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THE TAXONOMY AND ZOOGEOGRAPHY OF THE FAMILY BOGIDIELLIDAE (CRUSTACEA, AMPHIPODA), WITH EMPHASIS ON THE WEST INDIAN TAXA

by

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ABSTRACT

The diagnosis of a family of groundwater Amphipoda, the Bogidiellidae, is revised. Based on a cladistic analysis, the former genus *Bogidiella* is subdivided. In its present conception, the Bogidiellidae comprise eleven named genera, seven subgenera, and 50 named species, whereas several other taxa remain unnamed. These are distributed over all major continents (except Antarctica), and some oceanic islands. This distribution pattern is presumably due to at least two major vicariant processes: the breakup of Pangaea in the Mesozoic and the geological regression movements in the Tertiary.

A number of West Indian taxa is described, including four new species.

RÉSUMÉ

La diagnose d'une famille d'Amphipodes stygobies, les Bogidiellidae, a été revisée. Basée sur une analyse cladistique, l'ancien genre *Bogidiella* a été divisé. Dans sa conception actuelle, les Bogidiellidae comprennent onze genres nommés, sept sous-genres et 50 espèces nommées, tandis que plusieurs taxa doivent rester inédits. Les Bogidiellidae sont distribués dans tous les continents majeurs (abstraction faite de l'Antarctique), et dans certains îles océaniques. Cette distribution peut s'expliquer par au moins deux causes vicariantes majeurs: la fragmentation de la Pangée dans l'ère Mesozoïque et des mouvements géologiques de régression pendant l'ère Tertiaire.

Un nombre de taxa des Indes Occidentales a été décrit, comprenant quatre espèces nouvelles.

INTRODUCTION

Only two named and three unnamed bogidiellid amphipods were thus far known from the West Indies. The two named species are *Bogidiella bredini* Shoemaker, 1959, from a cave on Barbuda, and *B. martini* Stock, 1978, from wells on Saint Martin. Unnamed taxa have been reported from a sandy marine beach on Curaçao (Stock, 1978), from a cave on Marie-Galante (Stock, 1980b) and from a cave on Bermuda (Sket & Ilife, 1980).

In the present paper, four additional species are named (two from Tortola, and one each from Saint John and Margarita), and several unnamed forms are recorded (from Puerto Rico and Curaçao).

Several authors, above all Ruffo, 1973, have attempted in the past to find some order in the seemingly randomly distributed morphological features of the various members of what is usually considered one genus, *Bogidiella*. The worldwide occurrence of the presumed *Bogidiella*'s and their presence from cold mountain springs (*B. glacialis* at 4° C from an altitude of 1900 m in Yugoslavia) to warm mineral springs (*B. hebraea* at 29° C in Israel) and to infralittoral, marine conditions (*B. tyrrhenica* from a depth of 6 m on Ischia and an unnamed form from 42-51 m in the British Channel), made it, in analogy with similar cases in Amphipoda (the *Gammarus* group, *Ingolfiella*, the hadziids), likely that more than one genus was represented. An analysis, using among others a cladistic approach, of the various character states that occur within the group, brought me to a subdivision of the good old genus *Bogidiella* into 7 subgenera, whereas a couple of other units were separated from it on generic level. Moreover, a number of recently described genera are included in the Bogidiellidae. The careful and illuminating treatment by Ruffo of the 19 named taxa known in 1973, has been a most valuable tool for the start of my own work. In the present work, 50 named taxa (not counting synonyms) have been used for the construction of a cladogram (see

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table I). This steep augmentation in number of taxa shows clearly that our knowledge of the hypogean amphipods has increased explosively in the last decade, in particular that of non-European taxa.

THE BOGIDIELLIDAE HERTZOG, 1936

Essentially, I agree with Barnard & Karaman's outspoken opinion (1980: 12) that the bogidiellids are "not worth superfamily distinction" and represent only "a weak cluster".

For the moment, I have retained the bogidiellids as a family, characterized by a combination of characters, all of which, however, are not always present in every unit on generic level. Such characters are: absence of eyes; elongated, vermiform body (exceptions: *Spelaeogammarus, Artesia*); coxal plates wider than long and not or hardly overlapping (exceptions: again *Spelaeogammarus* and *Artesia*); reduction of the number of coxal gills to three pairs (exceptions: *Dussartiella, Bollegidia, Parabogidiella, Artesia, Pseudingolfiella, Kerguelenicola*) associated with P4, P5, and P6; propodus of gnathopod 2 smaller than (rarely subequal to) that of gnathopod 1; carpus of gnathopod 1 with a distoposterior projection (exceptions: *Kerguelenicola, Dussartiella, Pseudingolfiella*); uropod 3 biramous, magniramous (exceptions: *Dussartiella, Pseudingolfiella*), with a 1-segmented exopodite (exception: *Dussartiella*); telson entire, without, or with a shallow, distal notch (exception: *Artesia*); pleopodal endopodite segments fused to a single segment, reduced to a vestige, or entirely absent (exceptions: *Parabogidiella, Artesia*); in the more apomorphous genera, the pleosomal and/or urosomal appendages have been modified, presumably for sperm transfer; oöstegites with limited (terminal) setation only; accessory flagellum short, 1- to 3-segmented; no calceoli on A2; mandible palp usually 3-segmented, but in some genera in reduction; mandible palp segment 3, if present, with relatively simple armature; sexual differences in the gnathopods feeble, in other pereiopods absent (exception: *Orchestigidiella*); no sternal gills.

It remains to be seen if this combination of characters, many of them not synapomorphous, forms sufficient basis for delimiting the Bogidiellidae as a family. The discovery of several new taxa outside the Tethyan area in the last few years has not facilitated the diagnosis of the Bogidiellidae.

In the above conception, 50 named species or subspecies (not counting synonyms) belong to the family. On the basis of our phylogenetic interpretations (see section on cladistics) we have arranged these 50 species in 11 genera, one of which is subdivided in 7 subgenera (see table I).

TABLE I

Named, valid genera and subgenera in the family Bogidiellidae, and the number of valid species assigned, or provisionally assigned, to each.

1. Genus *Artesia* Holsinger, 1980 (1)
2. Genus *Spelaeogammarus* da Silva Brum, 1976 (1)
3. Genus *Somagidiella* nov. (1)
4. Genus *Parabogidiella* Holsinger, 1980 (1 + 1 unnamed, dubious species)
5. Genus *Bogidiella* Hertzog, 1933
   - Subgenus *Bogidiella* s. str. (16)
   - Subgenus *Medigidiella* nov. (8)
   - Subgenus *Orchestigidiella* nov. (1)
   - Subgenus *Stygogidiella* nov. (4 + 1 unnamed species)
   - Subgenus *Mexigidiella* nov. (4)
   - Subgenus *Guagidiella* nov. (2)
   - Subgenus *Antillogidiella* nov. (1 + 1 unnamed subspecies)
6. *Actogidiella* nov. (1 + 1 unnamed species)
7. *Marigidiella* nov. (3)
8. *Kerguelenicola* Ruffo, 1974b (1)
9. *Bollegidia* Ruffo, 1974a (2)
10. *Dussartiella* Ruffo, 1979 (1)
11. *Pseudingolfiella* Noodt, 1965 (2)

Total: Eleven genera, one with 7 subgenera, lodging 50 named species and 4 unnamed species/subspecies.

Additional Bogidiellidae, not brought to any particular genus or subgenus because of lack of information are known from Ecuador (Sket, 1979), Curaçao in the Antilles (Stock, 1978), Marie-Galante in the Antilles (Stock, 1980b and present paper), the English Channel (Spooner, 1959, 1960), Réunion Island in the Indian Ocean (Ruffo, 1973), Japan (Matsumoto, 1976), and Heron Island on the Great Barrier Reef (unpublished personal observation). These records are not counted in the above table, but they are incorporated in the distribution map (fig. 2).

CLADISTICS

Generalities. — Twenty-three character states (see table II) have been used to construct

a cladogram (fig. 1) for the Bogidiellidae. Several of these character states relate to secondary sexual differences, which presumably play a role in copulation (character 23) or sperm transfer (characters 11 through 16).

It looks disconcerting, at first sight, that one of the genera which has plesiomorphous coxal plates, mesosomal, pleosomal and urosomal appendages, viz. *Artesia*, has apomorphous mouthparts. *Parabogidiella* agrees in mouthparts and body appendages with *Artesia*, but has apomorphous coxal plates. Such cases of mosaic evolution (one set of characters being advanced, another set being retarded) are in reality quite common and do not undermine the utility of cladistic analysis.

A number of apomorphous genera, such as *Pseudingolfiella*, and especially *Dussartiella*, have retained various plesiomorphous character states. I have refrained from giving these genera a separate family or subfamily status, since they are linked by genera like *Bollegidia*, *Marigidiella*, and *Actogidiella* to the cluster of subgenera of *Bogidiella*. The latter cluster is too weakly characterized (by synplesiomorphies only) to be considered a separate (sub)family.

Noteworthy is also that the brackish and marine genera tend to concentrate in the right half of the cladogram, having more numerous apomorphous character states (but *Dussartiella*, a freshwater genus from Madagascar, is an exception). Vice versa, the left half of the cladogram (the more plesiomorphous genera) contains exclusively taxa from continental waters. Two possible ways of explanation for the generally more plesiomorphous nature of the freshwater taxa can be brought forward. First of all, it is possible that the freshwater genera are the original, basic bogidiellids from which the brackish and marine genera have evolved; in other words, the bogidiellids are, according to this concept, a primarily freshwater group. In the second hypothesis, the bogidiellids are of marine origin, having massively invaded the continental waters; after their adaptation to fresh water, they invaded the groundwater, or may be periods of drought or glaciations forced them into the groundwater. In the phreatic environment, competition pressure was much reduced, and the evolution rate slowed down, so that at present the phreatic forms have retained many plesiomorphous character states. I am unable to decide which of these two theories is right. However, it should be pointed out (see also the paragraph on the biogeography of the family) that the bogidiellids appear to be a very old family, which had already spread over the fresh waters of the continents before the break-up of Pangaea. This seems to mean that they were already adapted to freshwater life in the earlier Mesozoic, and that — supposing that these old freshwater taxa evolved from marine ancestors — their ancestors are now extinct. The living marine taxa, rather few in number as compared to the freshwater taxa, might then represent a secondary re-adaptation to (or re-invasion of) the marine environment.

Value of the pleopodal endopodites. — In most bogidiellids, the pleopodal endopodites are reduced to a 1-segmented bud, or they are entirely absent. The distinction between those taxa (species) in which a 1-segmented bud armed with a long seta is present and those in which the bud is absent, is less clear-cut than it looks at first sight. Certain species still have a vestigial bud, but without terminal seta, whereas in some other species (*Bogidiella martini*, *B. vandeli*), the male still has a pleopodal endopodite, while the female is devoid of it. Furthermore, the presence or absence of a pleopodal endopodite seems to be randomly scattered over the generic and subgeneric units as they are defined by other characters used in the cladogram (present, thus plesiomorph, in *Spelaeogammarus*, *Artesia*, *Parabogidiella*, *Dussartiella*, some but not all *Bogidiella* s. str., *Stygogidiella*, *Mexigidiella*, and *Kerguelenicola*; lacking in the females, but not in the males, of certain *Medigidiella* and *Antillogidiella*; absent or vestigial in the others).

Taking this into consideration, I have decided to omit the character states "small", "vestigial" or "absent" of the pleopodal endopodites from the cladogram, but to retain "long" and "short or absent", which results in a classification of the bogidiellids into 11 genera, one of which with 7 subgenera.

Position of some of the bogidiellid genera. — The genus *Dussartiella* Ruffo, 1979, with one species, *D. madagassa*, from a small freshwater spring in Madagascar, shows some suggestive morphological similarities to the classical bogidiellids (structure of A1; reduced, 1-segmented, endopodite on the pleopods; basic telson shape; reduced inner lobe of Mx1; reduced palp on left — though not on right — Mx1; transformed Ur1 and Ur2 ♂). Some of these might be due to convergencies, according to Ruffo, 1979: 438.

Disconcerting characters of *Dussartiella* are the asymmetry of the left and right palp in Mx1, the reduced palp of Md, the absence of an inner lobe on the labium, but most in particular the *Chaetogammarus*-like structure of the Ur3 (exopodite 2-segmented, thus plesiomorphous; endopodite scale-like, thus apomorphous). This latter character notwithstanding, I have endeavoured to place *Dussartiella* in the Bogidiellidae.

Two synapomorphous genera (*Bollegidia* and *Marigidiella*), both from marine habitats, can be distinguished in both sexes by the monomerous condition of the palp of Mx1 (character state 18) and by a varying degree of apomorphy in the sperm transfer mechanisms in Ur1 and Ur2, and Pl1 and Pl2 (character states 11 through 16). *Actogidiella* and *Kerguelenicola* link this group of genera with the *Bogidiella* cluster, in that its first maxilla is "normal", but its uropods 1 and 2 are still modified in both sexes. In *Antillogidiella*, only the first female uropod is modified, whereas in *Guagidiella* the first male uropod is modified.

Pseudingolfiella can be recognized by its apomorphous (uniramous) Ur3.

Three plesiomorphous genera *Artesia, Spelaeogammarus*, and *Somagidiella*) can be recognized in both sexes by the primitive configuration of the coxal plates 1 to 4 (character state 1), but one of them (*Somagidiella*) resembles in all its other characters (except for its Md palp) a generalized *Bogidiella.*

Parabogidiella shares with *Artesia* the plesiomorphous state of the segmented pleopodal endopodites (character state 4).

The remaining taxa can be discriminated only on the basis of secondary sexual characters.

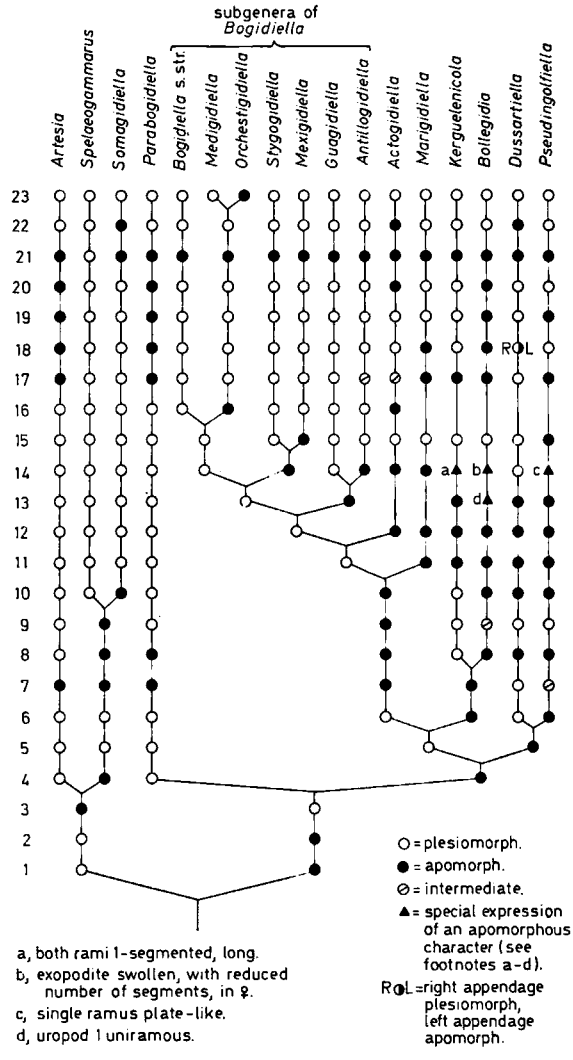

Fig. 1. Cladogram of the eleven genera and seven subgenera of the family Bogidiellidae, based on analysis of 50 species. The numbers 1 to 23 refer to the character states enumerated in table II.

