure liquid on three slides are preserved in the same museum (nos 351, 352, 353). Paratypes: 20 ♂♂, 30 ♀♀, same locality, date and collectors; of these, 1 ♂ (slides 344, 345, 346) and 3 ♀♀ (slides 342, 343; slides 347, 348, 349; slide 350) partially dissected, and 14 ♂♂, 22 ♀♀ undissected are preserved in the same collection as the holotype, and 5 ♂♂, 5 ♀♀ are preserved at the U. S. National Museum of Natural History in Washington.

In addition to the typical series, we examined the following material: 2 ♂♂, 3 ♀♀, Guatemala, Alta Verapaz, Senahu, Finca Sepacuute, Cueva Sepacuute 2, 26.VIII.1969, S. and J. Peck leg., "pools at ent.", in the Ruffo-Vigna Taglianti Collection at the Museo Civico di Storia Naturale in Verona.

DESCRIPTION. The description is based on the dissection of the holotype and of the 1 ♂ and 3 ♀♀ paratypes, together with the direct examination of the other paratypes.

The material collected at the second station, close to the typical station, seems absolutely identical to the typical material.

♂: Body elongated (fig. 10 *a*); total length 4–4.5 mm (holotypus about 4.5 mm). Head short, with buccal appendages shifted forward; pereon, pleon and coxal plates as in the other species discussed here, with mesosomites higher than their length. Pleonal epimera (fig. 11 *a*) with arcuate ventral edge, convex posterior margin and postero-inferior corner projecting and dentate, with 1 seta at the posterior incisure. Branchial appendages subcylindrical, elongated (figs. 11 *c*, 13 *h*), present on segments IV–VI (apparent) of the pereon (pereopods IV, V, VI).

Antennae I (figs. 12 *a*, *c*) short, barely more than 1/3 the length of the body, with flagellum of 7–9 cylindrical articles, provided with short apical setae and, from the third to the sixth, an inconspicuous aesthetasc; accessory flagellum (fig. 12 *b*) of 2 articles, about as long as the first article of the flagellum.

Antennae II (figs. 12 *d*, *e*) with flagellum of 4–5 articles, shorter than the fourth article of the peduncle; excretory cone shorter than the third article of the peduncle; fifth article shorter than the fourth.

Labrum (fig. 10 *b*) prominent, with markedly convex edge; labium (fig. 10 *c*) with anterior lobe deeply incised, with setulae at the sides of the incisure.

Mandibles (figs. 10 *d*, *e*) with small molar process, with closely-packed elongated scales; pars incisiva narrow and pluridentate, lacinia mobilis denticulate; inner edge, near the lacinia, with 4 appendages, subconical and ciliate; palpus with second article without setae, and third, slightly shorter than the second, with 3 long apical setae and a series of setulae on the outer side.

Maxillae I (figs. 10 *f*, *g*) with inner lobe rounded and elongated, which reaches the middle of the outer lobe, with 2 ciliate apical setae; outer lobe with 7 spines, all pluridentate and comb-like, the inner ones straight, the outer ones curved, and a tuft of setulae at the apex of the inner edge; palpus with 5–6 setae at the apex.

Maxillae II (fig. 10 *h*) with narrow and elongated lobes, the outer one slightly longer than the inner one, provided with 7–9 apical setae.

Maxillipeds (fig. 10 *i*) with inner lobe reaching half the length of the outer one, provided with 2 spines and 2 setae at the apex and some setae on the inner edge; outer lobe rounded, with 3 spines and 2 setae at the apex and 4 setae on the inner edge; palpus with second article much broadened, with the inner edge slightly arcuate in the proximal part and then abruptly folded at an obtuse angle, provided with 4 setae on the proximal part and 1 on the distal part, the third article with apical and subapical setae and a series of apical setulae, the fourth article with apical spine, 2 spines on the inner side and 1 on the outer and a series of lateral setulae.

