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ERRATUM

In the article by J.H. Stock on Bogidiellidae from Haiti (Stygologia, vol. 1, no. 2) a couple of typographical errors on page 217 have made the diagnosis of the new subgenus Hagidiella incomprehensible. The first lines on p. 217 should run as follows:

Subgenus Hagidiella nov.

Diagnosis.- Subgenus of Bogidiella, with one modified element on the exopodite of pleopod 2 (♂) (exopodite segments itself not modified).....
Distinction.- Resembles the marine subgenus Xystriogidiella. .....
In Xystriogidiella, however, the exopodite of pleopod 2 (♂) has transformed segments, and modified elements are present on uropod 2 (♂) and absent on uropod 1 (♂).

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# BOGIDIELLIDAE (AMPHIPODA) FROM HAITI AND SOME GENERAL RULES ON THE OCCURRENCE OF CRUSTACEA MALACOSTRACA IN INLAND GROUNDWATERS OF THE WEST INDIES*)

BY

JAN H. STOCK

Institute of Taxonomic Zoology, University of Amsterdam, P.O.Box 20125, 1000 HC Amsterdam, The Netherlands

## SUMMARY

Bogidiellid Amphipoda are rare in Haiti, whereas hadziid/weckeliid Amphipoda are common. Only two species of *Bogidiella*, both new, have been found in two out of 242 groundwater samples.

A number of general rules governing the occurrence of malacostracan Crustacea in inland groundwaters of the West Indies are enumerated.

## RÉSUMÉ

Les Amphipodes Bogidiellidae sont rares à Haïti, tandis que le groupe des hadziides/weckeliides y est fort bien représenté. Seulement deux espèces de *Bogidiella*, les deux nouvelles, ont été trouvées dans deux échantillons seulement (d'un total de 242 échantillons prélevés dans les eaux souterraines de Haïti).

On énonce plusieurs lois qui semblent déterminer la présence des Crustacés Malacostracés dans les eaux souterraines "continentales" des Antilles.

## INTRODUCTION

Stygobiont Amphipoda are relatively common and strongly diverse in Haitian groundwaters. They belong mostly to a group of Gammaridae s.l., called hadziids/weckeliids (sensu Barnard & Barnard, 1983): in more than 20% of the stations sampled during the Amsterdam Expeditions to the West Indian Islands, these animals were present, often in large numbers (Table II). On the other hand, a presumably old (at least Mesozoic) suborder of Amphipoda, the Ingolfiellidea, was not found in Haiti, and another old group, the family Bogidiellidae, was encountered in two stations only. So far, not a single hypogean amphipod was recorded from Haiti (or from the island of which Haiti forms the most western part, Hispaniola).

The present paper describes the members of the Bogidiellidae found in Haiti, another publication (Stock, in press) will be devoted to the hadziids/weckeliids.

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*) Amsterdam Expeditions to the West Indian Islands, Report 43

ACKNOWLEDGEMENTS

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Logistic assistance of COHAN (the Haitian-Netherlands organisation for cooperation, Port-au-Prince) and in particular of Mr. and Mrs. G. Desloovere, is gratefully acknowledged.

## SOME GENERAL RULES

In several previous papers, I have developed a number of general rules as to the occurrence of malacostracan Crustacea in "continental" groundwaters of the West Indies (Stock, 1979, 1982, 1983a, 1983b). A study of the stygobiont Amphipoda of Haiti (present paper and in press) has confirmed these general rules:

— Inland-water Thermosbaenaceans occur only on islands West of the Anegada Trench.

— When gammarids (hadziids/weckeliids) are abundant in groundwaters, bogidiellids and thermosbaenaceans are scarce or absent (Table I).

TABLE I

The occurrence of hadziids/weckeliids and bogidiellids in "continental" groundwaters of the Antillean islands

Islands from which only hadziids/weckeliids are known:
Aruba, Curaçao, Tintamarre, Anguilla, St. Croix, Cuba, Guadeloupe.
Islands from which only bogidiellids are known:
Margarita, Tortola, St. John.
Islands on which hadziids/weckeliids are predominant and bogidiellids are rare:
Marie-Galante, Barbuda, Puerto Rico, Jamaica, Haiti (see Table II).
Islands on which both hadziids/weckeliids and bogidiellids are rare:
St. Martin.

— On islands which harbour both gammarids and thermosbaenaceans, their distribution patterns show a significant negative correlation.

— On geologically older islands of the Antillean arcs (Greater Antilles minus Jamaica), the hadziid/weckeliid fauna is (very) varied at the generic level.

— On geologically younger islands (Lesser Antilles plus Jamaica), the hadziid/weckeliid fauna is not varied at the generic level. On the youngest islands, only one genus (*Saliweckelia*) is present, on neogene islands two genera may be present (*Metaniphargus* and *Saliweckelia*).

— In islands which have undergone positive tectonic movements (uplift) or sea-level regressions, the groundwater fauna is much more varied than in subsiding islands.
— Power function regressions of island area on number of species of stygobiont Crustacea Malacostraca are linear. Such curves for older islands are not identical to those of younger islands, but run more or less parallel.
— Ingolfiellidea occur only on old continental plates (e.g. the South American plate) and on Antillean islands near such plates (viz. Aruba, Curaçao, Bonaire, Margarita, Los Testigos), but are absent on the remaining, more oceanic, islands of the Antillean arcs.
(The expression "younger" or "older" for an island, is defined for this purpose as the period elapsed since its permanent emergence above sea-level.)

## Taxonomic part

Bogidiellidae are considered an old family, that has reached the greater part of its present-day distributional range before the break-up of Pangaea (Stock, 1981). Presence or absence of certain inland-water genera and subgenera of the Bogidiellidae on the islands of the West Indies, can provide evidence for the geological history of the island. If a given island is a fragment of some continental plate, one would expect a different bogidiellid fauna than on, for instance, oceanic islands.