For the moment, I prefer to treat these taxa as subgenera, not because of any philosophical, or phylogenetical consideration, but simply because of the advantage that in cases in which only one of the sexes is known, the animals can at least be attributed to the "mother genus", *Bogidiella*, without reference to a subgeneric name.

A similar solution of divison into genera and subgenera has been employed by Stock (1976) for the suborder Ingolfiellidea of the Amphipoda, and has proved to work quite satisfactory for practical classificatory purposes. The genus *Bogidiella*

TABLE II

Characters of Bogidiellidae used in the construction of the cladogram (fig. 1)

	Plesiomorph	Apomorph
1.	Coxal plates longer than wide, overlapping	Wider than long, not overlapping (at least plates V and VI not overlapping)
2.	Third uropod, exopodite: with median setae/spines	Median armature reduced or absent
3.	Coxal plates I to VI of same height	Increasing in height
4.	Pleopodal endopodites articulated	Unsegmented or absent
5.	Endopodite of uropod 3 long	Short or absent
6.	Pleopodal exopodites 3- to 11-segmented	1- (rarely 2- or 3-) segmented
7.	Exopodite of uropod 3 bimerous	Monomerous
8.	Telson with deep cleft	Cleft shallow or absent
9.	Coxal gills: 5 pairs	3 pairs (= apomorph) or 4 pairs (= intermediate)
10.	Pleopodal endopodites long	Short or absent
11.	Rami of uropod 2 not transformed (for sperm transfer)	Transformed
12.	Rami of uropod 1 not transformed, or transformed in one sex only	Transformed in both sexes
13.	Rami of uropod 1 not transformed in either sex	Transformed in one of the sexes
14.	Pleopod 2: rami not modified for sperm transfer	Exopodite (rarely: endopodite) with modifications
15.	Exopodite of pleopod 1 not modified for sperm transfer	Modified
16.	Distal armature of rami of uropod 2: not modified for sperm transfer	Modified (presence of rasp- or spoon-like spines in ♂)
17.	Inner and outer lobe of maxilliped: large, with setae and spines	Small, with setae only
18.	Palp of maxilla 1: 2-segmented	1-segmented
19.	Inner lobe of maxilla 1: setiferous	Naked
20.	Armature of lobes of maxilla 2: dense setal cover	Setal cover reduced
21.	Posterior margin of coxal plates V and VI with strong posterior lobe, quite different in size from anterior lobe	Posterior lobe not well-developed, (sub)equal in size to anterior lobe
22.	Palp of mandible strong, 3-segmented	Weak (but still 3-segmented), with reduced number of segments, or transformed
23.	Weak or no sexual dimorphism in certain legs (gnathopod 2, pereiopod 7)	Strong sexual dimorphism

thus defined (including its subgenera) is characterized by the combination of an apomorphous character state 1, and a plesiomorphous character state 12. The apomorphous state of character state 12 characterizes the genera *Actogidiella* and *Marigidiella*, which are otherwise close to the *Bogidiella* cluster in the cladogram; at the same time these two genera are differentiated from *Bogidiella* by apomorphies in certain mouthparts (Mx2 = character state 20 in *Actogidiella*; maxilliped = character state 17 in *Marigidiella*).

ZOOGEOGRAPHY OF THE BOGIDIELLIDAE

Mondial distribution. — The distribution of the bogidiellids over the earth's surface has been discussed in several previous publications, most recently by Stock (1978: 112 and fig. 31). The conclusions of the latter treatment, based on 5 genera, 26 species and several unnamed species, are supported by the present-day status (11 genera, 50 named and several unnamed species). The distribution of these taxa is shown in fig. 2. It does not coincide with the boundaries

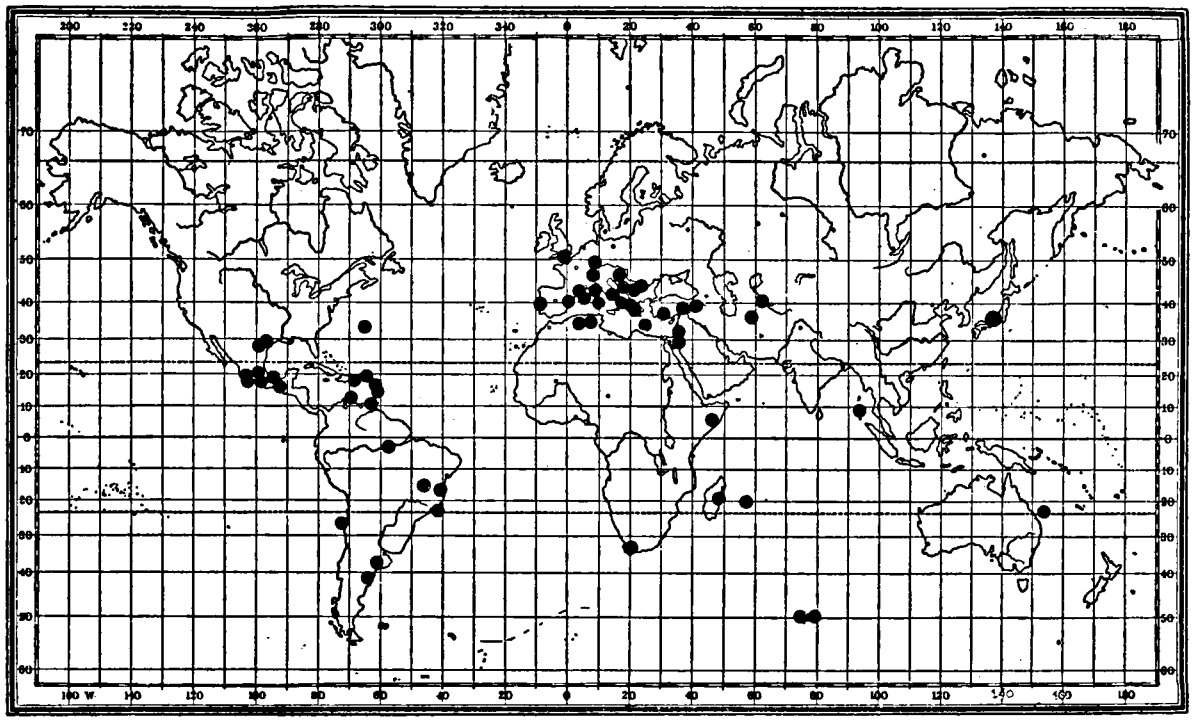

Fig. 2. The distribution of the species of the Bogidiellidae. The taxa are enumerated in table I. Close localities are sometimes represented by a single dot only. No distinction has been made between marine or continental species.

of the Tethys Sea in the middle Tertiary. Such coincidence is very striking in several other Malacostraca, e.g. the hadziid Gammaridae (Stock, 1977b), the Thermosbaenacea (Stock, 1976), and the microparasellid Isopoda (Stock, 1977a), but, as said, not in the Bogidiellidae. Several bogidiellid records are way out the former Tethyan region, e.g. the records of *Dussartiella* and *Pseudingolfiella* from Kerguelen, and of the latter genus from central Chile, as well as the inland records in South America (*Bogidiella neotropica, B. purmamarcensis, B. cooki, Spelaeogammarus*).

In this and other aspects, the distribution of the Bogidiellidae resembles that of the Amphipoda of the suborder Ingolfiellidea, as discussed by Stock, 1977c. Like the Ingolfiellidea, the Bogidiellidae comprise marine, mixohaline and freshwater taxa. Although, unlike the ingolfiellid situation, no true deep-sea bogidiellids are known, their distribution is not limited to the littoral zone either, as they are found in depths of to about 50 metres (Spooner, 1959, 1960). Another striking resemblance to the Ingolfiellidea is that, in addition to several (sub) genera with a limited, endemic distribution, also freshwater taxa with a transatlantic distribution pattern are known. In the Bogidiellidae, *Bogidiella* s. str. and *Medigidiella* form examples of subgenera found in the circum-mediterranean belt, in Central Europe, in Central Asia, and in Central and South America. It hardly seems accidental that the two subgenera of *Bogidiella* that are the most plesiomorphous (viz., *Bogidiella* s. str. and *Medigidiella*), are at the same time the most widely distributed (viz. amphiatlantic). The plesiomorphous morphology and the presumed old age (Mesozoic) of these subgenera are in good agreement with one another.

In my 1978 analysis, I explained such patterns by supposing that the transatlantic taxa were already widely distributed over the continents before the break-up of Pangaea in the Mesozoic era. The concentration, in the northern Mediterranean belt, of species (but not of genera and subgenera: only 2 or 3 of the 18 genera and sub-

genera known on mondial scale occur around the Mediterranean basin), coincides with the area in which classically the greatest research effort pertaining to subterranean and interstitial faunas has been accomplished. The low generic differentiation in that area may be indicative of the fact that many species evolved under influence of the fairly recent (Miocene) catastrophic geological events in the Mediterranean region (briefly, the salinity crisis, see for instance Stock, 1980a, and Danielopol, 1980).

Summarizing, the evolution and actual distribution of the Bogidiellidae can be explained as a result of at least two vicariant processes: (1) the break-up of Pangaea in the Mesozoic, and (2) the isolation of populations in the Tertiary, through an evolutionary scenario known as the Regression Model (Stock, 1977b, 1980a).

The limited distribution areas of all, or almost all, species of bogidiellids, and the low number of eggs (1 or 2) carried per ovigerous female, seem to point to the conclusion that dispersal faculties of members of this family are poor.

Distribution in the West Indies. — Not much can be said about the zoogeography of the bogidiellid amphipods in the West Indies. In qualitative terms, they are far less abundant than hadziid amphipods, which are known for a much greater number of islands and localities. Rarely, hadziids and bogidiellids coexist in the inland waters of one island. For instance, non-marine bogidiellids are known from wells on Tortola (British Virgin Islands), Saint John (U.S. Virgin Islands) and Margarita (Venezuelan islands), which do not harbour any hadziid. Hadziids are common in groundwater habitats of at least 15 islands, and they are abundant in wells of Marie-Galante and Barbuda. Only in one station each on the latter two islands Bogidiellidae have been found; in both cases this station was in a cave, and this may be a fact of some significance (vide infra).

Stock (in press) has shown by a statistical treatment of presence/absence and joint occurrence of hadziid amphipods and certain other groups of crustaceans, that hadziid islands usually do not support populations of Thermosbaenacea, and that on the islands where both groups occur, joint occurrence in one station is significantly lower than one would expect from the frequencies of solitary occurrence. On the basis of these data, it was assumed that hadziids are vigorous competitors, elimating several other crustaceans from groundwater habitats.

This explanation seems to fit interrelationships between hadziids and bogidiellids fairly well too. The old, and supposingly "primitive" Bogidiellidae are unable to withstand competition with the more recently evolved, supposingly more successful, hadziids. In small islands, offering relatively few niches, in which both groups still coexist (viz., Marie-Galante and Barbuda), the hadziids are abundant in both cave waters and phreatic waters of wells, whereas the bogidiellids are rare and restricted to caves. The greater extension of waterbodies in caves possibly provides them with means of escaping competition (presumably in the form of being eaten) by hadziids.

In agreement with this view is the fact that one island, Puerto Rico, supports a varied hypogean aquatic fauna, comprising hadziids, bogidiellids and thermosbaenaceans. In this case, the large size of the island, providing a greater array of niches, supposingly is the reason that older groups (bogidiellids and thermosbaenaceans) are not yet eliminated and that the competition of the hadziids is less severe.

The relatively young geological age (i.e. middle Tertiary or younger) of most Antillean islands (cf. Stock, 1981) is reflected by its bogidiellid fauna. None of the widely distributed (transatlantic, presumably Mesozoic) genera is represented in the Antilles. Of the four genera found in the West Indies, two are marine, interstitial genera (*Marigidiella, Actogidiella*), whereas the two remaining genera (*Stygogidiella, Antillogidiella*) are endemic to the West Indian island chain. The latter two probably evolved from marine ancestors when the islands broke through the sea's surface in or after the Miocene. This type of evolution has been called Regression evolution (see review in Stock, 1980a).

DIAGNOSES OF THE GENERA OF THE BOGIDIELLIDAE AND MONDIAL CHECKLIST OF THE SPECIES

Genus **Artesia** Holsinger, in Holsinger & Longley, 1980

Coxal plates partly overlapping; plates 5 and 6 enlarged; plates 2 to 6 longer than wide, plate 7 small. Mandible: pars molaris strongly reduced; palp strong, unmodified. First maxilla: palp 1-segmented; inner lobe unarmed. Second maxilla: distal armature reduced. Maxilliped: inner and outer lobe short, armed with setiform elements only. Carpus of gnathopod 1 with strong posterior projection. Gnathopods: with long palmar margin; not sexually dimorphous. Five pairs of coxal gills (on gnathopod 2 and pereiopods 3 to 6). Pleopods not sexually dimorphous, both rami pluriseg-mented, unmodified. Uropods 1 and 2 unmodified, not sexually dimorphous. Uropod 3: exopodite monomerous; endopodite as long as exopodite. Telson: deeply incised to about 2/3 of its length.

Monotypic: type-species *A. subterranea* Holsinger, in Holsinger & Longley, 1980. Artesian well in Texas, U.S.A.

Cladistics: a line with many plesiomorphous characters. Characterized by the apomorphous characters 17 through 20 (see cladogram); sharing the synapomorphous character 3 with *Spelaeogammarus* and *Somagidiella.*

Derivatio nominis. — *Artesia* is a shortened form of the word "artesian", alluding to the type-locality.

Genus **Spelaeogammarus** da Silva Brum, 1973

Coxal plates longer than wide, strongly overlapping; posterior plates with long anterior, and well-delimited short posterior lobe. Mandible: pars molaris reduced; palp rather weak, with reduced distal armature. First maxilla: palp 2-segmented, inner lobe with 3 setules. Second maxilla: with high number of setae. Maxilliped: inner and outer lobes rather well developed, armed with setiform elements only. Gnathopod 1: with long palmar margin, carpus with strong posterior projection; gnathopod 2 with short palmar margin. Three pairs of coxal gills. Pleopodal exopodites with long basal segment; endopodite almost as long as exopodite, setiferous, monomerous. Uropods untransformed. Rami of uropod 3 subequal, foliaceous. Telson with marked distal incision.

Monotypic: type-species *S. bahiensis* da Silva Brum, 1973. Cave water, state of Bahia, Brazil.

Cladistics: a line with many plesiomorphous character states, not having any apomorphous character to differentiate it from *Somagidiella.*

Derivatio nominis. — From σπήλαιον = cave, and *Gammarus,* the name of an epigean amphipod.

Genus **Somagidiella** n. gen.