Gnathopod I (fig. 10 *l*) very short; basis short, with anterior groove in which the propodus can fold back and with posterior edge provided with a series of 6 long setae; ischius with 1 seta on the outer edge and thick setulae; merus with 2 setae and thick setulae; carpus very short, transverse, with



Fig. 10. — *Bogidiella holsingeri* n.sp., holotypus (exc. *d*, *e*, *g*):

a) habitus; *b*) labrum; *c*) labium; *d*) right mandible (paratypus ♂, 346); *e*) magnified inner edge of the same; *f*) right maxilla I; *g*) outer lobe of the right maxilla I (paratypus ♂, 346); *h*) maxillae II; *i*) maxilliped: *l*) right gnathopod I; *m*) right gnathopod II.

lower corner much prolonged, with 4 setae and thick setulae on the distal edge and 1 on the inner edge; propodus of a very characteristic shape, with upper edge arcuate, lower edge concave, palmar edge sinuate (palm index-0.38), with two concavities separated by a middle projection, and lower corner lobate and provided with very short setulae; there are 2 setae on the articulation with the dactylus, 3 on the outer palmar edge, 1 middle spine and 1 seta on the inner palmar edge, 1 single spine at the palmar corner, on the inner side; dactylus shorter than the palmar edge, with 1 seta on the outer edge and 1 on the inner.

Gnathopod II (fig. 10 *m*) narrower and more elongated; basis longer, with a row of 5-6 setae on the posterior edge; ischius and merus with 1 seta on the lower edge; carpus subtriangular, with 1 seta on the upper edge and a row of 5 setae and thick setulae on the lower edge; propodus with lower and upper edges subparallel, the lower one provided with thick setulae and a row of at least 5 setae, and 2-3 longer setae at the palmar corner; there are 2 setae at the articulation with the dactylus, 4 on the outer palmar edge, 1 median spine and 1 seta on the inner palmar edge; there is only 1 spine at the palmar corner, on the inner side; the palmar corner is very slightly lobate; the palmar edge (palm index = 0.36) is sinuate, with two concavities separated by a median projection (corresponding to the group of 1 spine and 2 setae); dactylus longer than the palmar edge, with 1 seta on the outer edge and 1 on the inner.

Pereopods III and IV (figs. 11 *b, c*) similar, with a greater number of spines and setae than in the previous species, also on the posterior edge of the basis.

Pereopods V, VI, VII (figs. 11 *d, e, f*) of increasing length, far more spiny than in the previous species, with a row of spines also on the anterior edge of the basis; pereopod VII with propodus having a row of short spines and dactylus less than half as long as the propodus; the dactylus, fairly stout, have 1 small spine near the claw.

Pleopods (figs. 12 *f, g, h*) alike; very small endopodite, reduced to a small scale on pleopods I and II, not visible on III; exopodite with normal "whiplike" setae, with proximal part cylindrical and slightly ciliate and distal part with longer and thicker cilia. Retinacula (fig. 12 *i*) consisting of two denticulate and harpoon-like hooks.

Uropod I (figs. 12 *l, m, n*) radically modified; peduncle with 2 subapical spines on the upper surface; inner ramus less than half the length of the peduncle, with 3 spical spines, the middle one being almost as long as the ramus itself, the inner one simple and the outer one bifid; the outer side of the inner ramus is concave; the outer ramus is reduced to an irregular scale, about 1/3 length of the inner ramus and prolonged outwards into a spine; near this, there is a bifid spine; medially, a long jointed spine and, on the inner side, a long curved jointed spine, with the lower surface channelled and with the groove deepened and broadened at the apex and outlined by two rows of denticles.