TABLE II

Relative abundance of hadziid/weckeliid Amphipoda and relative scarcity of bogidiellid Amphipoda in Haitian "continental" groundwaters

| | | |
|---|---|---|
| Number of stations sampled in Haiti (1978/79) | 242 | |
| Number of stations containing hadziids/weckeliids | 50 | ( = 20.7 %) |
| Number of stations containing bogidiellids | 2 | ( = 0.8 %) |

In the case of Haiti, only two stations yielded Bogidiellidae (Table II), presumably due to predation by hadziid/weckeliid Amphipoda which are relatively common on the island. One station yielded a new subgenus of the genus *Bogidiella*, and thus provided no useable zoogeographic evidence; another station provided a new member of the subgenus *Mexigidiella*, a subgenus which is diversified in Mexico, and perhaps also on the South American continent. This record is not devoid of zoogeographic interest, since it might indicate a relationship between the island of Hispaniola and the proto-Central American plate. It must be stressed, however, that our knowledge of the bogidiellid taxonomy and distribution may greatly amplify in the near future, in particular when the discovery rate of new taxa in this family continues at the same speed as in the past 20 years.

## Genus *Bogidiella* Hertzog, 1933

The two species found in Haiti, both have a proximal, digitiform process on the molar of the left and right mandible. This process has, as far as I know, never been described in any other species of *Bogidiella.*

## Subgenus *Mexigidiella* Stock, 1981

### *Bogidiella (Mexigidiella) hamatula* n. sp. Figs. 1-4

Material.-1 ♂ (holotype), 1 ♀ (allotype), and 28 paratypes. Amsterdam Expedition to the West Indian Islands, Stn. 79-656. Haiti: département de la Grande Anse, Rivière de la Grande Anse at Fondelain, about 1 km above Marfranc (18°34′44″N 74°13′12″W); interstitia of coarse sand and fine gravel under large stones, in a rather large river; chlorinity < 10 mg/l; temperature 26.3°C; 5 Dec. 1979. (ZMA Amph. 107.792).

Description.- Body length of ♂ holotype and ♀ allotype 4 mm, most paratypes smaller. Blind, unpigmented. Urosome dorsally unarmed.

The first antenna (fig. 1a) slightly more than half the length of the body. Peduncle segment 1 with 4 ventral spines, segment 2 as long as segment 1, segment 3 much shorter (35-40% of the length of segment 2). Accessory flagellum (fig. 1b) 3-segmented, longer than the 3rd peduncle segment. Flagellum 17-segmented in the holotype, with a long aesthete on each segment.

Second antenna (fig. 1c) somewhat shorter than the first. Gland cone short and robust. Peduncle segments 4 and 5 slender. Flagellum 5-segmented.

Mandible palp (fig. 1e) 3-segmented; segment 1 unarmed; segment 2 with bulging lower margin, armed with 3 setae; segment 3 narrow, somewhat shorter than segment 2, armed with 1 subterminal and 3 terminal setae. Mandibular body reduced; left incisor blade nearly straight; with 3 small teeth, right incisor with 2 larger teeth (figs. 1d, e); right lacinia mobilis bicuspidate, finely toothed; left lacinia a broad plate bearing several large, irregular teeth; molar small, with a finger-shaped, bent, proximal projection on both sides, bearing (at least on the right side) a short seta. Two flat setae between the lacinia and the molar.

First maxilla (fig. 1f): palp 2-segmented, 2nd segment with 3 terminal setae. Outer lobe with 6 spines, armed with 3, 2, 7, 1, 7, and 1 medial denticles, respectively, and with 1 heavy, more setiform, element, barbed on both margins. Inner lobe ovate, with 3 terminal spines and some medial cilia.

Second maxilla (fig. 2a): outer lobe with 8 setae, arranged in 2 rows; inner lobe with 5 heavier, ciliated setae.

Maxilliped (fig. 1g): inner lobe with 2 bicuspidate terminal spines; outer lobe very small, with 3 terminal spines. Claw of palp long.

Coxal plates small, much wider than high.

First gnathopod (fig. 2b): posterior margin of basis with 3 setae, anterior margin with 3 small setules only; carpus produced into a strong, pointed, posterior projection; propodus elongate-ovate (palmar index, sensu Ruffo,