Coxal plates longer than wide or as long as wide. Mandible: pars molaris and pars incisiva rather well developed; palp modified, emaciated: all segments, but in particular segments 1 and 2, thin and slender. First maxilla: palp 2-segmented; inner lobe with setules. Second maxilla: with several setae. Maxilliped: inner and outer lobes well developed, spiniferous. Gnathopods of normal bogidiellid type. Three pairs of coxal gills. Pleopodal exopodite unmodified; endopodite vestigal. Uropods 1 and 2 unmodified. Uropod 3: exopodite monomerous; endopodite as long as exopodite. Telson with very shallow distal notch.

Monotypic: type-species *Somagidiella somala* (Ruffo, 1970a) (as *Bogidiella*). Slightly salty well in Somalia.

Cladistics: sharing many plesiomorphous characters with *Spelaeogammarus,* but characterized by apomorphous character states 21, 22, and 10.

Derivatio nominis. — Contraction of Somalia (the terra typica) and *Bogidiella,* the nominate genus of the family.

Genus **Parabogidiella** Holsinger, in Holsinger & Longley, 1980

Coxal plates small, wider than long, not overlapping. Mandible: pars molaris reduced; palp well developed. First maxilla: palp 1-segmented; inner lobe unarmed. Second maxilla: lobes with reduced setal armature. Maxillipeds: inner and outer lobes weak, armed with setiform elements only. Gnathopods of bogidiellid type. Coxal gills: 5 pairs, on gnathopod 2 and pereiopods 3 to 6.

Pleopods: unmodified, both rami 3-segmented, subequal. Uropods 1 and 2: unmodified. Uropod 3: rami short; both rami monomerous, subequal. Telson: with well-marked distal incision.

Monotypic: type-species *P. americana* Holsinger & Longley, 1980. The same authors described also a *Parabogidiella* ? spec. (artesian well in Texas, U.S.A.).

Cladistics: mainly having plesiomorphous characters, but sharing synapomorphies (character states 1 and 2) with the *Bogidiella*-complex; characterized by apomorphous mouthparts.

Derivatio nominis. — From παρά (= near, beside) and *Bogidiella*, the nominate genus of the family.

Genus **Bogidiella** Hertzog, 1933

A small-sized, mainly plesiomorphous, bogidiellid with small, non-overlapping coxal plates, without marked sexual dimorphism in the gnathopods and pereiopods. Mandible: with small but distinct pars molaris and pars incisiva; palp heavy. First maxilla: palp 2-segmented; inner lobe setiferous. Second maxilla: with full setal armature. Maxillipeds: inner and outer lobes not very large, distally armed with setae and some short spines. Carpus of gnathopod 1 with strong posterior projection. Three pairs of coxal gills. Pleopodal endopodites very small, vestigial or absent. Mechanisms for sperm transfer on pleopods or uropods may be present or absent; if present, they are limited to one of the sexes only. Uropod 3 biramous, rami subequal, each ramus 1-segmented. Telson with shallow or insignificant distal notch.

Type-species: *B. albertimagni* Hertzog, 1933.

Derivatio nominis. — According to Hertzog (1935, 1936) the taxon is named after Albert the Great (Albertus Magnus), count of Bollstaedt (Schwaben), who lived from 1193 to 1280. He was a philosopher, theologist and biologist, amongst others in Strassbourg (the type-locality).

Alternatively, the genus name might have been inspired by the Latin name for the Vosges, *Vogia*, in allusion to the localities near Strasbourg where it was first found.

Subgenus **Bogidiella** Hertzog, 1933

Pleopodal exopodite not sexually dimorphous; endopodites very small, vestigal or absent. Uropods 1 and 2 not sexually dimorphous; rami rod-like and spiniferous, not transformed.

Type-species: *B.* (*B.*) *albertimagni* Hertzog, 1933 (= *B. denticulata* Meštrov, 1962).

Other species: *B.* (*B.*) *skopljensis* (S. Karaman, 1933) (as *Jugocrangonyx*); *B.* (*B.*) *longiflagellum* S. Karaman, 1959; *B.* (*B.*) *helenae* Mateus & Maciel, 1967; *B.* (*B.*) *ruffoi* Birstein & Ljovuschkin, 1968; *B.* (*B.*) *apruntina* Pesce, 1980; *B.* (*B.*) *ischnusae* Ruffo & Vigna, 1975; *B.* (*B.*) *ischnusae africana* G. Karaman & Pesce, 1980; *B.* (*B.*) *vomeroi* Ruffo & Vigna, 1977.

Uncertain: *B. glacialis* S. Karaman, 1959; *B. dalmatina* S. Karaman, 1953; *B. semidenticulata* Meštrov, 1962; *B. lindbergi* Ruffo, 1958a; *B. neotropica* Ruffo, 1952; *B. niphargoides* Ruffo & Vigna, 1977; *B. michaelae* Ruffo & Vigna, 1977.

Phreatic waters, often far from the sea, in Central, S. E. and S. W. Europe, Central Asia (Turkmenia), Algeria, Central America. Possibly also in Afghanistan (*lindbergi*) and Brazil (*neotropica*).

Synonymy. — *Jugocrangonyx* S. Karaman, 1933 and *Bogidiella* were both erected in 1933, and both were described in the same journal, the Zoologischer Anzeiger, but *Bogidiella* (published in vol. 102) has priority over *Jugocrangonyx* (in vol. 103).

Subgenus **Medigidiella** nov.

As subgenus *Bogidiella*, but with sexually dimorphous anterior uropods, usually with transformed (rasp-like) spines on uropod 1 and/or uropod 2.

Type-species: *B.* (*M.*) *chappuisi* Ruffo (in Ruffo & Delamare Debouteville, 1952) (syn. *B. minotaurus* Ruffo & Schiecke, 1976, teste G. Karaman, 1979a).

Other species: *B.* (*M.*) *paraichnusae* G. Karaman, 1979b; *B.* (*M.*) sp. of Ruffo, 1953; *B.* (*M.*) *arganoi* Ruffo & Vigna, 1973; *B.* (*M.*) *vandeli* Coineau, 1968.

Possibly belonging in this subgenus: *B. silverii* Pesce, 1981; *B. balearica* Dancau, 1973 (see G. Karaman, 1979a); *B. italica* G. Karaman, 1979b; *B. hebraea* Ruffo, 1963.

Phreatic waters (wells, interstitial habitats), often near the seacoast of the Mediterranean basin; one species (*arganoi*) in Mexico.

Derivatio nominis. — Contraction of "*Mediterranea*" and *Bogidiella.*

Subgenus **Orchestigidiella** nov.

As *Medigidiella,* but moreover with distinct sexual dimorphism in the seventh pereiopod (carpus in male enlarged), third uropod (endopodite clavate), and shape of the propodus of the second gnathopod.

Monotypic: type-species *B.* (*O.*) *orchestipes* Ruffo & Vigna, 1977. Mexico, in a well.

Derivatio nominis. — Allusion to the *Orchestia*-like shape of the 7th pereiopod, in combination with the ending of *Bogidiella.*

Subgenus **Stygogidiella** nov.

As subgenus *Bogidiella* (i.e., uropods not sexually dimorphous), but with a modified element on the 2nd male pleopod (presumably for sperm transfer).

Type-species: *B.* (*S.*) *bredini* Shoemaker, 1959.

Other species: *B.* (*S.*) *virginalis* n. sp.

Possibly belonging to this subgenus: *B. perla* n. sp., *B. cerberus* Bou & Ruffo, 1980, and *B.* spec. (vide infra) from Puerto Rico.

Groundwaters in macroporous substrates (caves, wells), West Indian archipelago; often slightly brackish. Possibly also in Greece (*B. cerberus*).

Derivatio nominis. — Combination of Στύξ (= subterranean waterbody) and *Bogidiella.*

Remarks. — The attribution of *B. cerberus,* from a Greek cave, to this subgenus is tentative. In absence of males, it is not very well possible to place this species correctly. Several morphological characters are reminescent, however, of *Stygogidiella* (e.g. the hairy propodus of pereiopod 7, the long palmar margin of gnathopod 1, the slender gnathopod 2, and the body size).

Subgenus **Mexigidiella** nov.

As subgenus *Stygogidiella* (i.e., uropods not sexually dimorphous), but with transformed elements on pleopods 1 and 2.

Type-species: *B.* (*M.*) *tabascensis* Villalobos, 1961.

Other species: *B.* (*M.*) *sbordonii* Ruffo & Vigna, 1973.

Possibly in this subgenus: *B. purmamarcensis* Grosso & Ringuelet, 1979; *B. cooki* Grosso & Ringuelet, 1979.

Cave waters, Mexico. Possibly also in Argentina.

Derivatio nominis. — Contraction of Mexico and *Bogidiella.*

Subgenus **Guagidiella** nov.

As subgenus *Bogidiella* (i.e., pleopods not sexually dimorphous), but with strongly transformed first male uropod (exopodite shortened and modified). Second uropod not sexually dimorphous.

Type-species: *B.* (*G.*) *holsingeri* Ruffo & Vigna, 1973.

Other species *B.* (*G.*) *pasquinii* Ruffo & Vigna, 1977.

Cave waters, Guatemala.

Derivatio nominis. — Combination of Guatemala and *Bogidiella.*

Subgenus **Antillogidiella** nov.

As subgenus *Stygogidiella* (i.e., one element on the exopodite of the 2nd male pleopod modified), but with strongly transformed (rami dagger-like) first female uropod.

Type-species: *B.* (*A.*) *martini* Stock, 1978.

Other taxon: *B.* (*A.*) *martini* ssp. nov. of Sket & Iliffe, 1980.

Well and cave waters of Lesser Antilles and Bermuda; oligohaline to mesohaline.

Derivatio nominis. — Contraction of Antilles and *Bogidiella.*

Genus **Actogidiella** nov.

Coxal plates small, wider than long, posterior plates not overlapping. Mandible: masticatory part in reduction, palp slightly transformed (2nd segment ventrally swollen). First maxilla: palp 2-segmented, inner lobe setiferous. Second maxilla: with slightly reduced number of setae. Maxilliped: inner and outer lobes short, distally armed with short spines. Gnathopods not sexually dimorphous. Three pairs of coxal gills. Pleopodal exopodites not transformed; one spine on exopodite segment 2 of pleopod 2 (♂) transformed. Uropod 1 transformed (♂, ♀): endopodite curved, dagger-like (♂, ♀), exopodite shorter than endopodite (♂, ♀), dagger-like (♀) or baculiform with transformed distal spines (♂). Uropod 2 not transformed in shape or armature (♂, ♀). Third uropod: exopodite monomerous, endopodite long. Telson with very shallow distal notch.

Monotypic: type-species *A. cultrifera* n. sp. Intertidal, interstitial, marine beaches; Tortola (West Indies); possibly also an unnamed species in Curaçao.

Derivatio nominis. — From ἀκτή (= seacoast) and *-gidiella*, alluding to the habitat, in the interstitial of marine sandy beaches.

Remarks. — Differs from *Antillogidiella* in the first uropod (transformed in male) and in the bulbous 2nd mandible palp segment.

Genus **Marigidiella** nov.

Coxal plates small, wider than long, not overlapping. Mandible: pars molaris small; palp robust. First maxilla: palp monomerous; inner lobe setiferous. Second maxilla: number of distal setae reduced. Maxilliped: inner and outer lobes small, armed with setae only. Gnathopods not sexually dimorphous. Three pairs of coxal gills. Pleopodal endopodites 1-segmented but long (possibly transformed in male); exopodites of 1st and 2nd pleopods 3-segmented, of 3rd pleopod 2-segmented. Uropods 1 and 2 with transformed, dagger-like rami (♀, ♂); uropod 3 with 2 equal, 1-segmented rami. Telson without distal notch.

Type-species: *M. brasiliensis* (Siewing, 1953) (as *Bogidiella*).

Other species: *M. crassipes* n. sp.

Possibly in this genus: *Bogidiella tyrrhenica* Schiecke, 1973 (formal description: 1979).

Marine, intertidal sands of Brasil and Antilles. Possibly also subtidal (Italy).

Derivatio nominis. — Combination of *mare* (= sea) and *Bogidiella.*

Genus **Kerguelenicola** Ruffo, 1974b

(= *Kerguelenella* Ruffo, 1970b, preocc.)

Coxal plates small, wider than long, not overlapping. Mandible: pars molaris with reduced armature; palp strong, with high number of setae. First maxilla: palp 2-segmented, inner lobe with 1 seta. Second maxilla: with normal setal armature. Maxilliped: inner and outer lobes short, armed with setiform elements only. Gnathopod 1: carpus without posterodistal projection, similar to gnathopod 2. Five pairs of coxal gills. Pleopodal exopodites and endopodites subequal, one-segmented. Uropods 1 and 2 with slightly transformed (dagger-shaped) rami. Uropod 3 with equal rami, each ramus 1-segmented. Telson with a deep cleft.

Monotypic: type-species *K. macer* (Ruffo, 1970b) (as *Kerguelenella*) (found in stomach of freshwater trout, Kerguelen).

Cladistics: sharing several synapomorphous characters with *Bollegidia*; characterized by a special expression of character state 14.

Derivatio nominis. — From the name of the island of Kerguelen and *incolus* (= inhabitant).

Genus **Bollegidia** Ruffo, 1974a

Coxal plates small, wider than long, not overlapping. Mandible: masticatory part in reduction; palp moderately strong. First maxilla: palp 1-segmented; inner lobe unarmed. Second maxilla: with reduced setal armature. Maxilliped: inner and outer lobes weak, outer lobe armed with setae, inner lobe with 1 spine and some setae. Carpal lobe of gnathopod 1 not very well developed. Palmar margin of gnathopods 1 and 2 rather short.

Four pairs of coxal gills (on pereiopods 3 to 7). Pleopods without endopodite; exopodite in reduction (1- to 2-segmented), sexually dimorphous (swollen in female). Uropod 1: uniramous; ramus dagger-like. Uropod 2: inner ramus dagger-like. Uropod 3: rami equal, monomerous. Telson: distal spines placed closely together, without distal notch.

Type-species: *B. capensis* Ruffo, 1974a.

Other species: *B. sootai* (Coineau & Rao, 1972) (as *Bogidiella*).

Marine, intertidal sands, South Africa, Gulf of Bengal.

Cladistics: sharing several synapomorphies with *Kerguelenicola* but strongly characterized by apomorphous character states 10, 13, 14, 18, 19, and 20.

Derivatio nominis. — Anagram of *Bogidiella.*

Genus **Dussartiella** Ruffo, 1979

Coxal plates wider than long, anterior plates touching, posterior plates well spaced. Mandible: pars molaris and pars incisiva well developed; palp reduced to an unarmed, 2-segmented rudiment. First maxilla: asymmetrical (left appendage with rudimentary, 1-segmented palp; right appendage with spiniferous, 2-segmented palp); inner lobe with 1 seta. Second maxilla: with high number of setae. Maxilliped: inner and outer lobes fairly well developed, armed with spines and setae. No carpal lobe on gnathopod 1; palmar margin of gnathopods 1 and 2 rather short. Five pairs of coxal gills. Pleopods with plurisegmented exopodite and 1-segmented, vestigial endopodite. Uropods 1 and 2 with transformed (dagger-like) rami. Uropod 3: outer ramus long, 2-segmented; inner ramus short, scale-like. Telson much longer than wide, with very small distal notch.

Monotypic: type-species *D. madegassa* Ruffo, 1979.

Small spring or trickle near Mantasoa reservoir, Madagascar.

Cladistics: strongly characterized by an apomorphous character state 22 and sharing a synapomorphy (character state 5) with *Pseudingolfiella.*

Derivatio nominis. — Named after Prof. B. Dussart (Paris).