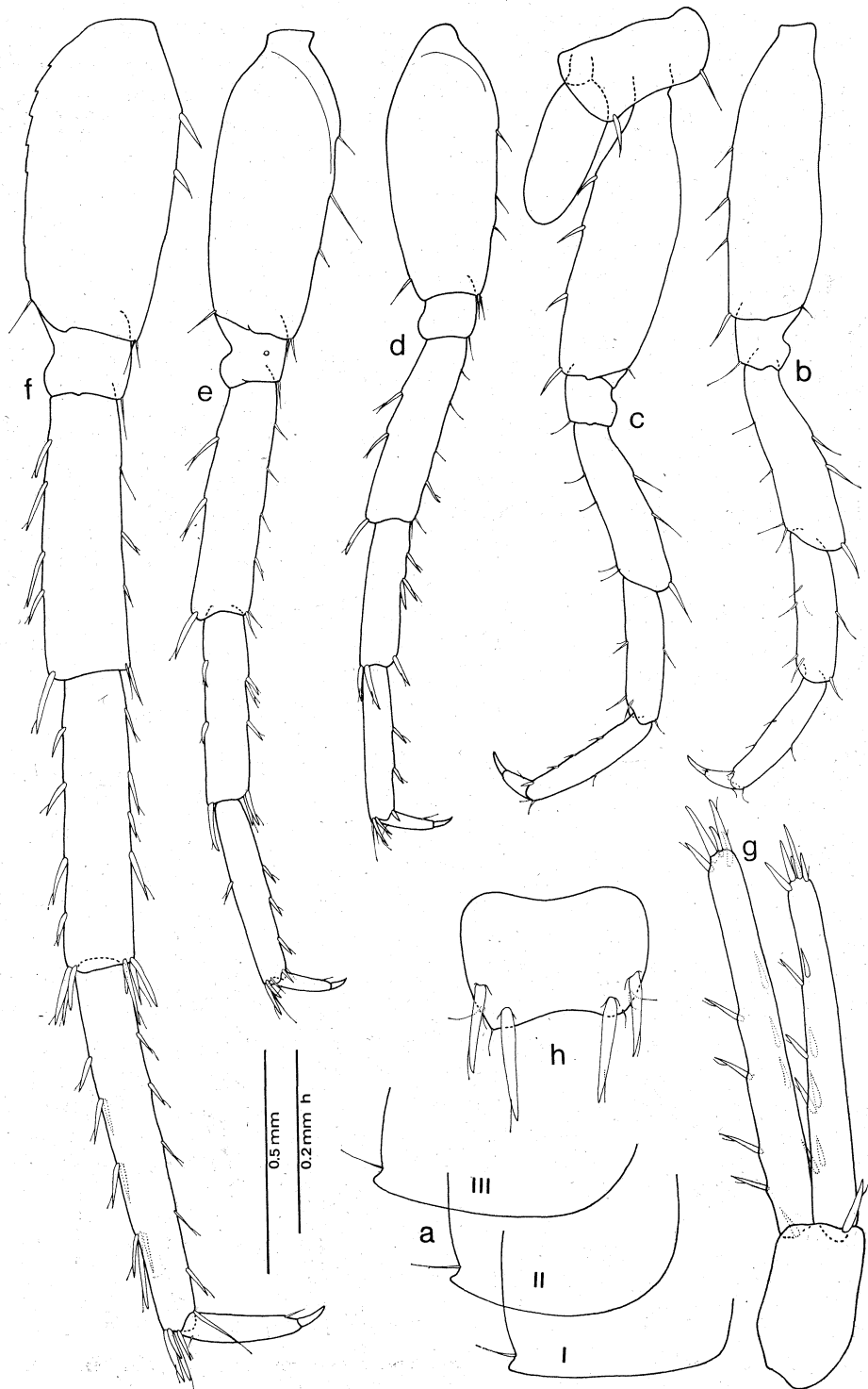


Fig. 11. — *Bogidiella holsingeri* n.sp., right appendages of the holotypus:
a) pleonal epimera, right side; b) pereopod III; c) pereopod IV, with branchial appendage; d) pereopod V;
e) pereopod VI; f) pereopod VII; g) uropod III; h) telson.

Uropod II (fig. 12 *o*) with subequal rami almost as long as the peduncle; peduncle with 2 spines on the upper surface; outer ramus with one outer spine halfway along and 4 apical spines, one of which is over $\frac{2}{3}$ the length of the ramus itself; inner ramus with 3 apical spines, one of which is over $\frac{2}{3}$ the length of the ramus itself.