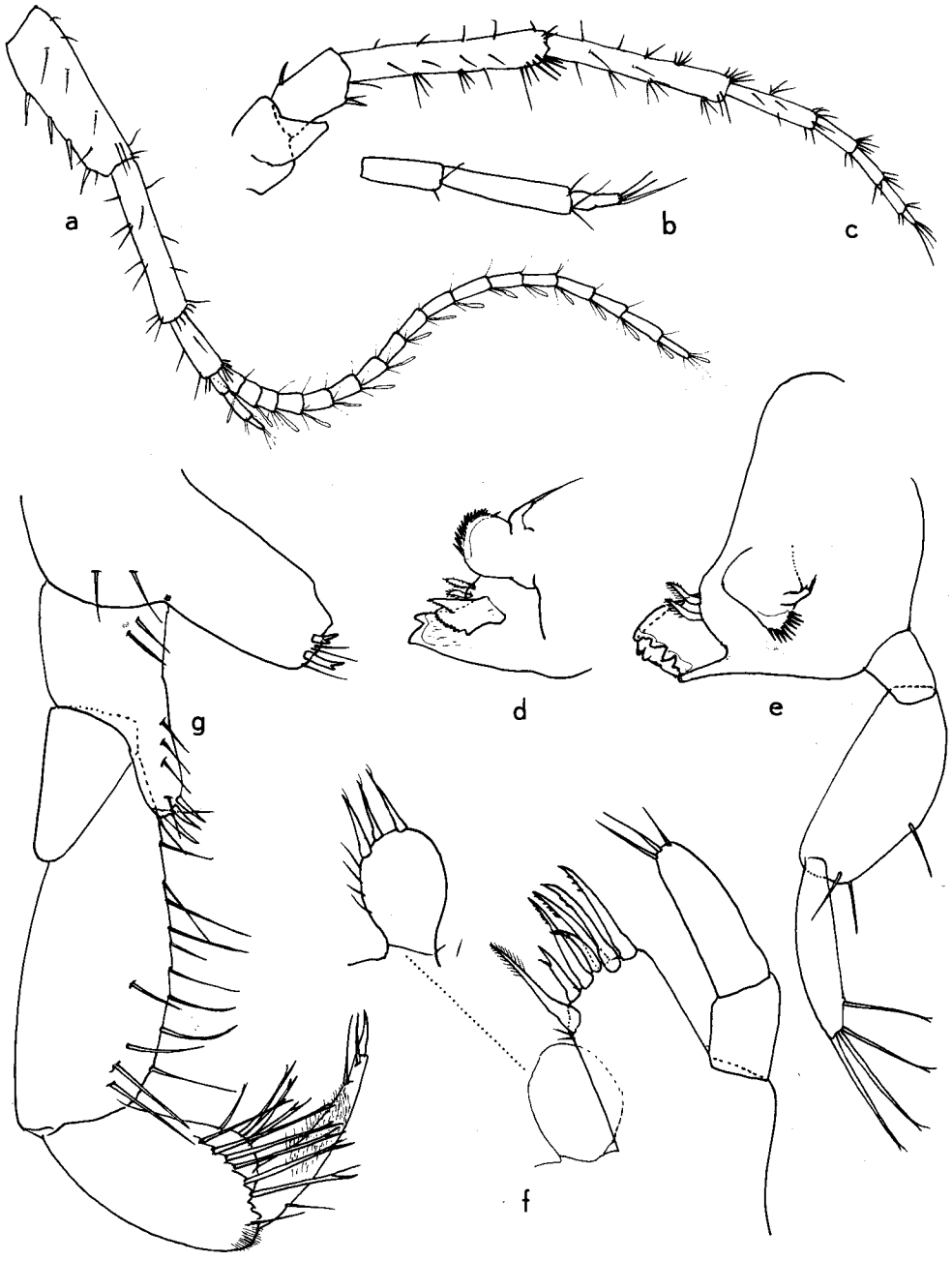


Fig. 1. *Bogidiella* (*Mexigidiella*) *hamatula* n. sp., ♂. a, first antenna (scale *xy*); b. accessory flagellum of first antenna (*pr*); c, second antenna (*xy*); d, right mandible (palp omitted) (*pr*); e, left mandible (*pr*); f, first maxilla (*ps*); g, maxilliped (*pr*). Scales on fig. 3.

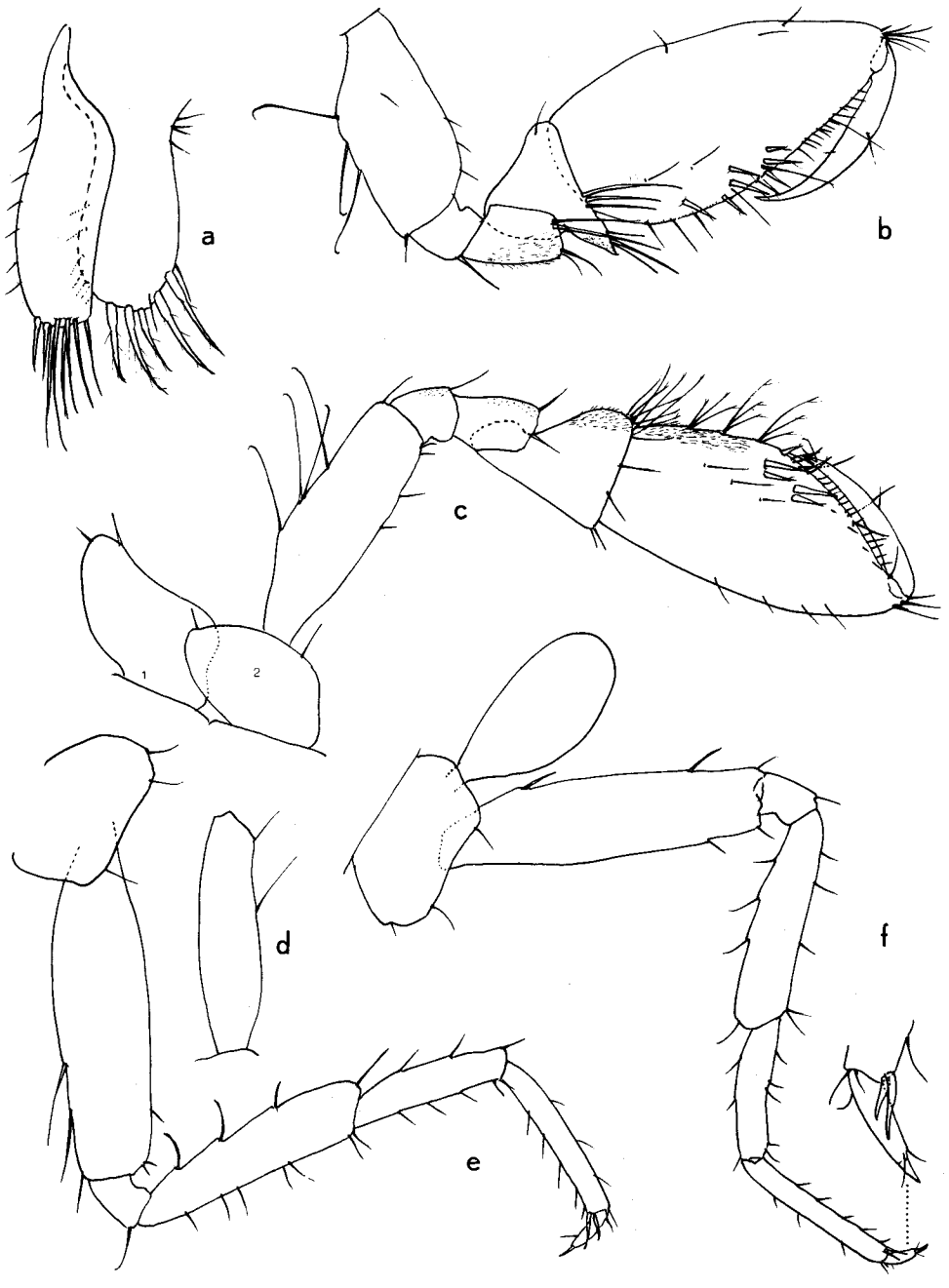


Fig. 2. *Bogidiella* (*Mexigidiella*) *hamatula* n. sp. a, second maxilla, ♂ (scale *ps*); b, first gnathopod, ♂ (*xz*); c, second gnathopod, and coxal plates 1 and 2, ♂ (*xz*); d, oostegite of gnathopod 2, ♀ (*pr*); e, third pereiopod, ♂ (*xz*); f, fourth pereiopod, ♂ (*xz*). Scales on fig. 3.

1973, 1.97 in both sexes); posterior margin with 1 spine; palmar angle with 3 spines in ♂, or 2 spines in ♀; palmar margin with 4 spines in its proximal part and a row of short setae in its more distal part.

Second gnathopod (fig. 2c): posterior margin of basis with 4 setae, anterior margin with 4 short setules; carpus without pointed projection; propodus slightly smaller than that of P1; palmar angle with 2 spines; moreover 2 + 2 spines (♂) or 1 + 2 spines (♀) near the palmar angle; palmar margin with a row of fine setules; palmar index 2.08 (♂), or 2.20 (♀).