Genus **Pseudingolfiella** Noodt, 1965

Coxal plates very small, not touching. Mandible: masticatory part weak; palp strong. First maxilla: palp 2-segmented, inner lobe unarmed. Second maxilla: setal armature in reduction. Maxilliped: inner and outer lobes weak, armed with setiform elements only. No carpal projection on gnathopod 1; palmar margin of gnathopods 1 and 2 not very long. Four pairs of coxal gills. Pleopods in reduction, uniramous, the ramus being 1-segmented (or with a vestigial 2nd segment); setation absent or consisting of a single seta. Uropods 1 and 2 with transformed (dagger-like) rami; uropod 1 sexually dimorphic. Uropod 3 uniramous, ramus 1- or 2-segmented. Telson: longer than wide, apical margin short, unnotched.

Type-species: *Ps. chilensis* (Noodt, 1959) (as *Ingolfiella*).

Other species: *Ps. soyeri* Coineau, 1977.

In sand and gravel of the mouth of streams, near the sea (Central Chile, Kerguelen).

Cladistics: characterized by numerous apomorphous character states, such as 6, 14, 15.

Derivatio nominis. — From ψεῦδος (= falsehood) and the generic name *Ingolfiella*, an amphipod genus superficially resembling the present genus.

DESCRIPTIONS OF THE WEST INDIAN TAXA

Bogidiella (Stygogidiella) bredini Shoemaker, 1959. Fig. 3.

Shoemaker, 1959: 273-276, fig. 1; Ruffo, 1973: 52, 55, 56; Stock, 1978: 110.

Material. — All from Barbuda (Lesser Antilles): Dark Cave, estimated position 17°38'56"N 61°46'02"W.

Two ♂♂, one ♀, in large pool (dark), 6 July 1955, Hummelinck sta. 671. Zoölogisch Museum Amsterdam (ZMA) coll. no. Amph. 104.770 and 106.141.

One ♂, in third pool (dark), 10 April 1978, Amsterdam Expeditions to the West Indian Islands, sta. 78/24a (ZMA coll. no. Amph. 107.451a).

Two ♂♂, two ♀♀ in first pool (dark), 10 April 1978, chlorinity 1880 mg/l, Amsterdam Expeditions to the West Indian Islands, sta. 78/24c (ZMA coll. no. Amph. 107.451b).

The accompanying fauna in stations 78/24a and 78/24c

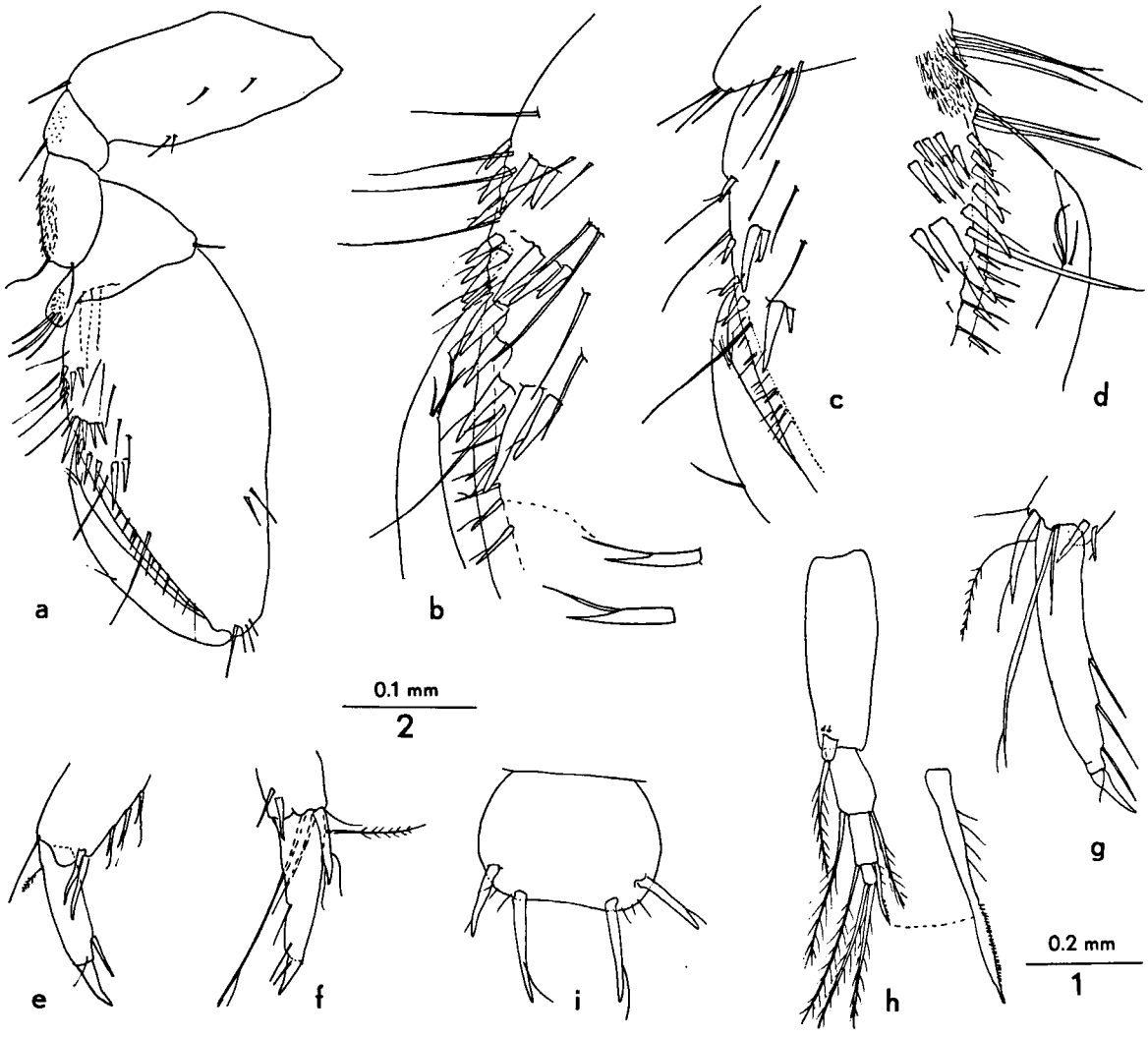

Fig. 3. *Bogidiella* (*Stygogidiella*) *bredini* Shoemaker, 1959, from Dark Cave, Barbuda: a, first gnathopod, ♂ ad. (scale 1); b, detail of palmar armature of first gnathopod, ♂ ad. (2); c, same of ♂ juv. (2); d, palmar armature of second gnathopod, ♂ ad. (2); e, claw of third pereiopod, ♂ (2); f, claw of fifth pereiopod, ♂ (2); g, claw of sixth pereiopod, ♂ (2); h, second pleopod, ♂ (1), with special spine of 2nd exopodite segment more strongly enlarged; i, telson, ♀ (2).

consisted of *Metaniphargus nicholsoni* Shoemaker, 1959 (Amphipoda), *Typhlatya* sp. (Decapoda), Oligochaeta, Nematoda, and Cyclopoida (Copepoda).

Remarks. — The present specimens are topotypes (the species is only known from Dark Cave in Barbuda). In several details, Shoemaker's description can be complemented or corrected. The first gnathopod has a palmar index (see Ruffo, 1973: 62 and fig. 1) of ca. 0.75 in the holotype (see Shoemaker, 1959, fig. 1k) and in the senile ♀ from Hummelinck sta. 671 (present collection). In all other specimens, although apparently sexually mature, the palmar index is lower (0.51-0.57, our fig. 3a). The same holds true for the palmar index of the second gnathopod: ca. 0.50 in the holotype versus 0.43 in the present material. Apparently, the value of the index changes during the subsequent moults of the individuals.

Also changing is the number of spines on the palmar angle and the posterior margin of the propodus of gnathopods 1 and 2. This number increases from 8 to 16 in P1 and from 6 to 13 in

P2 (figs. 3 a-d). The number of groups of setae on the posterior margin of the propodus of gnathopod 2 increases from 3 to 6.

Shoemaker's figure (1a) of the 6th pereiopod needs correction: it has a long claw as in P7 (fig. 3g). Ruffo (1973: 52) has already corrected Shoemaker's erroneous count of the coxal gills: they occur in relation with pereiopods 4 to 6.

Another, important, point needing rectification is the alleged absence of sexual dimorphism in the pleopods. In reality, the 2nd exopodite segment of the 2nd male pleopod bears a transformed element, which is styliform, laterally pectinate in its distal half (fig. 3h).

The curious, sigmoid spines on the distal end of the propodus of pereiopods 3 and 4 (see under *B. virginalis*) are present in *B. bredini* as well, but they are not shown by Shoemaker's fig. 10.

Bogidiella (Stygogidiella) virginalis n. sp.
Figs. 4-6.

Material. — One ♂ (holotype), one ♀ (allotype) and five paratypes. Amsterdam Expeditions to the West Indian Islands, sta. 78/142. Tortola (British Virgin Islands), Road Town, well of Water Works (ca. 100 m W. of the Police H.Q.) (18°25'45"N 64°37'23"W); water table at 14 m, water depth 2 m; chlorinity 400 mg/l; Cvetkov net; 25 April 1978. (ZMA coll. no. Amph. 107.452). Accompanying fauna: Thermosbaenacea, Phyllopoda, Cyclopidae, Oligochaeta.

One specimen. Amsterdam Expeditions to the West Indian Islands, sta. 78/146. Tortola (British Virgin Islands), well Hannah Bay (18°24'10"N 64°38'10"W); chlorinity 1720 mg/l; Cvetkov net; 26 April 1978 (ZMA coll. no. Amph. 107.455). Accompanying organisms: *Pyrgophorus* (Gastropoda), Cyclopidae, Oligochaeta, filamentous algae.

Nine specimens. Amsterdam Expeditions to the West Indian Islands, sta. 78/156. Saint John (U.S. Virgin Islands), King Well (18°20'53"N 64°43'06"W); water table at ca. 5 m, water depth ca. 2 m; chlorinity 200 mg/l; Cvetkov net; 27 April 1978 (ZMA coll. no. Amph. 107.453). Accompanying fauna: Thermosbaenacea, Cyclopidae.

Description. — Length of body (without antennae and third uropods) 3½-4 mm (♂) or 4-4½ mm (♀). The body shape and general habit is very similar to that of *Bogidiella bredini* Shoemaker, 1959, fig. 1a.

The first antenna (fig. 4a) has a slender peduncle; the flagellum consists of about 12 segments; the accessory flagellum is rather long (it overreaches the third flagellum segment) and 3-segmented. One aesthetask is found on each of the flagellum segments 4 to 10; they have a short basal stalk and a slightly wider, spadix-like, sensory part (fig. 4b); each aesthete is almost as long as the corresponding flagellum segment.

The second antenna (fig. 4c) is shorter than the first; segments 4 and 5 are elongate; the flagellum is 5-segmented, slightly longer than peduncle segment 5; gland aperture on the tip of a conical projection, pointing forward; no calceoli or aesthetasks.

The mandibles are asymmetrical (figs. 4d, e). The left mandible has a smaller lacinia mobilis and a larger pars incisiva than the right one; between the pars incisiva and the pars molaris, there are 4 (left) or 6 (right) flat spines. The palp is 3-segmented; segment 1 is slightly longer than wide, unarmed; segment 2 bears 1 ventral seta; segment 3 has about the same length as segment 2, is sausage-shaped and bears 3 or 4 terminal setae.

The labium (fig. 4f) has well-developed inner lobes, which have a straight free margin and angular corners.

The first maxilla (fig. 4g) has a 2-segmented palp, distally armed with 3 setae; the outer lobe bears 7 strong spines, whose inner margin is provided with denticles: 2 spines bear only 1 denticle, 1 spine bears 2 denticles, 1 spine bears 3 denticles, and 3 spines bear numerous fine denticles; the inner lobe bears 2 plumose setae.

The second maxilla (fig. 4h) bears 6 setae on the outer lobe and 7 setae (of which two very heavy) on the inner lobe.

The maxilliped (fig. 4i) has short inner and outer lobes: the inner lobe (armed with 2 spines and 3 short setae) reaches a little beyond the basal part of the outer lobe, and the outer lobe (armed with 3 distal spines and 4 medial setae) reaches to the distal end of the first palp segment. The claw-like terminal portion of the palp is slender and elongate.

No marked sexual dimorphism has been observed in the gnathopods. Gnathopod 1 (fig. 5a) possesses 2 rudimentary setae on the anterior margin of the basis; the carpus shows the finger-shaped posterior projection characteristic of the whole genus; the propodus is egg-shaped; the claw reaches to about the middle of the posterior propodal margin; the palmar margin bears some 10

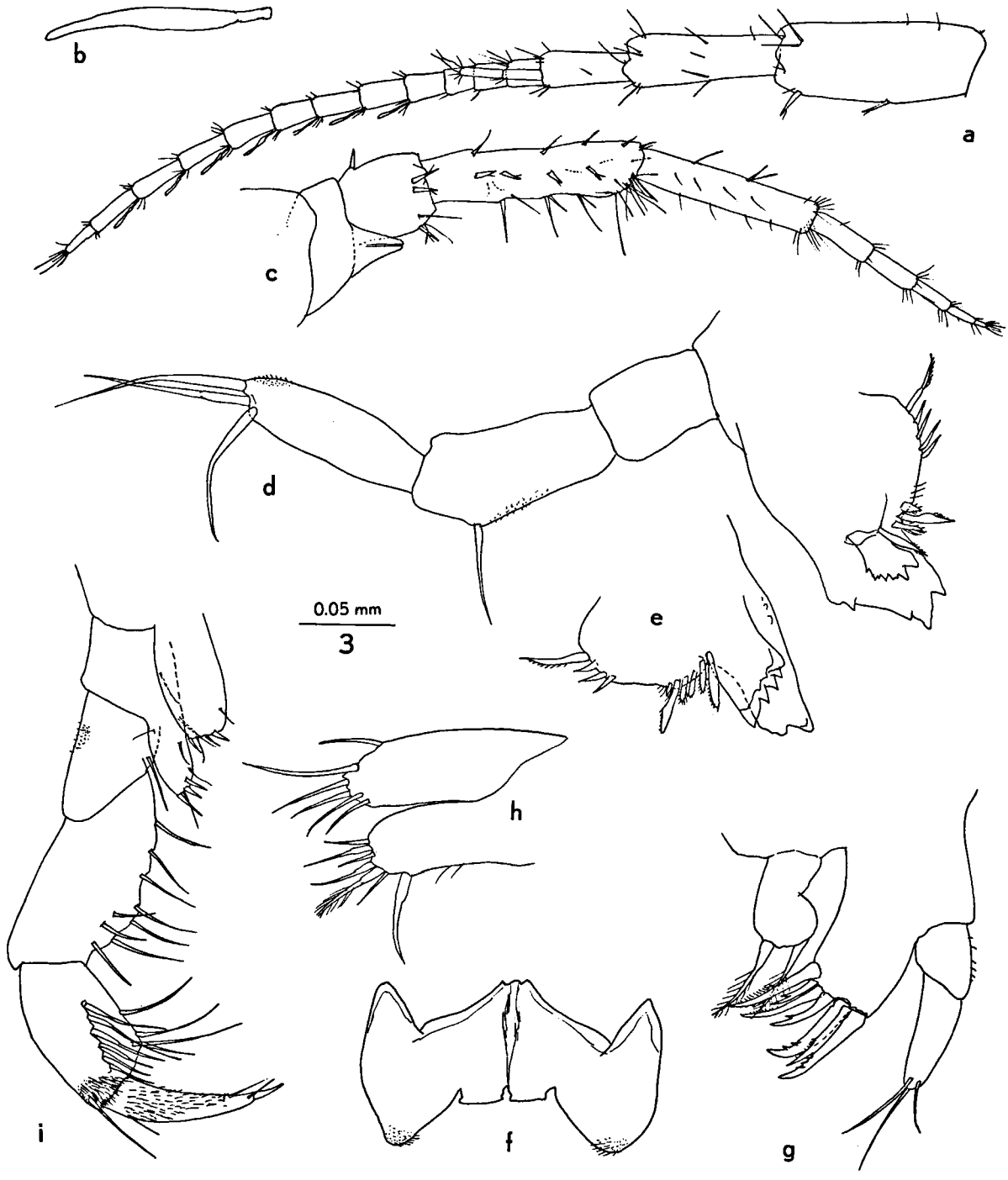

Fig. 4. *Bogidiella* (*Stygogidiella*) *virginalis* n. sp., from King Well, Saint John: a, first antenna, ♀ (scale 1); b, aesthetask of first antenna, ♀; c, second antenna, ♀ (1); d, left mandible, ♀ (3); e, masticatory part of right mandible, ♀ (3); f, labium, ♀ (2); g, first maxilla, ♂ (3); h, second maxilla, ♀ (3); i, maxilliped, ♀ (2).

