

STYGOFAUNA OF THE CANARY ISLANDS, 22.
BOGIDIELLA (STYGOGIDIELLA) ATLANTICA N. SP. (AMPHIPODA)
FROM INTERSTITIAL WATERS ON THE WESTERN
CANARY ISLANDS

BY

E. L. SÁNCHEZ

Museo de Ciencias Naturales de Santa Cruz de Tenerife, Apdo. Correos 853,
38.080 Santa Cruz de Tenerife, Islas Canarias, Spain

RESUMEN

Una nueva especie de *Bogidiella (Stygogidiella)*, denominada *atlantica* es descrita de las aguas intersticiales marinas de las Islas Canarias occidentales (Tenerife, Gomera y Hierro). Se trata de una especie con características intermedias a las especies del subgenero, ya descritas de Canarias (Fuerteventura, aguas dulces y Lanzarote, medio mixohalino). Se incluyen una clave de las especies del subgenero.

INTRODUCTION

Until now 3 species of *Bogidiella* have been described from the Canary Islands: *Bogidiella (Stygogidiella) uniramosa* Stock & Ronde-Broekhuizen, 1987; *B. (S.) purpuriae* Stock, 1988 and *B. (Xystrogidiella) spathulata* Stock & Ronde-Broekhuizen, 1987. In the Canary Islands *Stygogidiella* was found in mixohaline waters of Lanzarote (*B. (S.) uniramosa*), and in inland groundwaters of Fuerteventura (*B. (S.) purpuriae*). The new species described in this paper inhabits a different type of habitat, viz. the marine interstitial waters of Tenerife, Gomera and Hierro. This is the first representative of the genus in the western part of the Canary Archipelago.

In the recent papers of Stock (1981, 1984, 1985); Karaman (1982); Grosso & Claps (1985) and Grosso & Fernandez (1985); the genus *Bogidiella* is divided in 11 subgenera, viz. *Bogidiella* s. str. Hertzog, 1933; *Medigidiella* Stock, 1981; *Orchestigidiella* Stock, 1981; *Stygogidiella* Stock, 1981; *Mexigidiella* Stock, 1981; *Guagidiella* Stock, 1981; *Antillogidiella* Stock, 1981; *Xystrogidiella* Stock, 1984; *Hagidiella* Stock, 1985; *Dyticogidiella* Grosso & Claps, 1985 and *Mesochthongidiella* Grosso & Fernandez, 1985.

The subgenus *Stygogidiella* is characterized by the presence of sexual dimorphism in the second pleopod of the ♂ (with a modified element, presumably used for sperm transfer, cf. Stock, 1981). So far the subgenus includes the following species: *B. (S.) bredini* Shoemaker, 1959; *B. (S.) virginialis* Stock, 1981;

B. (S.) perla Stock, 1981; *B. (S.) lavillai* Grosso & Claps, 1984; *B. (S.) uniramosa* Stock & Ronde-Broekhuizen, 1987; *B. (S.) purpuriae* Stock, 1988; *B. (S.) horcomollensis* Grosso & Fernandez, 1988, and *B. (S.) atlantica* n. sp.

Bogidiella cerberus Bou & Ruffo, 1979 from the Alepotrypa cave (Peleponnesos, Greece) was attributed with some doubt to *Stygogidiella* by Stock (1981) and Karaman (1982), and therefore is not included in the above list.