Third and fourth (fig. 2f) pereiopods as illustrated. Coxal gills club-shaped, on P4 to P6. Oostegites narrow, with 0, 1, or 2 setules, on P2 to P5 (fig. 2d).

Fifth pereiopod (fig. 3a): coxal plate anterolobate. Sixth pereiopod lacking in the holotype and allotype, but present in one of the smaller paratypes (fig. 3c): coxal plate likewise anterolobate (fig. 3b). Seventh pereiopod (fig. 3e) long, characterized by long setae on the propodus; coxal plate anterolobate (fig. 3d). No lenticular organs.

Pleopods 1 to 3 (♀) with long, unarmed peduncle, 3-segmented exopodite and 1-segmented endopodite, the latter with 1 seta; similar in morphology to pleopod 3 (♂), see fig. 4c. Retinacula with 2 teeth (fig. 4a), two on each pedunculus.

Pleopod 1 (♂) (fig. 4a): lateral element on exopodite segment 1 transformed, shorter than the usual seta, slightly downcurved, and with cilia on its proximal margin only (instead of on both margins).

Pleopod 2 (♂) (fig. 4b): 2nd exopodite segment shortened; lateral elements on exopodite segments 1 and 2 transformed into somewhat hook-shaped, short structures with peculiar ornamentation, especially in the element of segment 2. On the tip of the 2nd pleopods, the holotype carries a cluster of slimy, spirally threads, that may be spermatophores to be transferred to the female.

Pleopod 3 (♂) (fig. 4c) and all male endopodites unmodified.

Epimeral plates (fig. 3f) unarmed, posteroventral corners produced into a minute point.

Uropods not sexually dimorphous. Uropods 1 (fig. 3g) and 2 (fig. 3h): exopodite a trifle shorter than the endopodite, both rami with 2 to 3 dorsal spines and several terminal spines. Peduncle of uropod 1 longer than the rami, with proximoventral spine. Uropod 3 (fig. 4d) aequiramous; exopodite armed with spines on lateral margin and with plumose setae on medial margin; endopodite armed with spines only.

Telson (fig. 3i) not sexually dimorphous, wider than long, distal margin very slightly concave; armature consisting of 2 pairs of long spines.

Derivatio nominis.- The specific name, *hamatula* (Latin, bearing small hooks) alludes to the 2 hook-shaped elements on the second male pleopod.

Remarks.- In accordance with the subdivision of *Bogidiella* into subgenera (Stock, 1981; Karaman, 1982b), the present species falls within the subgenus *Mexigidiella* Stock, 1981, characterized by the absence of sexual dimorphism in