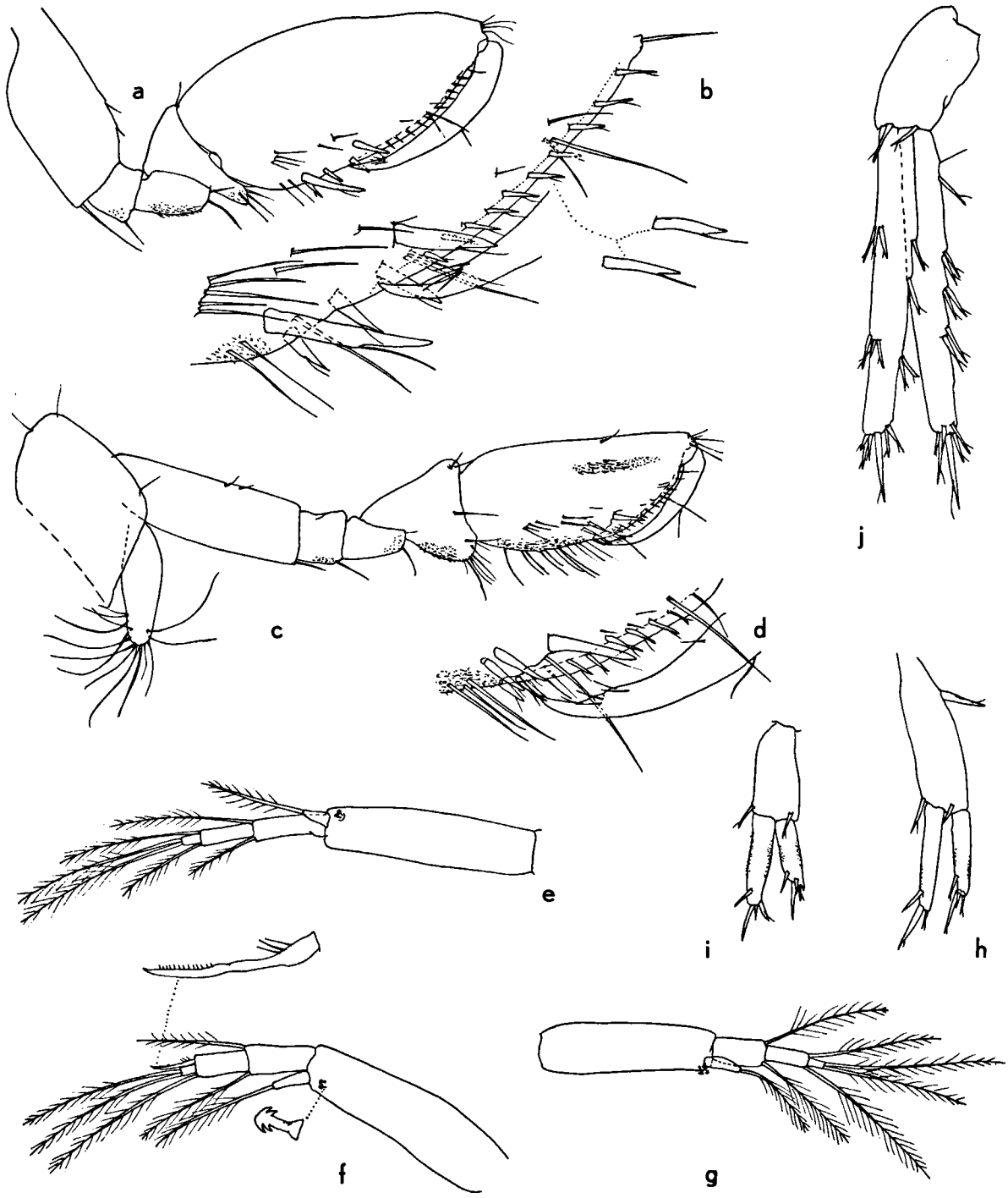

Fig. 5. *Bogidiella* (*Stygogidiella*) *virginalis* n. sp., from King Well, Saint John: a, first gnathopod, ♀ (scale 1); b, palmar margin of same (2); c, second gnathopod, ♀ (1); d, palmar margin of same (2); e, first pleopod, ♂ (1); f, second pleopod, ♂ (1), with retinaculum and special exopodite spine more strongly enlarged; g, third pleopod, ♂ (1); h, first uropod, ♀ (1); i, second uropod, ♀ (1); j, third uropod, ♀ (1).

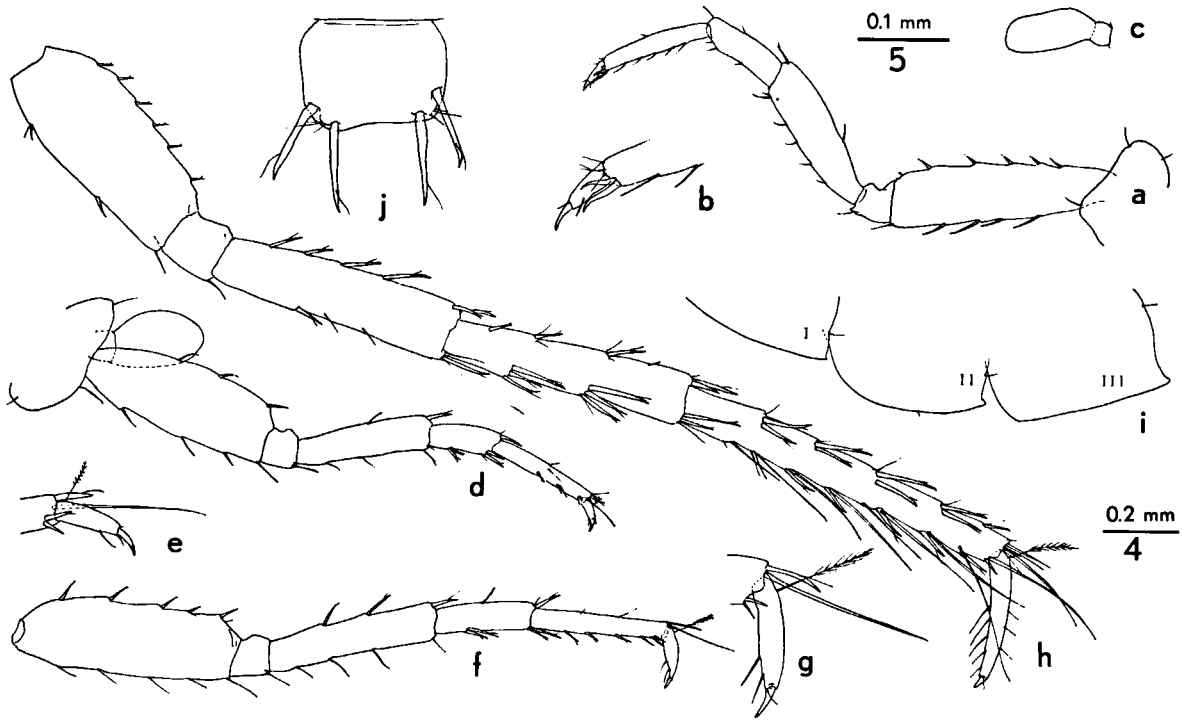

Fig. 6. *Bogidiella* (*Stygogidiella*) *virginalis* n. sp., from King Well, Saint John: a, third pereiopod, ♀ (scale 4); b, claw of third pereiopod, ♀ (5); c, coxal gill of fourth pereiopod, ♀ (4); d, fifth pereipod, ♀ (4); e, claw of same (5); f, sixth pereiopod, ♀ (4); g, claw of same (5); h, seventh pereiopod, ♀ (4); i, epimeral plates I-III, from the left, ♀ (4); j, telson ♀ (5).

spinules of a size and a few setae; the palmar angle is not well indicated, it bears 1 larger and 1 smaller spine; more proximally, 3 more spines are found, one of which is very long, its tip reaching the tip of the dactylus (fig. 5b); outer margin of dactylus with 1 setule. The palmar index (Ruffo, 1973) of P1 is 0.50.

The second gnathopod (fig. 5c) has a trapezoidal coxal plate, and bears 2 rudimentary setae on the anterior margin of the basis; the carpus is triangular and without posterior projection. The propodus is smaller than that of the first gnathopod, its free margins are fairly straight, the posterior one bears 4 or 5 groups of setae; the palm is well delimited, rather oblique; palmar margin with 6 spinules, 2 setae, and a large mid-palmar spine; a group of 6 smaller palmar angle spines (fig. 5d). The claw bears 1 seta on its outer margin. The palmar index of P2 is 0.45.

Oöstegites present on gnathopod 2 and pereiopods 3 to 5, sausage-shaped, and distally armed with numerous (> 10) setae (fig. 5c). Coxal gills (fig. 6c) with a small peduncle, which is about as long as wide, and an oval distal part; present on pereiopods 4 to 6.

Third (fig. 6a) and fourth pereiopods similar. Coxal plate rounded-rectangular; basis elongate, with several (4-6) spines on each margin; merus also elongate, with some 6 short setae on its posterior margin; carpus much shorter, with 3 short setae on its posterior margin; propodus thin and slender, with about 5 short setae on its posterior margin; distoposteriorly, the propodus bears 2 long, sigmoid spines; claw (fig. 6b) short.

P5 $<$ P6 $<<$ P7. Devoid of lentiform organs. The coxal plate of the 5th pereiopod (fig. 6d) is slightly bilobate. The carpus and propodus bear 2+2 and 1+1+2 spines, respectively, on their inner margin. Claw (fig. 6e) short, inner margin of dactylus with 1 seta, 1 distal seta, and 1 long, plumose proximal seta on the outer margin of the dactylus.

Sixth pereiopod (fig. 6f) with 1+1+1+1+2 spines on the inner propodal margin; inner margin of dactylus with 2 setae; dactylus more slender than in P5 (fig. 6g).

Seventh pereiopod (fig. 6h) with numerous long spines on carpus and propodus, the latter moreover with several long setae on its inner margin. Dactylus very slender, ungulus small; inner margin of dactylus with 4 or 5 setae, outer margin of dactylus with 1 proximal plumose seta and 2 or 3 short setae more distally.

The epimeral plates (fig. 6i) have an almost rectangular posteroventral corner, drawn into a small point; posterior margin of each plate with 1 seta, ventral margin naked.

The pleopods 1-3 (figs. 5 e-g) are biramous. The exopodite is 3-segmented, the endopodite is 1-segmented. The endopodite is cylindrical or finger-shaped, 1/3 to 1/2 as long as the first exopodite segment, distally armed with a long, plumose seta. Each exopodite segment carries 2 long, plumose setae. In the male, the outer plumose seta of exopodite segment 2 is transformed into a claw-like structure (fig. 5f), presumed to have a function in sperm transfer; the proximal part of the lateral margin of this claw-like structure bears some cilia, the distal part about 13 minute teeth. The pedunculus is very elongate in pleopod 1, gradually less elongate in pleopods 2 and 3. Mediodistally, the peduncle bears 2 retinacula, each with 2 pairs of hooks (fig. 5f).

The first uropod has a strong basoventral spine. The rami are narrow, subequal (fig. 5h). The second uropod is shorter than the first and lacks a basoventral spine (fig. 5i). The rami of uropods 1 and 2 are not transformed in either sex. The third uropod (fig. 5j) has two subequal, very slender rami; the exopodite bears spines on the lateral and distal margins, the endopodite on the lateral, medial and distal margins.

The telson (fig. 6j) is not sexually dimorphous; it is rounded-rectangular; the distal margin is feebly concave. Each distal corner with 2 long spines and 3 sensory setules.

Remarks. — *Bogidiella* (*Stygogidiella*) *virginalis* n. sp. from the Virgin Islands is very close to *B.* (*S.*) *bredini* Shoemaker, 1959, from Barbuda. Only the fact, that their localities are widely separated, also by deep water, viz. the Anegada passage, preventing all possibilities of geneflow, made me consider them distinct species, instead of subspecies of each other.

The differences are subtle but clear:
(1) The propodal armature of gnathopods 1 and 2 consists of fewer spines in *B. virginalis*. Although this character is to some degree age-dependent (see under *B. bredini*), the number of spines in juvenile *B. bredini* is still higher than that of *B. virginalis* (8 to 16 spines in P1 of *bredini*, 5 in *virginalis*; 6 to 13 spines in P2 of *bredini*, 6 in *virginalis*); (2) the carpus and propodus of pereiopods 3 and 4 bear setiform elements on their posterior margin in *B. virginalis*, but bifid, spiniform elements in *B. bredini*; (3) the endopodite of the pleopods is scale-like, hardly longer than wide, in *B. bredini*, versus finger-shaped, much longer than wide, in *B. virginalis*; (4) the telson of *B. bredini* has a straight to convex distal margin, a concave distal margin in *B. virginalis*; (5) the transformed spine of the 2nd male pleopod bears distally some 25 denticles in *B. bredini*, some 13 in *B. virginalis*; (6) the dactylus of pereiopod 5 bears 2 inner setae in *B. bredini*, only 1 in *B. virginalis*; (7) the dactylus of pereiopod 6 bears 3 inner setae in *B. bredini*, only 2 in *B. virginalis*; (8) the outer margin of the dactylus of pereiopod 7 bears only 1 plumose seta in *B. bredini*, 1 plumose seta and 2 or 3 extra setae in *B. virginalis*.

Bogidiella (Stygogidiella ?) perla n. sp.
Figs. 7-9.

Material. — One ♂ (holotype). Amsterdam Expeditions to the West Indian Islands, sta. 78/341. Venezuela: Isla de Margarita, well La Plaza (11°05'33"N 63°51'35"W), water-table at 9 m, water depth 4 m, chlorinity 480 mg/l, Cvetkov net, 1 June 1978 (ZMA coll. no. Amph. 107.454). Accompanying fauna: *Ingolfiella* (*Gevgeliella*) *margaritae* Stock, 1979 (Amphipoda), Cyclopidae, Harpacticoidea, Isopoda, Acari, Collembola, Annelida.