KEY TO THE SPECIES OF *STYGOGIDIELLA*

1. Propodus of Gn1 elongate *B. (S. ?) cerberus*
- Propodus of Gn1 not elongate 2
2. Pereopods with lentiform organ 3
- Pereopods without lentiform organ 5
3. Simple spines on inner lobe of Mxp *B. (S.) perla*
- Bilobed spines on inner lobe of Mxp 4
4. Telson with 1 lateral spine on middle of lateral margin. Modified element on 2nd pleopod male compact *B. (S.) lavillai*
- Telson with 2 lateral spines on middle of lateral margin. Modified element on 2nd pleopod male hollow (leaf-shaped) *B. (S.) horcomollensis*
5. Pleopods biramous (endopodite vestigial) 6
- Pleopods uniramous 7
6. Palmar margin of Gn1 densely spinose *B. (S.) bredini*
- Palmar margin of Gn1 sparsely spinose *B. (S.) virginialis*
7. With bilobed spines on inner lobe of Mxp 8
- With simple spines on the inner lobe of Mxp *B. (S.) uniramosa*
8. With bifurcate spines on outer lobe of Mxl *B. (S.) atlantica*
- With simple spines on outer lobe of Mxl *B. (S.) purpuriae*

Bogidiella (Stygogidiella) atlantica sp. nov. (figs. 1-5)

Material examined:

1 male, 1.7 mm (holotype); 1 female, 1.2 mm (allotype); 1 female, 1.5 mm (paratype), and 5 paratypes. Mesa del Mar, Tenerife, Islas Canarias. Low tide line; interstitial of coarse sand U.T.M.: CS 3613 × 31558. 6 Mar. 1990. J. H. Stock and R. Vonk leg. (Z.M.A. Amph. 108.768).

7 specimens. Playa de San Juan, Tenerife. In harbour, fine sand. U.T.M.: CS 3223 × 311913. 20 Mar. 1990. Stock and Vonk leg.

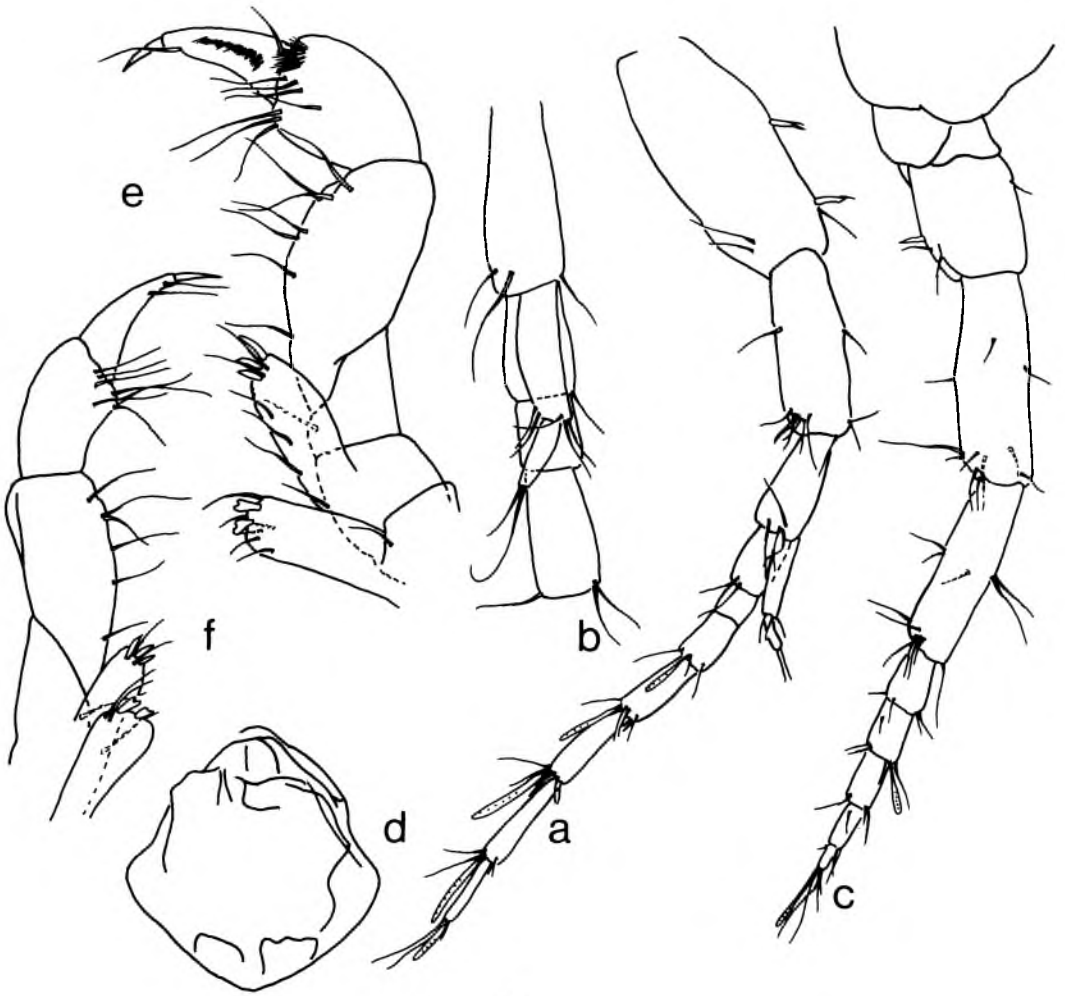
1 specimen (partially damaged, probably this species). Playa de San Juan, Tenerife. Low tide line, interstitial of coarse sand. 4 Mar. 1990. Stock and Vonk leg.