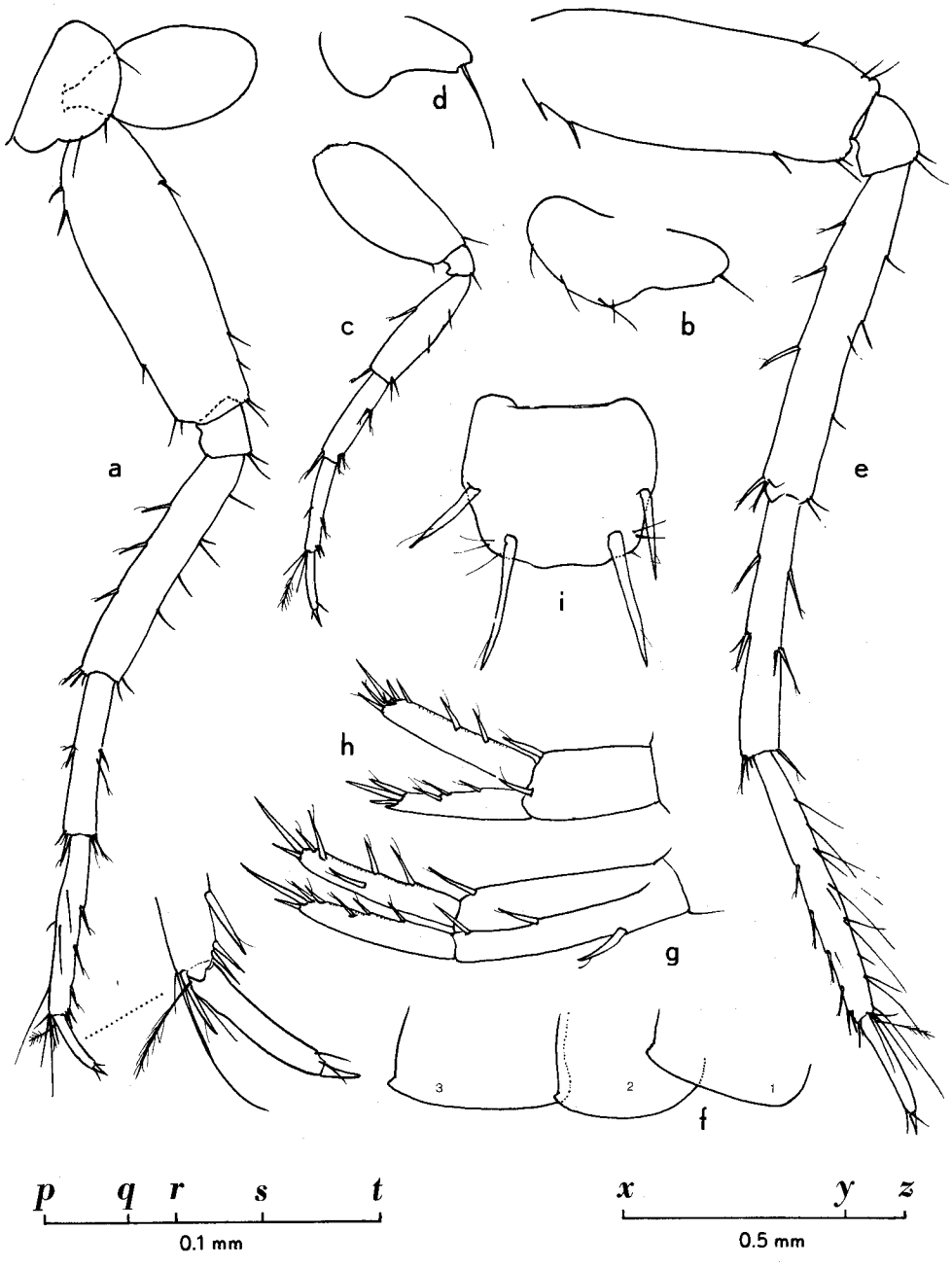


Fig. 3. *Bogidiella* (*Mexigidiella*) *hamatula* n. sp. a , fifth pereiopod, ♂ (scale *xz*); b, coxal plate of sixth pereiopod, ♂ (*xz*); e, sixth pereiopod, ♀ (*xz*); d, coxal plate of seventh pereiopod, ♂ (*xz*); e, seventh pereiopod, ♂ (*xz*); f, epimeral plates 1 to 3, ♂ (*xy*); g, first uropod, ♂ (*xz*); h, uropod 2, ♂ (*xz*); i, telson, ♂ (*pr*). Each of the scales *pq*, *pr*, *ps*, and *pt* represents 0.1 mm; each of the scales *xy* and *xz* represents 0.5 mm.

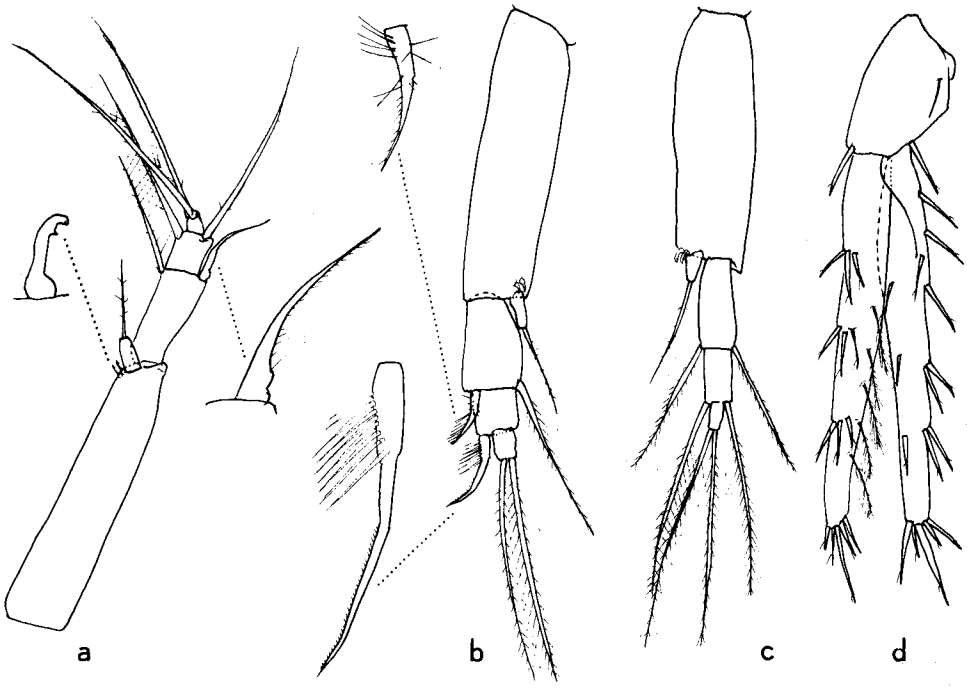


Fig. 4. *Bogidiella* (*Mexigidiella*) *hamatula* n. sp. a, first pleopod, ♂ (scale *xz*); b, second pleopod, ♂ (*xz*); e, third pleopod, ♂ (*xz*); d. third uropod, ♀ (*xz*). Scales on fig. 3.

the uropods, and the presence of sexual dimorphism in the first and second pleopods.

To the subgenus *Mexigidiella* belong with certainty four species: *B.* (*M.*) *tabascensis* Villalobos, 1961, *B.* (*M.*) *sbordonii* Ruffo & Vigna, 1973, *B.* (*M.*) *chitalensis* Karaman, 1982, and *B.* (*M.*) *mexicana* Karaman, 1982. *Bogidiella cooki* Grosso & Ringuelet, 1979, known from ♀ ♀ only, might or might not belong in this subgenus, *Bogidiella purmamarcensis* Grosso & Ringuelet, 1979, was transferred by Karaman (1982a, 1982b) to the genus *Eobogidiella*, which seems to be a justified decision. The four certain members of *Mexigidiella* all are from cave waters in Mexico; *B. cooki*, if belonging at all to this subgenus, was described from river alluvia in Argentina.

The present Haitian species differs from all Mexican forms of *Mexigidiella* by the presence of a well-individualized, setiferous pleopodal endopodite (absent or non-setiferous in the Mexican forms), and spiniferous dorsal margins of uropods 1 and 2 (unarmed in the Mexican forms). From all Mexican forms and from *B. cooki*, the new species differs in a more slender propodus of gnathopod 1, and in the presence of a well-developed, 3-segmented (instead of a small, 2-segmented) accessory flagellum of the first antenna.

## Subgenus *Hagidiella* nov.

Diagnosis.- Subgenus of *Bogidiella*, with one modified element on the exopodite of pleopod 1 (♂) (exopodite segments itself not modified), and with modified elements on exopodite and endopodite of uropod 1 (♂) (rami itself not modified).

Distinction.- Resembles the marine subgenus *Xystriogidiella* Stock, 1984, from the Great Barrier Reef, in the presence of modified elements on pleopods and uropods of the male. In *Xystriogidiella*, however the pleopodal exopodite has transformed segments, and the modified elements are present on pleopod 2, absent on pleopod 1.

Type-species: *Bogidiella* (*Hagidiella*) *prionura* n. sp.

Derivatio nominis.- *Hagidiella* (gender feminine) is a contraction of the name of the locus typicus, Haiti, and the generic name *Bogidiella*. The specific name is composed of the Greek words πρίων ( = saw) and οὐρα ( = tail), alluding to the saw-like elements on the first male uropod.

### *Bogidiella* (*Hagidiella*) *prionura* n. sp. Figs. 5-8.

Material.- 1 ♂ (holotype), 1 ♀ (allotype), 1 ♀ (paratype). Amsterdam Expeditions to the West Indian Islands, Stn. 79-639. Haiti: département de la Grande Anse, Berquer well at Jérémie (rue Paul Emile Jeanmichel), about 100 m from the sea (18°38′32″ N 74°07′05″ W); open clean well, chlorinity variable (131 mg/l at the moment of sampling); temperature 26.2°C; well 4 m deep, water depth 0.8 m; 1 Dec. 1979. (ZMA Amph. 107.793).