Description. — Male (holotype): Length of body 2.5 mm, first antenna 1.3 mm, third uropod 0.5 mm.

First antenna (fig. 7a) with robust pedunculus, of which the 1st segment bears two ventral spines. Accessory flagellum 2-segmented, about as long as the third peduncle segment and longer than the

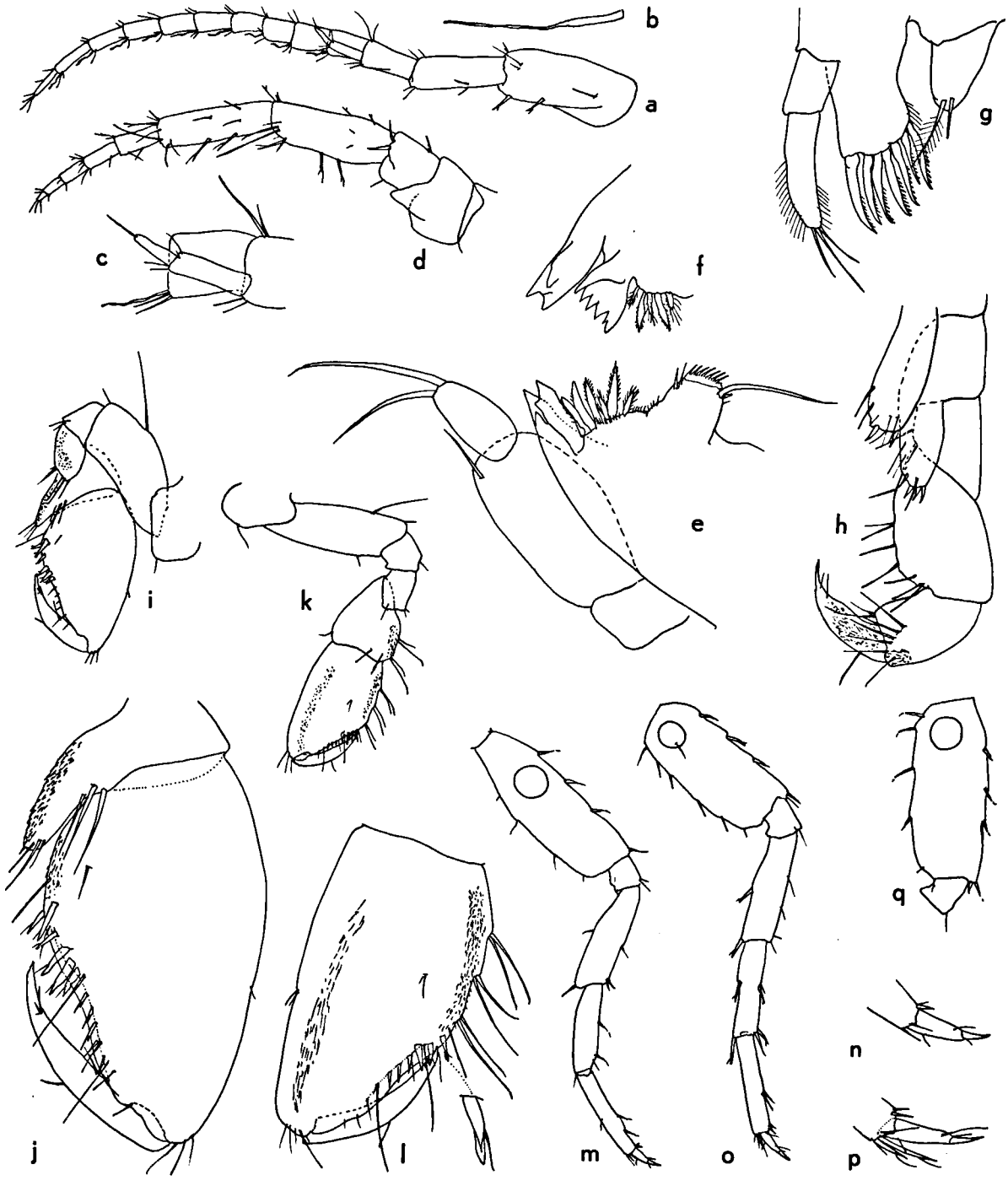

Fig. 7. *Bogidiella* (*Stygogidiella ?*) *perla* n. sp. ♂ (holotype), from La Plaza, Margarita: a, first antenna (scale 1); b, aesthetask from first antenna; c, accessory flagellum of first antenna (2); d, second antenna (1); e, left mandible (3); f, masticatory part of right mandible (3); g, first maxilla (3); h, maxilliped (2); i, first gnathopod (1); j, distal segments of first gnathopod (2); k, second gnathopod (1); l, distal segments of second gnathopod (2); m, fourth pereiopod (1); n, claw of fourth pereiopod (2); o, fifth pereiopod (1); p, claw of fifth pereiopod (2); q, basal segments of sixth pereiopod (1).

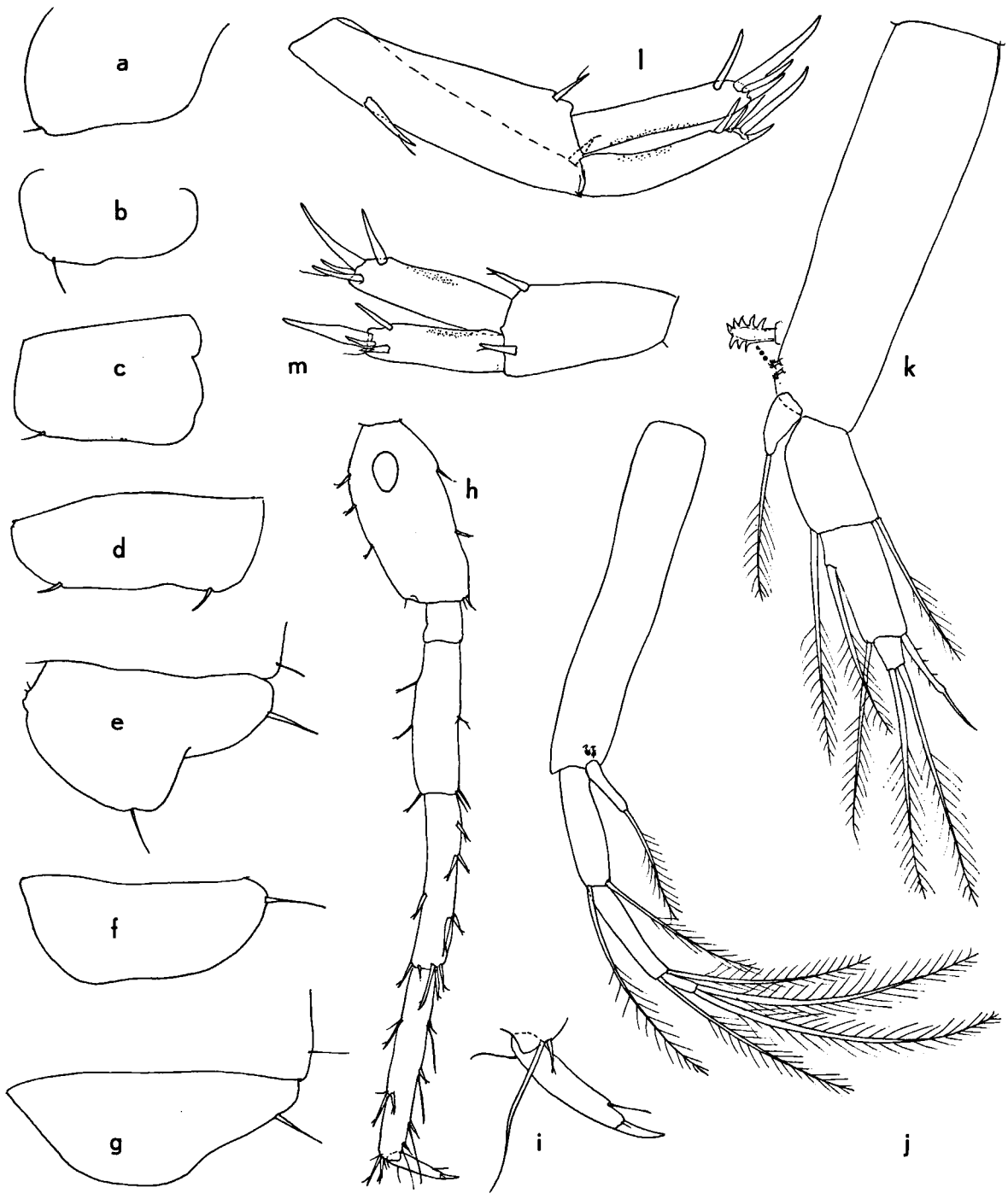

Fig. 8. *Bogidiella* (*Stygogidiella ?*) *perla* n. sp., ♂ (holotype), from La Plaza, Margarita: a, coxal plate of gnathopod 1 (scale 2); b, same of gnathopod 2 (2); c, same of pereiopod 3 (2); d, same of pereiopod 4 (2); e, same of pereiopod 5 (2); f, same of pereiopod 6 (2); g, same of pereiopod 7 (2); h, seventh pereiopod (1); i, claw of seventh pereiopod (3); j, first pleopod (2); k, second pleopod (2); l, first uropod (2); m, second uropod (2).

first flagellum segment (fig. 7c). Flagellum 10-segmented, segments squarish to rectangular; aesthetasks (fig. 7b) present on segments 1 to 9, 50-75% as long as the corresponding segment.

Second antenna (fig. 7d) slightly shorter than the first, with a triangular cement gland cone, directed forward; segment 4 of pedunculus rather short, shorter and less slender than segment 5; segments 4 and 5 with 3 and 2 long ventral spines, respectively. Flagellum shorter than peduncle segments 4 and 5 combined, 5-segmented.

Right mandible (fig. 7f) with a wide lacinia mobilis, armed with 6 distal teeth; left mandible (fig. 7e) with a narrow, bicuspidate lacinia mobilis. Palp segment 1 unarmed; segment 2 very robust, almost elliptical in outline, armed with 1 short distal seta; segment 3 short and much narrower than segment 2, also almost elliptical, armed with 2 long distal setae.

Labium: inner lobes less distinct than in *B. virginalis*.

First maxilla (fig. 7g) with 2-segmented palp; segment 2 with 3 distal setae. Outer lobe with 7 distal spines, each spine medially armed with about 9 sharp teeth. Inner lobe with 2 setae.

Second maxilla of the usual bogidiellid structure. Inner lobe with 5, outer lobe with 8 distal elements.

Maxilliped (fig. 7h) of the usual structure. Inner lobe with 2, outer lobe with 4 distal spines. Palp segments rather short and robust.

Coxal plates 1 to 7 (figs. 8 a-g) wider than long, armed with 1 (P1, P2, P3, P6, P7) or 2 (P4, P5) ventral spinules. Coxal gills present on P4 through P6, elliptical, largest on P4, smallest on P6 (figs. 9 a-c).

First gnathopod (fig. 7i): coxa with 1 long and 1 short seta on posterior margin; a finger-shaped projection is present on the posterior margin of the carpus (typical of most members of the family). Propodus (fig. 7j) with a slightly concave palm; palmar angle with 6 spines. Palmar index 0.54.

Second gnathopod (fig. 7k): coxal armature as in P1; carpus trapezoidal, non-projecting. Propodus (fig. 7l) smaller than in P1, palmar margin nearly straight, palmar angle armed with 3 spines. Palmar index 0.43.

Third and fourth (fig. 7m) pereiopods similar, with circular lentiform organ at about 1/3 of the length of the basis. Fifth leg (fig. 7-o) of the same length as the fourth; circular lentiform organ near the proximal end of the basis. Sixth leg (fig. 7q) longer than the fifth, but shorter than the seventh; lentiform organ as in P5, otherwise resembling P7. Seventh leg (fig. 8h) with elliptical lentiform organ; propodus with some longer, setiform elements on its anterior margin.

Epimeral plates I to III (fig. 9d) with unarmed ventral margin; posteroventral corner rounded, armed with 1 subdistal spinule placed in a notch.

Pleopod 1 (fig. 8j) with slender peduncle; two more or less spoon-shaped retinacula, laterally armed with 3 to 5 denticles; endopodite 1-segmented, elongate, finger-shaped, distally armed with a long, plumose seta; exopodite 3-segmented, segments slender, each armed with 2 long, plumose setae.

Pleopod 2 (fig. 8k) with more robust peduncle and exopodite segments. Endopodite tapering, less elongate than in pleopod 1. Exopodite segment 2 with 2 inner plumose setae, outer seta transformed into a shorter, curved, almost glabrous, element.

Pleopod 3 as pleopod 2, but all exopodite elements are setiform and plumose as in pleopod 1.

Uropods 1 (fig. 8l) and 2 (fig. 8m) not transformed. Uropod 3 (fig. 9e) of the typical Bogidiellid structure.

Telson (fig. 9f) trapezoidal; distal margin slightly concave; distal corners armed with 1 long spine each; in the middle of the lateral margin, another long spine is implanted; between the lateral and the distal spines, a pair of sensory setae is found.

D e r i v a t i o n o m i n i s. — The specific name, *perla* (pearl), refers to the name of the type-locality, the island of Margarita.

S u b g e n e r i c s t a t u s. — Since only the male sex of the new species is known, I am unable to decide if this species belongs to the subgenus *Antillogidiella* or *Stygogidiella* (which are differentiated on the structure of the first uropod in the female).

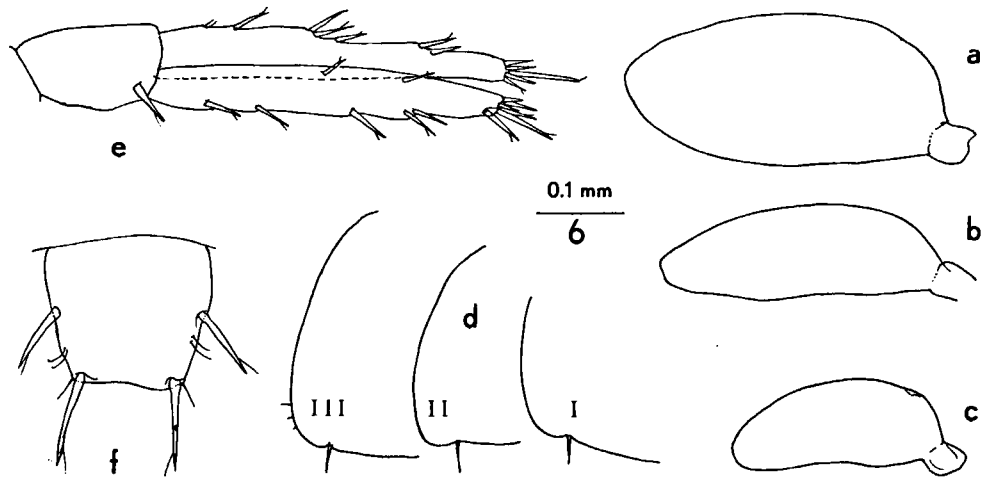

Fig. 9. *Bogidiella* (*Stygogidiella ?*) *perla* n. sp., ♂ (holotype), from La Plaza, Margarita: a, coxal gill of pereiopod 4 (scale 2); b, same of pereiopod 5 (2); c, same of pereiopod 6 (2); d, epimeral plates I-III, from the right (6); e, third uropod (6); f, telson (2).