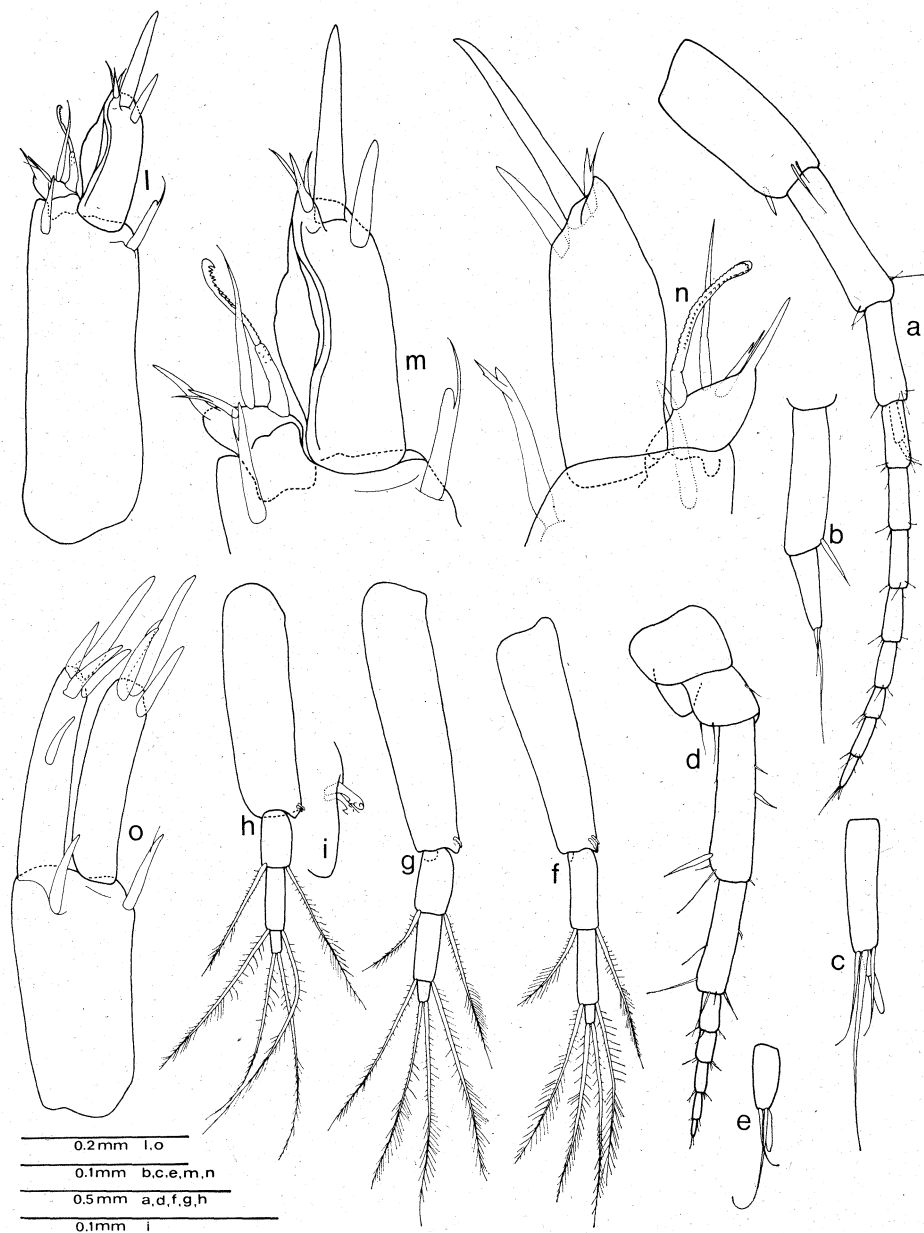


Fig. 12. — *Bogidiella holsingeri* n.sp., right appendages of the holotypus (exc. *n*):
a) antenna I; *b*) magnified accessory flagellum of the same; *c*) magnified apical article of the same antenna; *d*) antenna II; *e*) magnified apical article of the same; *f*) pleopod I; *g*) pleopod II; *h*) pleopod III; *i*) magnified retinaculum of the same; *l*) uropod I; *m*) magnified rami of the same, upper side; *n*) magnified rami of the right uropod I, lower side (paratypus ♂, 345); *o*) uropod II.

Uropod III (fig. 11*g*) with outer ramus slightly shorter than the inner one; rami less than three times the length of the peduncle; peduncle with 2 distal spines; rami with 3–4 tufts of lateral spines and a group of 5 apical spines, fairly short.

Telson (fig. 11*h*) with concave posterior margin, with 2 spines on each side, the median ones being longer.

♀: similar to the ♂ in the general form of the body but is generally smaller. The morphology of the buccal appendages and of all the pereopods and pleopods is exactly like that of the ♂ and is constant; on the other hand, the gnathopods are slightly smaller and narrower (figs. 13*a, b*) (palm index: gn I = 0.38, gn II = 0.32). Differs markedly from the ♂ in the form of uropod I (figs. 13*c, d*), which is not specialised, having the inner ramus $\frac{3}{4}$ the length of the peduncle and the outer ramus over $\frac{2}{3}$ the length of the inner, with normal spines: there are 2 distal spines on the upper side of the peduncle and 3 apical spines on the inner ramus, one of which is $\frac{2}{3}$ the length of the ramus itself, and 4 apical spines on the outer ramus, one being as long as the ramus itself. Uropods II (fig. 13*e*) and III (fig. 13*f*) and the telson (fig. 13*g*) are similar to those observed in the ♂.

The oostegites are present on segments II–V (apparent) of the pereon, corresponding to gnathopods II and pereopods III, IV, V; in conditions of greater development (fig. 13*i*) they are markedly different from those of the previous species and are provided with very long and fine setae.