Description.- Body length (♀, ♂) 2 to 2½ mm. Blind, unpigmented. One or two dorsal setules on thoracomeres 1 to 7, pleomeres 1 to 3, and uromere 1; no dorsal spines.

First antenna (fig. 5a) as long as the second, slightly less than half the length of the body. First peduncle segment with a strong ventrodistal spine; second segment shorter than first; third much shorter. Accessory flagellum (fig. 5b) 2-segmented, slightly shorter than the 3rd peduncle segment. Flagellum 7-segmented; aesthetes almost as long as the corresponding segment, present on segments 3 through 6.

Second antenna (fig. 5c): gland cone narrowly pointed; flagellum 5-segmented.

Upper lip (fig. 5d) more than 1½ times as wide as long; free margin slightly concave.

Mandibles (figs. 5e, f): pars incisiva (left, right) with 4 coarse teeth. Lacinia mobilis with 2 or 3 coarse teeth (left) or with 1 large and 6 small teeth (right). Molar exceptionally small, armed with 3 to 5 spinules and a bent, thumb-like process ending into a short seta. Proximad of the lacinia, 2 or 3 flat spines and a row of fine cilia are implanted. Palp 3-segmented; segment 1 unarmed; segment 2 with a swollen inferior margin, distally with 1 seta; distal segment the longest, with 4 (sub)terminal setae (fig. 5g).

Lower lip (fig. 5h) with rather small lateral lobes and a broad, uncleft, medial plate.

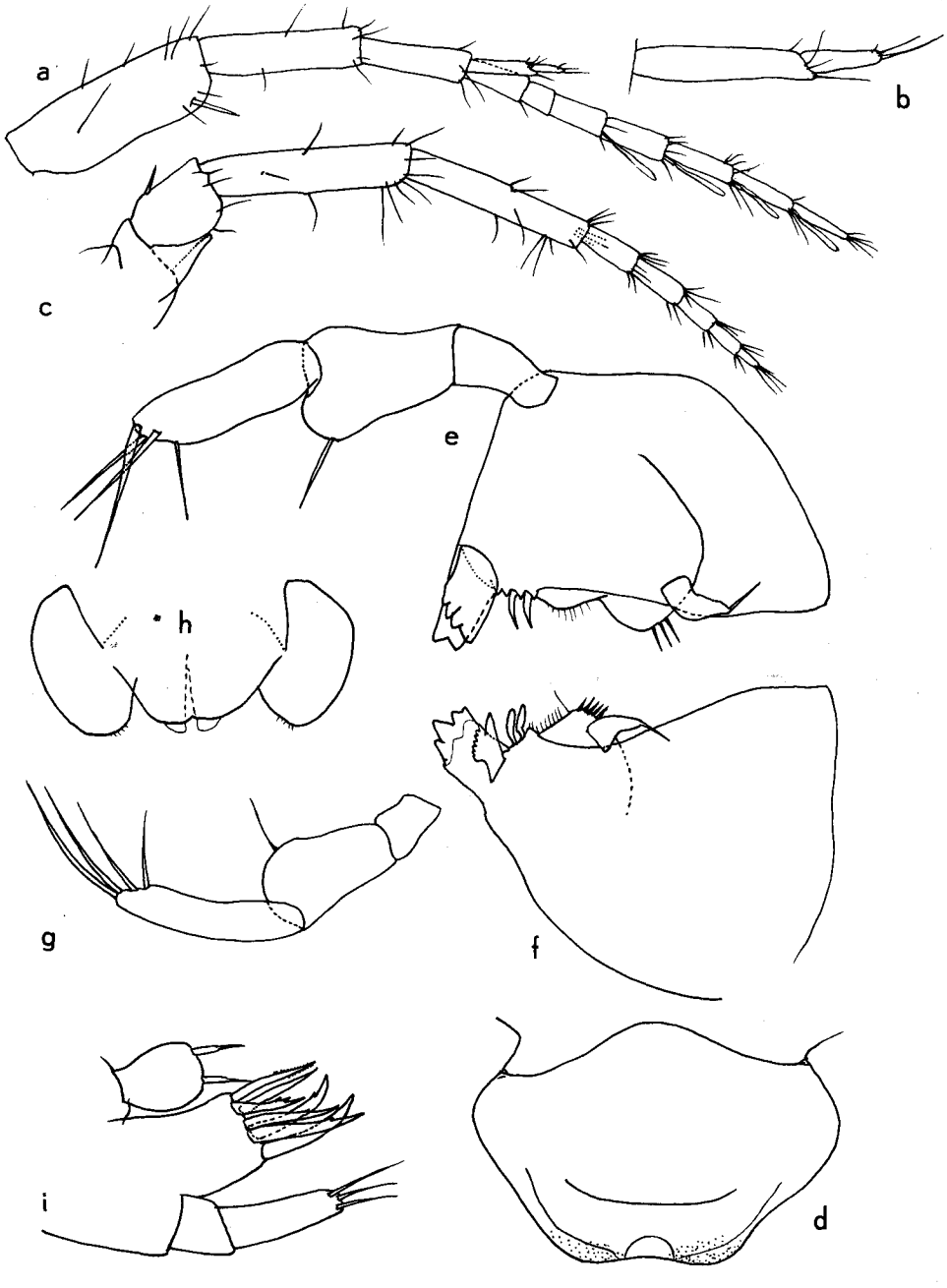


Fig. 5. *Bogidiella* (*Hagidiella*) *prionura* n. sp. a, first antenna, ♀ (scale *pq*); b, accessory flagellum of first antenna, ♀ (*ps*); c, second antenna, ♀ (*pq*); d, upper lip, ♂ (*pt*); e, left mandible, ♂ (*pt*); f, right mandible, ♂ (palp omitted) (*pt*); g, mandible palp, ♀ (*ps*); h, lower lip, ♀ (*ps*); i, first maxilla (*pt*). Scales on fig. 3.

First maxilla (fig. 5i): palp 2-segmented, distally with 3 setae; outer lobe with 7 spines, the medialmost of which with numerous minute barbs on both margins, the others with 2, 1 or 0 medial teeth (from medial to lateral: 0, 2, 1, 1, 0, 1); inner lobe ovate, with 2 distal spines.