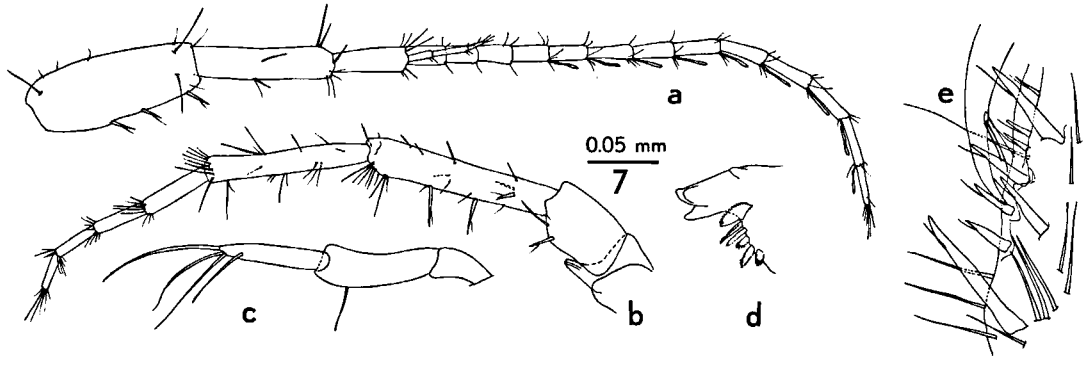

Fig. 10. *Bogidiella* (*Stygogidiella*) sp., ♀, from Palmarejo, Puerto Rico: a, first antenna (scale 4); b, second antenna (4); c, right mandible palp (5); d, masticatory part of left mandible (7); e, palmar margin of first gnathopod (5).

The overall resemblance (based on similarities in the telson structure, maxillipedal inner and outer plates, inner lobe of the first maxilla) with *Stygogidiella* has led (or misled) me to attribute the new species provisionally to this subgenus.

Distinction. — *B. perla* n. sp. differs from all other species of *Stygogidiella* and *Antillogidiella* by the presence of lenticular organs on the pereiopods, in the swollen second and short third segment of the mandibular palp and in the multidenticular nature of all spines on the outer lobe of the first maxilla.

Bogidiella (Stygogidiella ?) sp. Fig. 10

Material. — One ♀. Amsterdam Expeditions to the West Indian Islands, sta. 80/109. Puerto Rico: east of Palmarejo, pump of farmer (18°02'21"N 67°04'05"W), 20 April 1980 (ZMA coll. no. Amph. 107.461).

Remarks. — It is difficult in this genus to identify solitary females. The present specimen, a female of 4 mm long, is very similar to *B.* (*S.*) *virginalis*, described in the preceding pages. It differs, however, sufficiently from *B.* (*S.*) *virginalis* to be considered a subspecies of it. A final decision about its taxonomic status has not been made, since it is preferred to have access to males

before a formal description of a new taxon is endeavoured.

The Puerto Rican female differs from *B.* (*S.*) *virginalis* in the following characters:

The first antenna (fig. 10a) is more slender, as is obvious in peduncle segments 2 and 3 and in the flagellum segments; peduncle segment 1 bears 3 ventral spines.

The second antenna (fig. 10b) is likewise more slender, in particular peduncle segments 4 and 5 and the flagellum segments.

The mandible has more slender palp segments 2 and 3 (fig. 10c), the latter being armed with 4 long setae. The lacinia mobilis of the left mandible (fig. 10d) is more finely and more regularly toothed than in *B.* (*S.*) *virginalis*.

The palmar angle of the first gnathopod (fig. 10e) bears 2 larger and 4 smaller spines.

The seventh leg of the Puerto Rican specimen is lacking. The remaining legs are very similar to those of *B.* (*S.*) *virginalis*, and so are the other mouthparts, the pleopods, uropods, and telson.

Bogidiella (s.l.) sp.

Material. — One specimen (fragm.): Marie-Galante (Antilles françaises): Petit Trou à Diable (15°54'01"N 61°18'36"W), fresh water, 15 March 1977 (C. Juberthie, no. 508) (ZMA coll. no. Amph. 107.462).

The specimen is too damaged to make even a subgeneric identification possible. The same specimen has been mentioned by Stock (1980b).

Actogidiella cultrifera n. sp. Figs. 11-12.

Material. — One ♀ (holotype), one ♂ (allotype) and nineteen paratypes. Amsterdam Expeditions to the West Indian Islands, sta. 78/153. Tortola (British Virgin Islands): Beef Island, Well Bay, just west of the end of the airfield (18°26'39"N 64°32'53"W), coarse intertidal sands, interstitial, method Karaman-Chappuis, marine, 26 April 1978 (ZMA coll. no. Amph. 107.457, 107.458, 107.460). Accompanying fauna: Microcerberidae (Isopoda), Microparasellidae (Isopoda), Polychaeta, Sipunculida, Harpacticoida (Copepoda), and *Marigidiella crassipes* n. sp. (Amphipoda, Bogidiellidae).

Description. — A small, blind, unpigmented species (body length, without antennae and 3rd uropods, 0.92-0.98 mm).

Coxal plates not overlapping, wider than long. Epimeral plates with rectangular posteroventral corner, unarmed (fig. 11p). Dorsum smooth, non-setiferous.

First and second antennae subequal in length. Peduncle of first antenna (fig. 11a) longer than the flagellum; peduncle segments 1 to 3 decreasing in length; segment 1 armed with 2 spines on inferior margin. Flagellum 6-segmented, second, fourth and fifth segments with very long aesthetasks (overreaching the corresponding segments). Accessory flagellum 2-segmented (fig. 11b); basal segment very elongate, longer than first flagellum segment; second segment small.

Second antenna (fig. 11c) with short gland cone; flagellum 4-segmented.

Mandible (fig. 11d) with reduced pars molaris; lacinia mobilis finely serrated on one side, with 4 coarse teeth on the other. Palp 3-segmented; segment 1 unarmed; segment 2 ventrally lobed, with one seta; segment 3 short with 2 terminal and 1 subterminal setae.

Maxilla 1 (fig. 11f): palp 2-segmented; inner lobe broadly ovate with 2 short setae; outer lobe with 7 spines, the medial margin of which is armed with 2 to 5 denticles.

Second maxilla (fig. 11g) with about 5 setae on each lobe.

Lower lip (fig. 11e) with well-developed inner lobes.

Maxilliped (fig. 11h) with small inner and outer lobes, the former with 3, the latter with 2 small distal spines.

First gnathopod (fig. 11i): posterior margin of basis with 1 long seta; merus with posterodistal, rugose projection; carpus with strong posterior lobe, armed with 2 special spines; propodus piriform; palmar margin (fig. 11j) indicated by 3 spines. Palmar index 0.45. No sexual dimorphism, except for a slight difference in size of the distalmost palmar angle spine, which is longer in the male.

Second gnathopod (fig. 11k): posterior margin of basis with 1 long and 1 short seta; merus and carpus without projections; propodus piriform, palmar margin (fig. 11l) indicated by 2 spines. Palmar index 0.45. No sexual dimorphism.

Oöstegites (figs. 11k, m) linear, with 5 to 8 long distal setae. Coxal gills on P4 to P6.

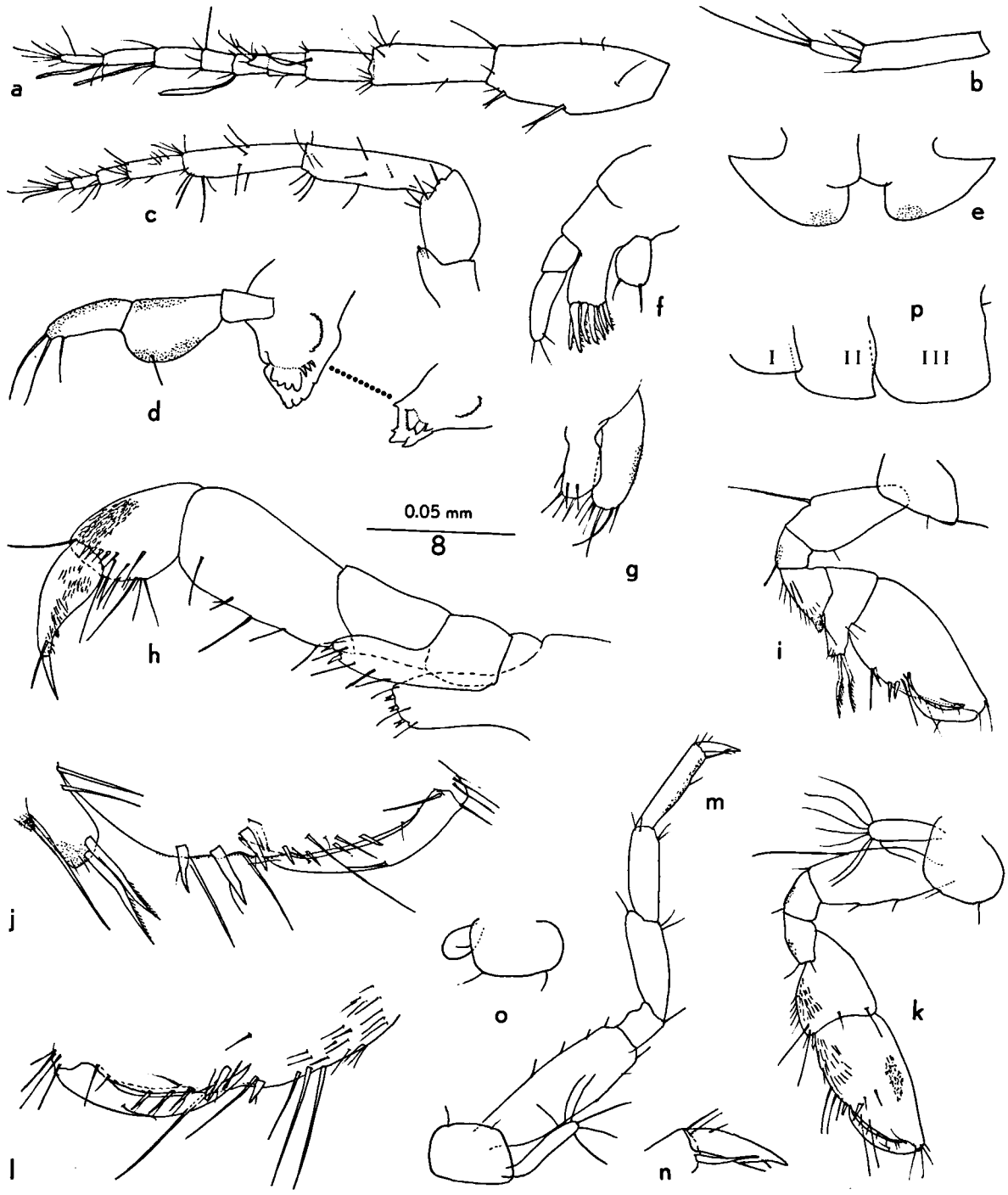

Fig. 11. *Actogidiella cultrifera* n. sp., ♀ (paratype), from Beef Island, Tortola: a, first antenna (scale 2); b, accessory flagellum (8); c, second antenna (2); d, right mandible and masticatory part of left mandible (8); e, labium (8); f, first maxilla (8); g, second maxilla (8); h, maxilliped (8); i, first gnathopod (2); j, palmar margin of first gnathopod (8); k, second gnathopod (2); l, palmar margin of second gnathopod (8); m, third pereiopod (2); n, claw of third pereiopod (8); o, coxal plate and coxal gill of fourth pereiopod (2); p, epimeral plates I-III, from the left (2).

Third pereiopod (fig. 11m) rather slender; fourth pereiopod similar to the third. Fifth (fig. 12a) and sixth pereiopod (fig. 12c) with very few spines and setae. Seventh pereiopod lacking in all specimens examined.

Pleopods devoid of endopodite (♀, ♂). Basipodite slender with only 1 (rarely 2) retinacula. Exopodite 3-segmented; short setae on segment 1, long plumose setae on segments 2 and 3 (♀, figs. 12 e-g); in the male, segments 1 and 2 bear short setae (figs. 12 h-i); one of the setae on segment 2 of pleopod 2 (♂) is transformed into a sigmoid spine (fig. 12i).

Uropod 1 sexually dimorphous. In the male (fig. 12j) the exopodite is baculiform, distally armed with 2 transformed ("spoon-shaped") spines; the endopodite is upcurved, dagger-like. In the female (fig. 12k) both rami are dagger-like, the exopodite being shorter than the endopodite.

Uropod 2 not sexually dimorphous; both rami are untransformed, distally armed with 2 or 3 short spines (fig. 12l).

Uropod 3 (fig. 12m) with two monomerous, equal rami; each ramus with rich distal armature, consisting of spines of different length, some being very long.

Telson (fig. 12n) trapezoidal, slightly tapering, lateral margins straight, unarmed; distal corners each with 1 long spine; distal margin very slightly concave.

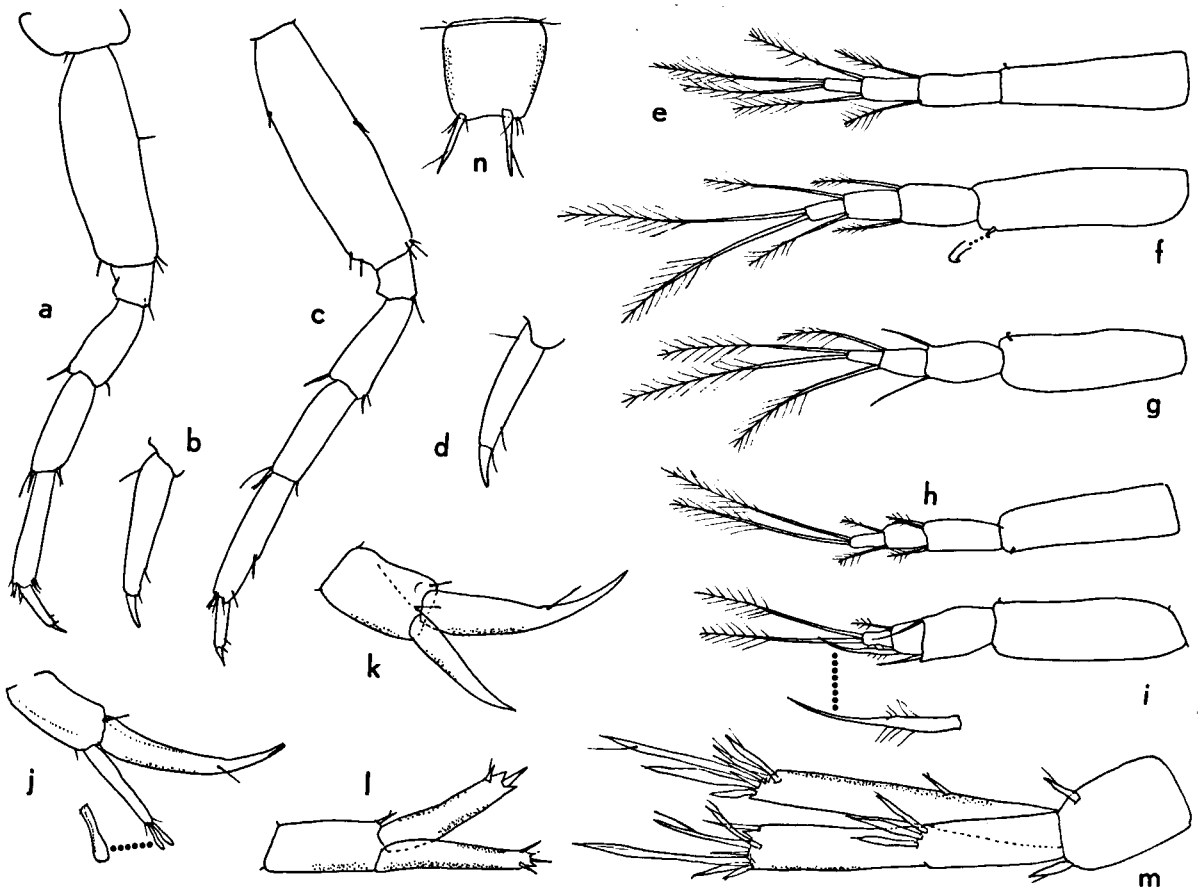

Fig. 12. *Actogidiella cultrifera* n. sp., from Beef Island, Tortola: a, fifth pereiopod, ♀ (scale 2); b, claw of fifth pereiopod, ♀ (8); c, sixth pereiopod, ♀ (2); d, claw of sixth pereiopod, ♀ (8); e, first pleopod, ♀ (3); f, second pleopod, ♀ (3); g, third pleopod, ♀ (3); h, first pleopod, ♂ (3); i, second pleopod, ♂ (3), with special spine on second exopodite segment more strongly enlarged; j, first uropod, ♂ (3), with special exopodite spine more strongly magnified; k, first uropod, ♀ (3); l, second uropod, ♀ (3); m, third uropod, ♀ (3); n, telson, ♂ (8).