DERIVATIO NOMINIS. We dedicate the new species to our colleague dr. John R. Holsinger, who so kindly sent us this interesting new species, on account of the important contribution that he has made to the knowledge of the subterranean Amphipods of Central and North America.

ECOLOGICAL NOTES. The specimens of this new species were found in two very near caves, Cueva Seamay and Cueva Sepacuite n. 2, in the surroundings of the town of Senahù. The collection from the Cueva Sepacuite n. 2 was made in a pool at the entrance to the cave, but, according to HOLSINGER (i.l.), we assume the habitat to be of true cave nature. The other cave, Cueva Seamay (type locality) contains a stream of water about 450 m from the entrance, where probably the collection by S. and J. Peck was made.

OBSERVATIONS. The new species is seen to be immediately distinguishable from the other three *Bogidiella* of Central America (which have been discussed previously) by the form of the gnathopods, having a lobate propodus with sinuate palmar edge, with a single palmar spine and with a basis with various setae on the posterior edge, and by the sexual dimorphism of uropod I, which is so radically modified in the ♂. The buccal apparatus is very similar to that of *B. arganoi*, with gnathopod I much shortened and shifted forwards, at the sides of the maxillipeds; these are very short, with the second article of the palpus broadened and with angular inner edge, such as to form a kind of shorter "pincer" while maxillae I and, even more so, maxillae II are very