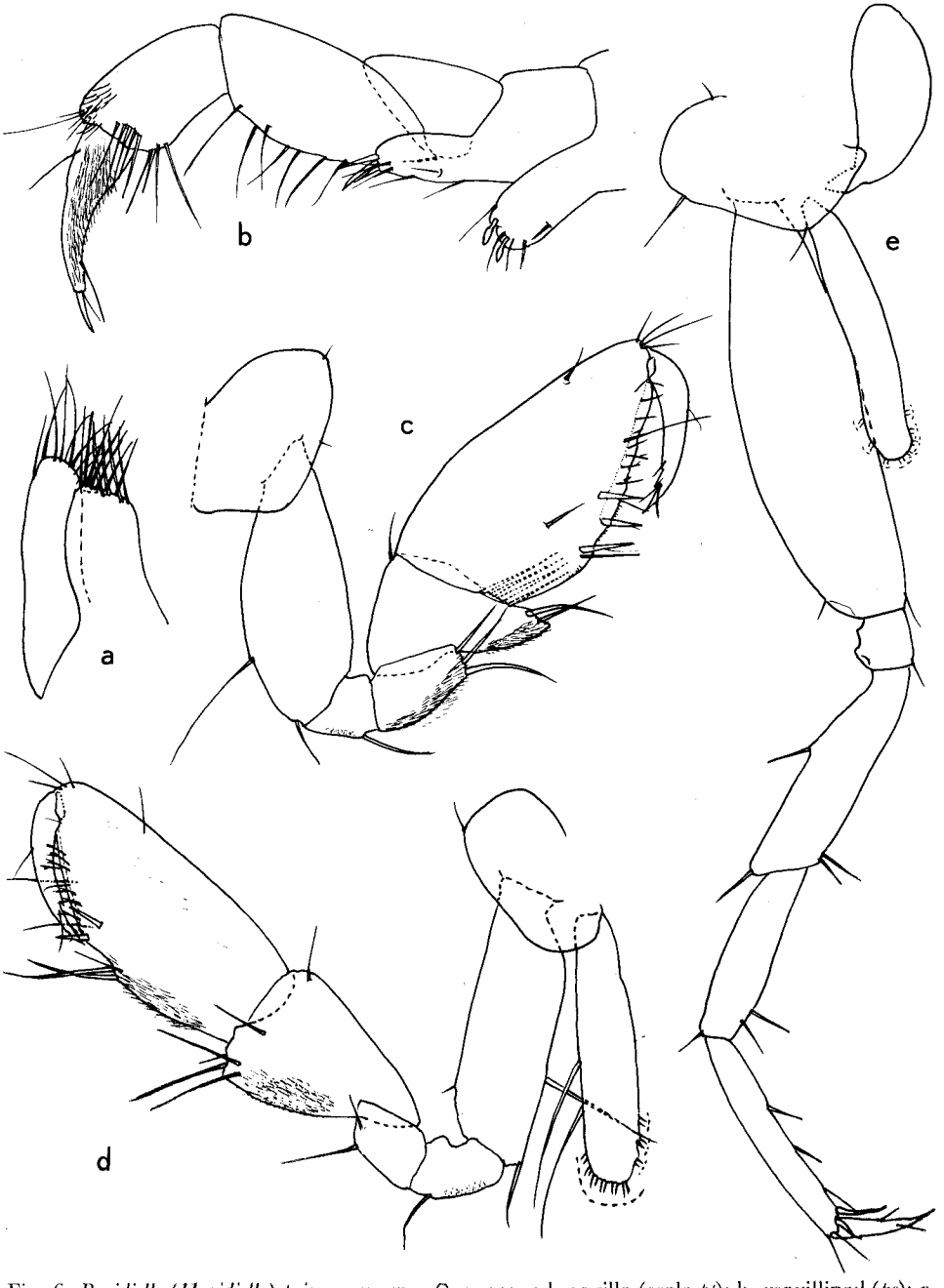


Fig. 6. *Bogidiella* (*Hagidiella*) *prionura* n. sp., ♀ .a, second maxilla (scale *pt*); b, maxilliped (*ps*); c, first gnathopod (*pr*); d, second gnathopod (*pr*); e, fourth pereiopod (*pr*). Scales on fig. 3.


Fig. 7. *Bogidiella* (*Hagidiella*) *prionura* n. sp. a, fifth pereiopod, ♀ (scale *pr*); b, sixth pereiopod, ♀ (*pr*); c, coxal plate of seventh pereiopod, ♀ (*pr*); d, epimeral plates 1 to 3, ♂ (*pr*); e, telson, ♀ (*ps*). Scales on fig. 3.