Actogidiella sp.

Material. — One ♀. Amsterdam Expeditions to the West Indian Islands, sta. 78/308. Curaçao: estate Blauwbaai in sand and gravel below the entrance of Blauwbaai cave (12°08'20"N 68°59'05"W), Bou-Rouch phreatobiological pump, 3 m from the high tide mark, salinity 18840 mg/l, 20 May 1978 (ZMA coll. no. Amph. 107.459).

Remarks. — The only available specimen is badly damaged, lacking all legs. The morphology of the mandible and the first and second uropods point to a close relationship with *A. cultrifera*, described above. It does not seem to be identical with that species, because the rami of the first uropod are less unequal in length than in *A. cultrifera*.

Marigidiella crassipes n. sp. Figs. 13-14.

Material. — One ♀ (holotype). Amsterdam Expeditions to the West Indian Islands, sta. 78/153. Tortola (British Virgin Islands): Beef Island, Well Bay, just west of the end of the airfield (18°26'39"N 64°32'53"W), coarse intertidal sands, interstitial, method Karaman-Chappuis, marine, 26 April 1978 (ZMA coll. no. Amph. 107.456). Accompanying fauna: Microcerberidae (Isopoda), Microparasellidae (Isopoda), Polychaeta, Sipunculida, Harpacticoidea (Copepoda), and *Actogidiella cultrifera* n. sp. (Amphipoda, Bogidiellidae).

Description of the holotype. — Length of the body 1.1 mm. Dorsum of each trunk segment with a couple of small setae.

First antenna much longer than the second. Peduncle segments 1 and 2 of the first antenna elongate, segment 3 much shorter (fig. 13a). Accessory flagellum very small, 2-segmented. Flagellum 7-segmented, with a long aesthetask on segments 4, 5 and 6.

Second antenna (fig. 13b) with a short, 5-segmented flagellum.

Mandible (figs. 13 c-d) with weakly developed corpus mandibulae; pars incisiva with only 2 well-developed teeth; 2 or 3 elements are implanted between the pars incisiva and the weakly developed pars molaris. Palp short, robust, 3-segmented; segment 1 unarmed; segment 2 with 1 seta; segment 3 with 4 setae.

First maxilla (fig. 13f) with a slender, finger-shaped, 1-segmented palp, distally armed with 2 setae; outer lobe with 7 spines, 4 of which bear 4 inner denticles, the remaining 3 bear only 1 inner denticle; inner lobe oval, with 2 distal setae.

Second maxilla (fig. 13g) consisting of 2 elliptical lobes, one with 4 and one with 5 setiform distal elements.

Labium (fig. 13e) with broadly oval, unarmed lateral lobes; inner lobes prominent, truncated, with sclerotized free margin.

Inner and outer lobes of the maxillipeds weak (fig. 13h), with reduced distal armature, consisting of setules only. Palp segment 4 with a heavy, spiniform, plumose distal spine; claw hooked, slender.

Coxal plates 1 to 4 not much wider than long. Coxal gills on P4 through P6, without well-defined basal stalk (fig. 13-o). Broodplates elongate-oval, with 3 or 4 distal, barbated setae.

First gnathopod (fig. 13i) with short and broad basis, the posterior margin of which bears 2 long and 1 short setae. Carpus with rather modest posterior projection, armed with 1 pectinate spine. Propodus roughly oval; palmar index 0.42; palmar margin with 1 spine on the free posterior margin and 2 palmar angle spines; palmar margin with 2 shallow, narrow excavations near the palmar angle (fig. 13j).

Second gnathopod (fig. 13k) with a more slender basis than in gnathopod 1; posterior margin of basis with 2 very long and 1 short setae; anterior margin of propodus with 3 pectinate spines; propodus almost rectangular (palmar index 0.27); 2 palmar angle spines (fig. 13l).

Pereiopods 3 (fig. 13m) and 4 (fig. 13-o) almost identical, rather robust, with reduced setosity. Propodus with a long distal spine, as long as the claw (fig. 13n).

Pereiopods 5 and 6 (fig. 13p) also very similar, robust; one of the distal propodal elements is much longer than the claw (fig. 13q). Pereiopod 7 (fig. 13r) very robust; distal propodal spine as long as the claw (fig. 13s).

First pleopod similar to the second (fig. 14a); two very small retinacula; exopodite 3-segmented, segments 1 and 2 very elongate, armed with 1 plumose seta on their inner distal and outer distal corners; distal segment minute, armed with 2 long plumose setae; endopodite thin, 1-segmented, almost as long as exopodite segment 1, armed with 2 distal setae.

Third pleopod (fig. 14b) with sausage-shaped

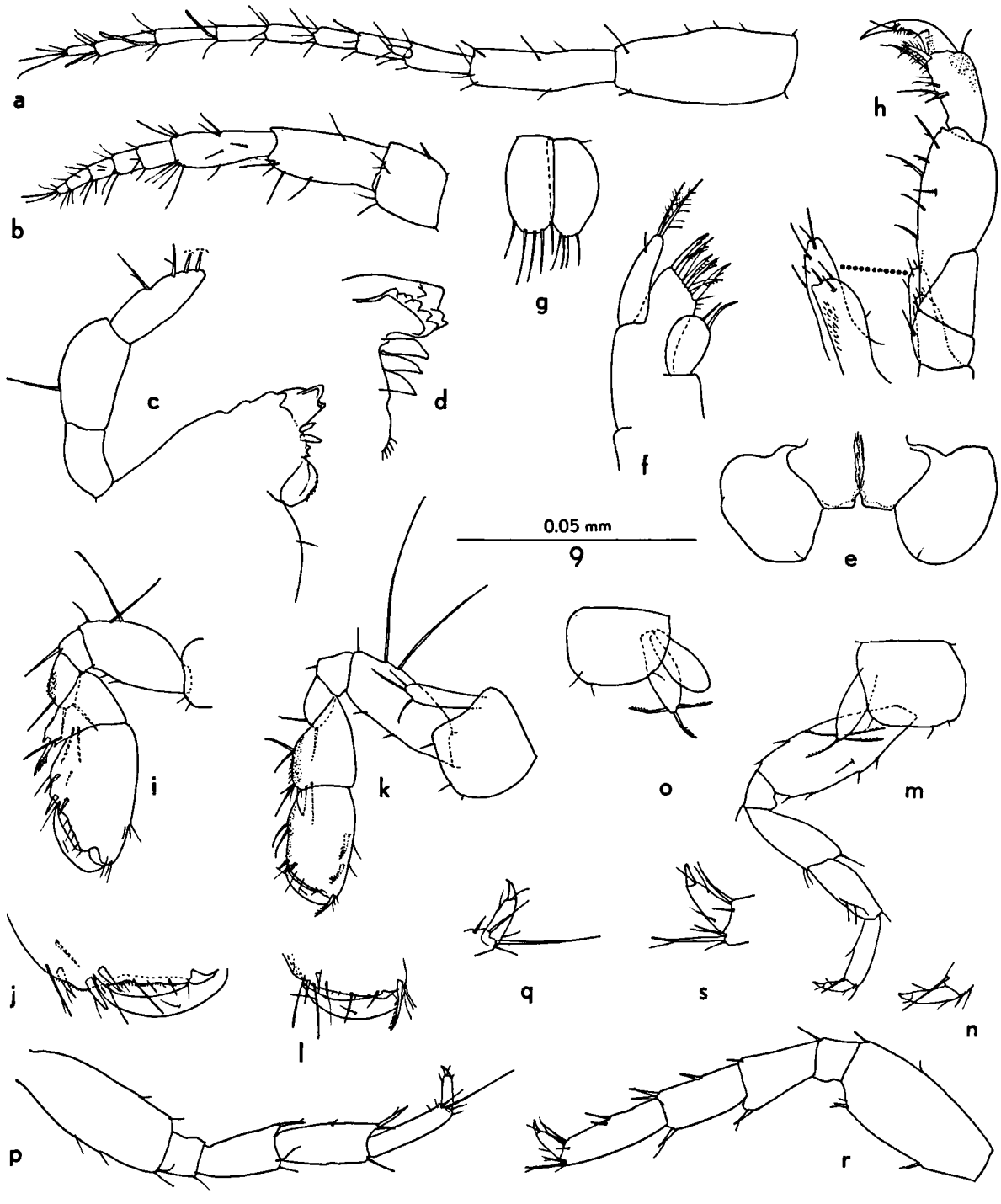

Fig. 13. *Marigidiella crassipes* n. sp., ♀ (holotype), from Beef Island, Tortola: a, first antenna (scale 2); b, second antenna (2); c, mandible (8); d, contralateral mandible, masticatory part (9); e, labium (8); f, first maxilla (8); g, second maxilla (8); h, maxilliped (3), inner and outer lobes more strongly magnified (8); i, first gnathopod (2); j, palmar margin of first gnathopod (3); k, second gnathopod (2); l, palmar margin of second gnathopod (3); m, third pereiopod (2); n, claw of third pereiopod (3); o, coxal plate, oöstegite and coxal gills of fourth pereiopod (2); p, sixth pereiopod (2); q, claw of sixth pereiopod (3); r, seventh pereiopod (2); s, claw of seventh pereiopod (3).

exopodite, first segment with 2 distal plumose setae; second segment minute, also with 2 plumose setae; endopodite thin, about two-thirds of the length of the first exopodite segment, armed with 2 setae.

Uropods 1 and 2 (figs. 14 d-e) with transformed rami. Both rami are more or less dagger-shaped; the exopodite in uropod 2 bears 1 distal and 1 subdistal spine; the endopodite terminates into a bicuspidate, slender process. The inner and outer margins of both rami are lined by numerous minute spinules.

Uropod 3 (fig. 14f) has two subequal rami, with unarmed lateral and median margins; distally, the rami bear 2 pointed processes and 1 spine.

The telson (fig. 14g) is much longer than wide, more or less tongue-shaped; two closely-set distal spines are separated by a small tubercle and flanked by 2 sensory setules.

Epimeral plates II and III (fig. 14c) with rectangular posterior corner; posterior margin with 1 setule, ventral margin unarmed.

Remarks. — The present material resembles closely the species described as *Bogidiella brasiliensis* by Siewing, 1953. Under the supposition that Siewing's description and drawings are correct, the following differences justify the separation of the West Indian material into a new species:

(1) The mandible palp is said to be 2-segmented in *B. brasiliensis* (versus 3-segmented); (2) the accessory flagellum of the first antenna is 1-segmented in *B. brasiliensis* (versus 2-segmented); (3) the basis of P2 bears 3+1 posterior setae in *B. brasiliensis* (versus 2+1); (4) the palp of maxilla 1 is as long as the outer lobe in *B. brasiliensis* (versus longer than the outer lobe); (5) the second maxilla bears short distal elements in *B. brasiliensis* (versus long elements); (6) the endopodites of uropods 1 and 2 terminate in one process in *B. brasiliensis* (versus bicuspidate); (7) the exopodite of pleopods 1 and 2 is 2-segmented in *B. brasiliensis* (versus 3-segmented); (8) the exopodite of pleopod 3 is 1-segmented in *B. brasiliensis* (versus 2-segmented); (9) the endopodite of pleopod 3 is less than half as long as the exopodite in *B. brasiliensis* (versus $> 1/2$); (10) the endopodite of pleopod 2 is much shorter than exopodite segment 1 in *B. brasiliensis* (versus subequal); (11) the first exopodite segment of pleopods 1 and 2 bear short setae in *B. brasiliensis* (versus long); (12) the palmar margin of gnathopod 1 shows one large concavity (versus 2 small concavities).

Derivatio nominis. — The specific name proposed, *crassipes*, alludes to the heavy aspect of the pereiopods, more in particular of the seventh.

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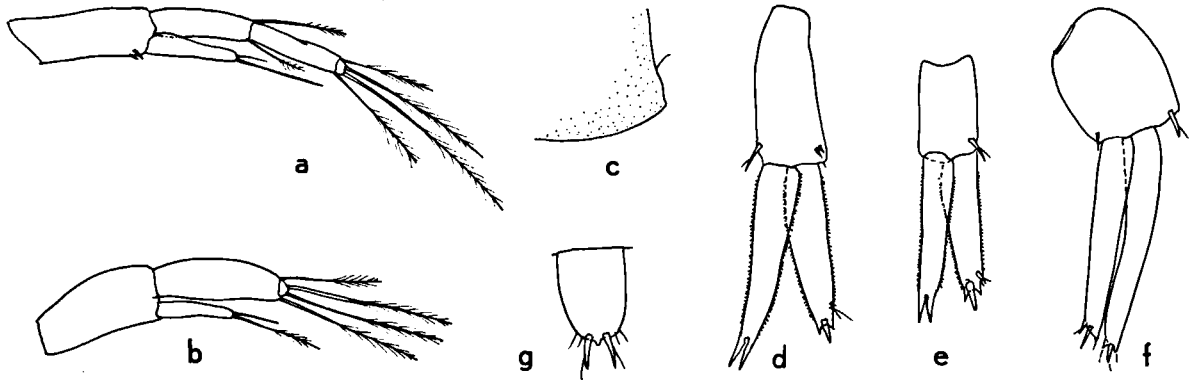

Fig. 14. *Marigidiella crassipes* n. sp., ♀ (holotype), from Beef Island, Tortola: a, second pleopod (scale 3); b, third pleopod (3); c, third epimeral plate, from the left (2); d, first uropod (3); e, second uropod (3); f, third uropod (3); g, telson (3).

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