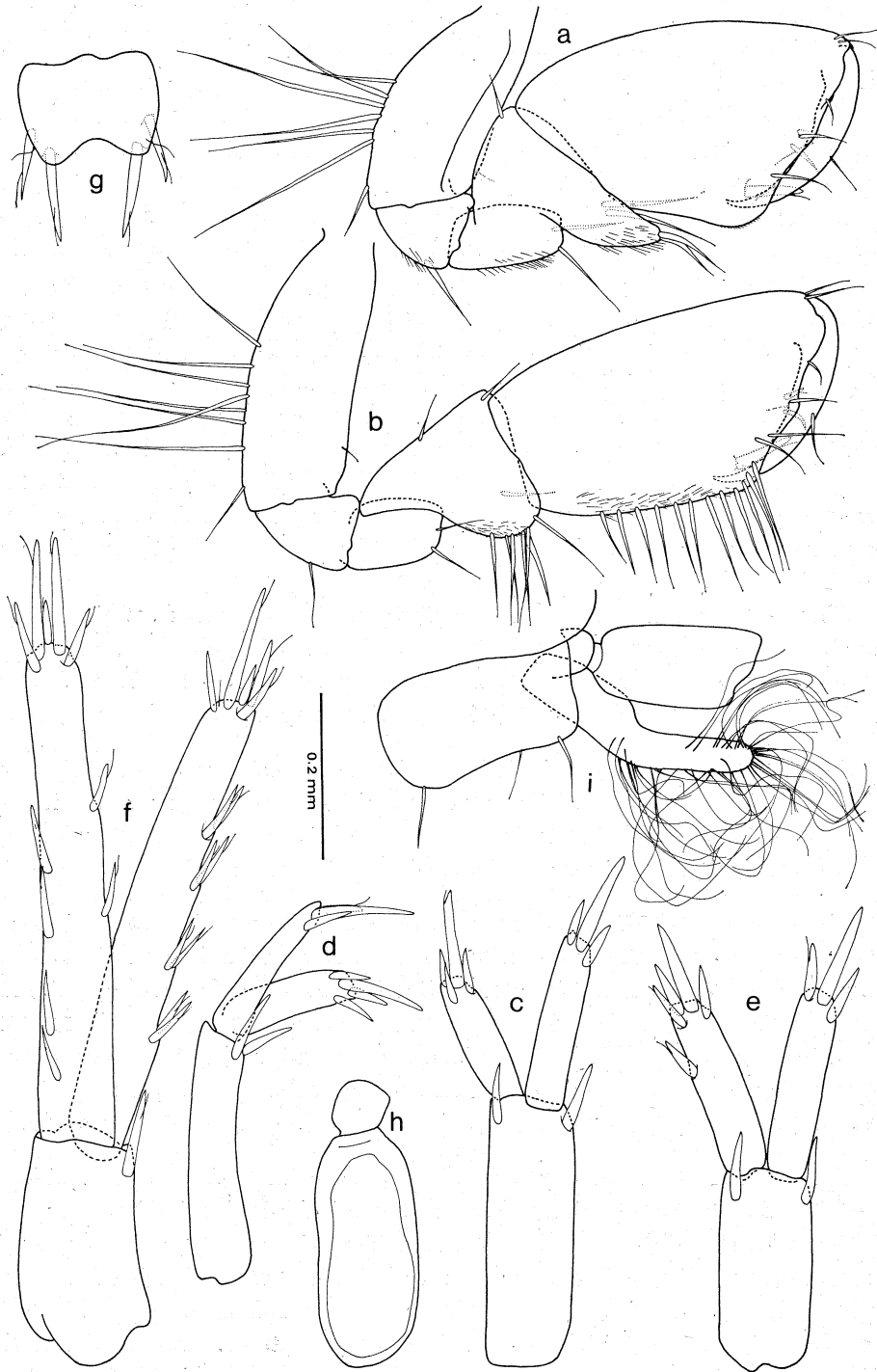


Fig. 13. — *Bogidiella holsingeri* n.sp., paratypi ♀♀ :

a) right gnathopod I; b) right gnathopod II; c) right uropod I; d) left uropod I; e) right uropod II; f) left uropod III; g) telson; h) branchial appendage of the right pereopod IV; i) coxa, oostegite and branchial appendage of the left pereopod IV; a, b, c, e, h) paratypus 347; d, f, g) paratypus 350; i) paratypus 342).

narrow and elongated; maxillae I are provided with comb-like pluridentate spines, the inner ones being straight, the outer ones curved and comb-like on the concave side; also the mandibles are narrow and prolonged downwards and the labrum is very thick; the head appears much shortened and thickened, on account of a considerable shift forward of the buccal pieces, which are almost contained between the bases of antennae II. In *B. tabascensis* and *B. sbordonii*, on the other hand, the head appears normally elongated and especially the maxillipeds are longer, while maxillae I and II are decidedly shorter and broader and placed further back and the mandibles are shorter.

In common with *B. arganoi*, the new species *B. holsingeri* also has "rasp-like" differentiated spines on uropod I: a single highly modified spine in the ♂ of *B. holsingeri*, various spines in the only specimen of *B. arganoi* (probably ♂, in view of the complete absence of oostegites). It differs sharply from the latter, not only in uropod I but also in its far greater size, in the more slender and elongated shape of the body, in the far shorter antennae, in the accessory flagellum of antennae I (which is 3-anticutate in *B. arganoi*), in the completely different form of the gnathopods and in the retinacula shaped like a pluridentate harpoon.

Moreover, it is easily distinguishable from *B. tabascensis* and *B. sbordonii* not only on account of the above-mentioned form of the gnathopods and the uropods but also by the buccal apparatus with shorter maxillipeds, the comb-like pluridentate spines of the outer lobe of maxilla I (certain of the spines in *B. tabascensis* are pluridentate, but with much shorter teeth, whereas they are unidentate in *B. sbordonii*), the shorter antennae, the more markedly spiny pereopods, and pleopods I and II without differentiate setae in the ♂. Furthermore, *B. holsingeri* differs, particularly from *B. tabascensis*, in the form of the branchial appendages, which are rounded in the latter, cylindrical in the former, of the telson, which in the latter is plurispinose and with sexual dimorphism, and of the oostegites, which have far longer and more slender setae in the former; on account of the form of the oostegites it also differs from *B. sbordonii*, in which, moreover, there are oostegites only on pereopods III, IV, V, being absent on gnathopods II.

CONSIDERATIONS ON THE CENTRAL AMERICAN SPECIES OF THE GENUS *BOGIDIELLA*

The four Central American species of the genus *Bogidiella* known today are clearly distinct from one another on account of a series of morphological characteristics described and discussed in the previous pages. The more important characteristics that distinguish the four separate species are shown in the comparative table below, in order to give a clearer picture of the differences that exist between them.

TABLE.