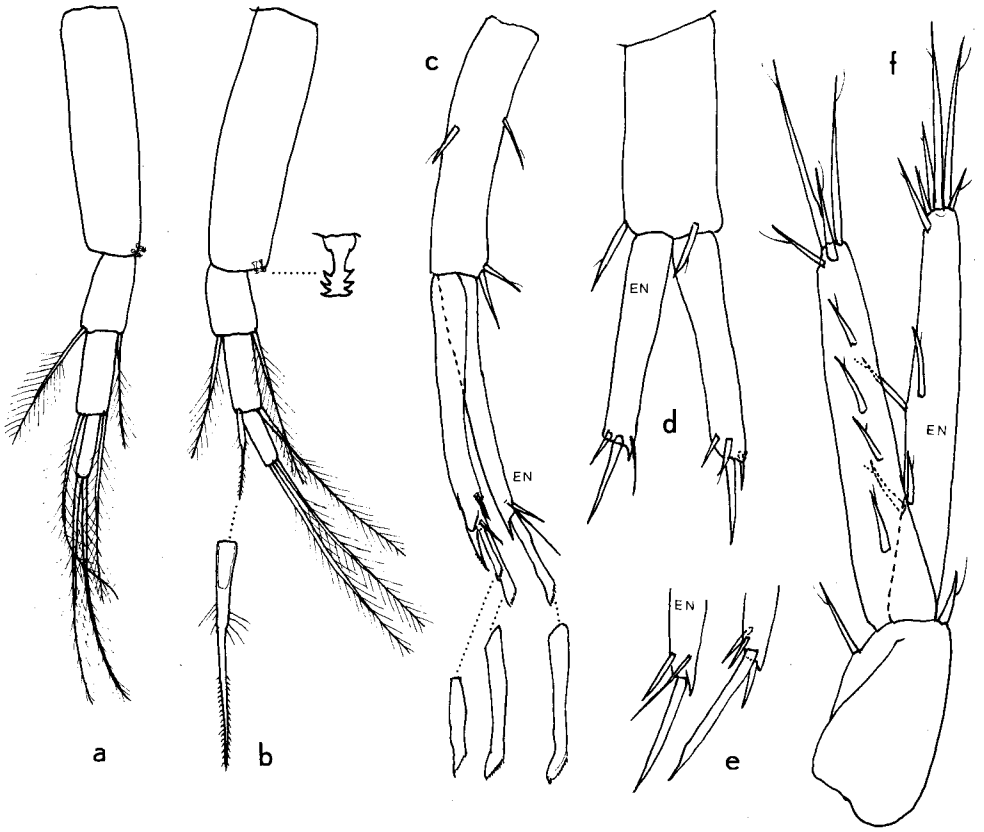


Fig. 8. *Bogidiella* (*Hagidiella*) *prionura* n. sp. a, first pleopod, ♂ (scale *pr*); b, second pleopod, ♂ (*pr*); c, first uropod, ♂ (*ps*); d, second uropod, ♂ (*ps*); e, tip of first uropod, ♀ (*ps*); f, third uropod, ♀ (*pr*). EN = endopodite. Scales on fig. 3.

Second maxilla (fig. 6a) of 2 lobes, each with 7 or 8 distal setae.

Maxilliped (fig. 6b): inner plate small, distally with 2 flat, simple spines and 4 setae; outer plate small, with 2 slender spines and some setae; palp 3-segmented; claw long, curved.

Coxal plates small, narrow.

First gnathopod not sexually dimorphous (fig. 6c). Basis: posterior margin with 2 setae, anterior margin unarmed. Carpus with strong, pointed, posterior projection. Propodus with long palmar margin, armed with 3 spines near and in front of the palmar angle; palmar index 0.50-0.51 (♀, ♂).

Second gnathopod (fig. 6d): armature basis as in P1; carpus triangular, without projection. Propodus with short palma; palmar angle with 2 spines; palmar index 0.42-0.44 (♀, ♂).

Oostegites narrow, tip rounded, most setae fallen off (fig. 6d).

Coxal gills in P4 through P6, small, slightly pedunculate, elongate oval.

Third and fourth pereiopods similar (fig. 6e), scantily armed.

Coxal plates 5 through 7 anterolobate (fig. 7c). Fifth and sixth pereiopods as illustrated (figs. 7a, b); claw very long and slender. Seventh pereiopod lacking in all specimens examined. No lenticular organs.

Epimeral plates (fig. 7d) with unarmed ventral margin; posterior margin with 1 setule; ventroposterior corner produced into a minute tooth.

Pleopods 1 to 3 (♀) unmodified: peduncle long, with 2 mediodistal retinaculae, which each bear 3 to 5 pairs of recurved teeth; inner ramus completely lacking; outer ramus of 3 slender segments, each segment with 2 long, plumose setae.

Pleopods 1 (fig. 8a) and 3 of the male of the same unmodified type. Pleopod 2 (♂) (fig. 8b) with transformed element on the lateral margin of exopodite segment 2; this element (fig. 8b) is not much longer than the segment; its base is strongly sclerotized and bears some long cilia; its distal part is spiniform, stiff, and armed with short barbs.

Uropod 1 (fig. 8c): pedunculus slender, with proximoventral spine; rami slender, subequal; in both sexes the exopodite bears 4 distal spines and a spiniform process, the endopodite 2 spines, 1 seta, and a spiniform process (fig. 8e). However, the two longest exopodite spines and the longest endopodite spine of the male are slightly modified: the spine tip is widened and distodorsally finely serrate (fig. 8c).

Second uropod not sexually dimorphous (fig. 8d); exo- and endopodite subequal, armed with 4 spines and 2 spines + 1 seta, respectively.

Third uropod (fig. 8f) not sexually dimorphous, rami subequal, each ramus with several marginal spines and long distal spines, more numerous on the endopodite; no setae.

Telson $1^3/_4$ × as wide as long; medioterminal margin slightly concave; only 2 long, subdistal spines (fig. 7e); no sexual dimorphism.

Remarks.- Easily distinguishable from the only other Haitian species, described above, by a much shorter flagellum in A1, a 2-segmented (instead of 3-segmented) accessory flagellum, fewer propodal spines in gnathopods 1 and 2, sexually dimorphous first uropods, different modifications in the 2nd male pleopod, etc.

## REFERENCES

BARNARD, J. L. & C. M. BARNARD. Freshwater Amphipoda of the world, 2 vols.: i-viii, 1-830. (Hayfield Associates, Mt. Vernon, Virginia).

KARAMAN, G. S., 1982a. Revision of Bogidiella-group of genera with description of some new taxa (fam. Gammaridae). Poljoprivreda i šumarstvo, **27** (3): 23-44.

——, 1982b. Critical remarks to the recent revisions of Bogidiella-group of genera with study of some taxa (fam. Gammaridae). Poljoprivreda i šumarstvo: **28** (3/4): 31-57.

RUFFO, S., 1973. Contributo alla revisione del genere Bogidiella Hertzog (Crustacea, Amphipoda, Gammaridae). Boll. Ist. Ent. Univ. Bologna, **31**: 49-77.

STOCK, J. H., 1979. New data on taxonomy and zoogeography of ingolfiellid Crustacea. Bijdr. Dierk., **49** (1): 81-96.

——, 1981. The taxonomy and zoogeography of the family Bogidiellidae (Crustacea, Amphipoda), with emphasis on the West Indian taxa. Bijdr. Dierk., **51** (2): 345-374.

——, 1982. Stygobiont Crustacea Malacostraca from geologically older and younger Antillean islands: a biogeographic analysis. Bijdr. Dierk., **52** (2): 191-199.
——, 1983a. Predation as a factor influencing the occurrence and distribution of small Crustacea in West Indian groundwaters. Bijdr. Dierk., **53** (2): 233-242.
——, 1983b. The stygobiont Amphipoda of Jamaica. Bijdr. Dierk., **53** (2): 267-286.
——, 1984. First record of Bogidiellidae (Crustacea, Amphipoda) from the Pacific: Bogidiella (Xystriogidiella n. subgen.) capricornea new species from the Great Barrier Reef. Bull. mar. Sci., **34** (3): 380-385.
——, in press. Stygobiont amphipod crustaceans of the Hazioid group from Haiti. Bijdr. Dierk., **55**.

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