<i>tabascensis</i>	<i>sbordonii</i>	<i>arganoi</i>	<i>holsingeri</i>
Length 3,5-4,6 mm	Length 5-7 mm	Length 2 mm	Length 3,5-4,5 mm
Subcircular gills	Subcylindrical gills	Subcylindrical gills	Subcylindrical gills
Oostegites on II-V legs	Oostegites on III-V legs	?	Oostegites on II-V legs
Antenna I: flagellum 8-articulate accessory flag. 2-articulate, shorter than 2 first art. of flagellum	Antenna I: flagellum 11-articulate accessory flag. 2-articulate, shorter than 2 first art. of flagellum	Antenna I: flagellum 8-articulate accessory flag. 3-articulate, longer than 2 first art. of flagellum	Antenna I: flagellum 8-articulate accessory flag. 2-articulate, shorter than 2 first art. of flagellum
Maxilla I: inner lobe with 3 setae outer lobe with pluridenticate spines	Maxilla I: inner lobe with 2 setae outer lobe with unidenticate spines (excp. inner spine)	Maxilla I: inner lobe with 2 setae outer lobe with all pluridenticate spines	Maxilla I: inner lobe with 2 setae outer lobe with all pluridenticate spines
Maxilliped: palp with art. 2 narrow	Maxilliped: palp with art. 2 narrow	Maxilliped: palp with art. 2 wide	Maxilliped: palp with art. 2 wide
Gnathopod I: basis with 1 long seta propodus pear-shaped palm index 0,42	Gnathopod I: basis with 1 long seta propodus suboval palm index 0,50	Gnathopod I: basis with 1 long seta propodus subtrapezoidal palm index 0,28.	Gnathopod I: basis with 5 long setae propodus subtrapezoidal, lobed palm index 0,38 ♂ and ♀
Gnathopod II: basis with 2 long setae propodus pear-shaped palm index 0,44	Gnathopod II: basis with 1 long seta propodus subtrapezoidal, shorter palm index 0,34	Gnathopod II: basis with 1 long seta propodus subtrapezoidal, longer, without setae on inferior margin palm index 0,32	Gnathopod II: basis with 5-6 long setae propodus subtrapezoidal, longer, with a series of setae on inferior margin palm index 0,36 ♂; 0,32 ♀
Pereopod VII: dactylus stout, shorter than half propodus in length	Pereopod VII: dactylus slender, shorter than half propodus in length	Pereopod VII: dactylus slender, longer than half propodus in length	Pereopod VII: dactylus stout, shorter than half propodus in length

segue: TABLE.

<i>tabascensis</i>	<i>sbordonii</i>	<i>arganoi</i>	<i>holsingeri</i>
Pleopods: vestigial inner ramus, scale-shaped	Pleopods: absolutely vestigial inner ramus, scale-shaped	Pleopods: inner ramus absent	Pleopods: vestigial inner ramus on pleopods I and II, absent on III
♂ with differentiate setae	♂ with differentiate se- tae	?	♂ without differentiate setae
Uropod I: apical spines shorter than rami, without differentiate spines	Uropod I: one apical spine of equal length to rami; without differentiate spines	Uropod I: apical spines shorter than rami; with diffe- rentiate spines	Uropod I: apical spines shorter than rami; ♂ with one differentiate spine on outer ramus
outer ramus shorter than inner	outer ramus subequal to inner	outer ramus shorter than inner	♂ outer ramus much shorter than inner; ♀ shorter than inner
Uropod II: apical spines shorter than rami	Uropod II: one apical spine of equal length that rami	Uropod II: apical spines shorter than rami	Uropod II: apical spines shorter than rami
Telson longer than broad, not incavated, with 3-5 spines on each side, dimorphic	Telson wider than long, incavated, with 2 spi- nes on each side, not dimorphic	Telson wider than long, incavated, with 2 spi- nes on each side	Telson wider than long, incavated, with 2 spi- nes on each side, not dimorphic

In view of the geographical localization of these four species, it was legitimate to suppose that they represented a particular distinct group within the genus, not only on account of common morphological characteristics but also on account of the particular habitat: in fact, three of them are cave-dwelling, whereas, as is known, the majority of the other species of *Bogidiella*—and practically all the European and Mediterranean ones—are mesopsammic and interstitial. One of us (RUFFO, 1963, 1970), as regards this question, had maintained that the cave-dwelling *Bogidiella tabascensis* was so different from all the other species then known as actually to suggest that it represented a different genus. In reality, the discovery of the three new Central American species described in the present work prompts us to revise this opinion considerably.

Apart from the fact that in Central America, besides the larger cave-dwelling forms (4-7 mm), there are now also found to be smaller species of the phreatic waters (*B. arganoi*, 2 mm), many of the characteristics that might have appeared singular in *B. tabascensis* (form of the gnathopods, elongated

and modified scale-like form of the endopodite of the pleopods, presence on these pleopods of setae that are radically transformed, perhaps in relation to the act of copulation, dimorphic and very spiny telson) are not found—or only to a certain extent—in the other species. On the other hand, in these species there appear other peculiarities not present in *B. tabascensis*: propodus of the gnathopods I of an unusual palmate form (*holsingeri*), progressive reduction or total disappearance of the endopodite of the pleopods (*sbordonii*, *arganoi*, *holsingeri*), uropods I dimorphic with extreme reduction of the outer ramus (*holsingeri*), the presence of denticulate spines in the uropods I (rasp-like spines) with probable significance in copulation (*arganoi* and *holsingeri*).

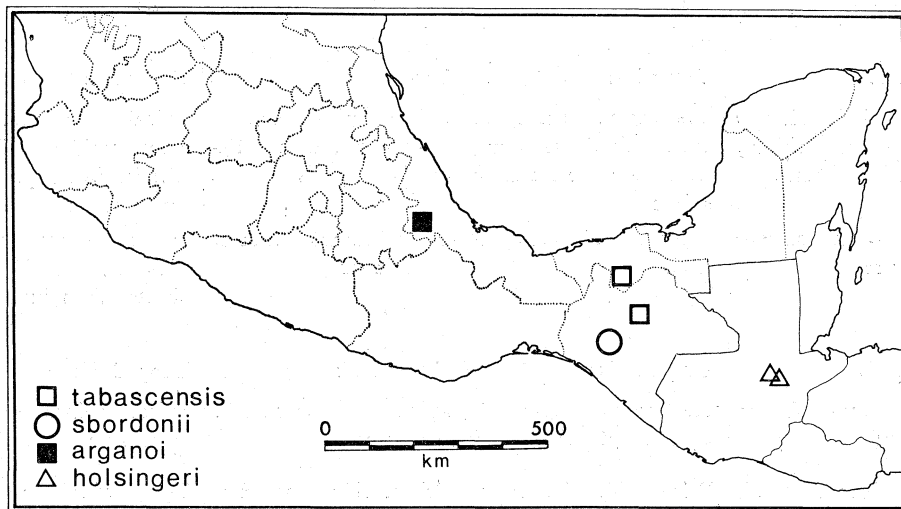


Fig. 14. — Map of the localities at present known of the species of the genus *Bogidiella* in Central America.

It should be noted that all the Central American species (only in the case of *B. arganoi* are we unable to say anything definite, since we know only one specimen, of undetermined sex; though the fact that it shows rasp-like spines on the uropods prompts us to think that it too may be dimorphic) show a fairly marked sexual dimorphism, though often in different appendages: dimensions of the gnathopods, pleopods, uropods I, telson. However, little is known to us for certain regarding the sexual dimorphism of the other species. In each case it seems certain that also in European species there exist sexes that differ very widely from one another, as in the limiting case of *B. vandeli* (COINEAU, 1968).

In conclusion, and with reference to what is so far known to us about the other species of *Bogidiella* (RUFFO, 1973), at present it seems very difficult to identify, within the genus, phyletic lines and hence groups of species having major systematic affinity. In reality the various species present a complex of characteristics that recur in different combinations in the different species described. It is not impossible that the present conclusion may be modi-

fied in the future; however, for this to occur, it will probably be necessary to wait until more species are known and until we have a more or less complete knowledge of all the species and of all those characteristics that have been gradually showing themselves to possess a relevant systematic significance.

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SUMMARY. — Three new species of the genus *Bogidiella* HERTZOG (Crustacea, Amphipoda, Gammaridae) are described from subterranean waters of Mexico and Guatemala.

Two of these species (*sbordonii*, *arganoi*) have been collected during the biospeleological researches in Mexico (1969, 1971) promoted and financed by the Accademia Nazionale dei Lincei. During these researches, also *Bogidiella tabascensis* VILLALOBOS, the only one species hitherto known from Central America, has been found in the type locality (Tabasco, Grutas de Coconà), and also in a new one in the Chiapas state (Grutas de Rancho Nuevo, at 2275 m).

Bogidiella sbordonii n.sp. (Mexico, Chiapas, Cueva de Cerro Brujo) and *Bogidiella holsingeri* n.sp. (Guatemala, Alta Verapaz, Cueva Seamay and Cueva Sepacuite n. 2) are two cave dwelling species, and have a relatively large size (respectively 7 mm and 4,5 mm); *Bogidiella arganoi* n.sp. (Mexico, Veracruz, Paraje Nuevo, well) is a phreatic species and has a relatively little size (2 mm).

The differences between the four Central American *Bogidiella* species are shown in table.

The last part of this work deals with the position of the Central American species within the genus *Bogidiella*, and, as far our present knowledge permits us to see, it is not possible to groups of species, based on systematic relationships, since the *Bogidiella* species have a complex of characters variously combined and recurring within the various taxa just now described.

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