2 specimens. Playa del Socorro, Tenerife. In the low tide line on coarse sand. U.T.M.: CS 3431 × 31423. 8 Mar. 1990. Stock and Vonk leg.

2 specimens (partially damaged). Playa del Rio Chimiche, Tenerife. Anchihaline rock pools. U.T.M.: CS 3559 × 311119. 18 Mar. 1990. Stock and Vonk leg.

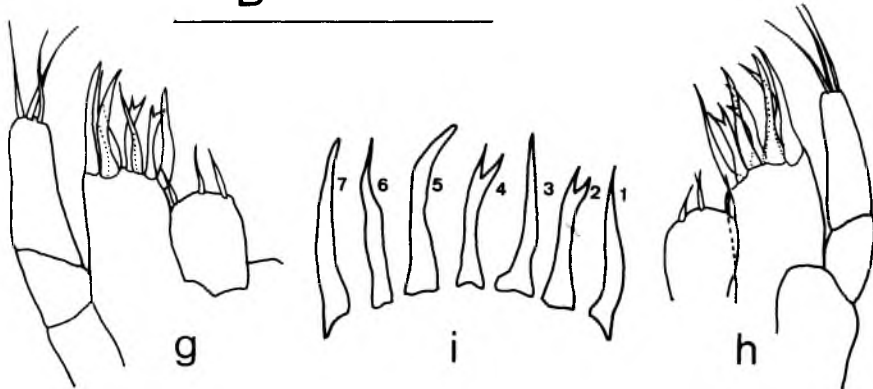
2 specimens (1 partially damaged, probably this species). Barranco de Iguete (San Andres),

Fig. 1. *Bogidiella (Stygogidiella) atlantica* sp. nov., ♂, Mesa del Mar (a, c, d, e, g, i); ♂, 1.2 mm, San Sebastian (b); ♀, 1.5 mm, Mesa del Mar (f); ♀, 2 mm, San Sebastian (h). a, antenna 1 (scale D); b, accessory flagellum A1 (F); c, antenna 2 (D); d, labrum (F); e, maxilliped (F) (♂); f, maxilliped (F) (♀); g, maxilla 1 (B) (♂); h, maxilla 1 (B) (♀); i, spines on outer lobe of Mxl (A) (♂).



0.5 mm A

B 0.1 mm



Tenerife. Resurgences on the high water line of the beach, interstitial of coarse sand, T: 20.6°C; cond.: 530 mS/cm. U.T.M.: CS 3877 × 315610. 3 Mar. 1990. Stock and Vonk leg.

1 female. San Andres, Tenerife. About 10 m from the beach. 4 Dec. 1988. R. Vonk and E. Sánchez leg.

2 specimens (probably this species). Los Roques, Tenerife. Just under the water line, interstitial of coarse sand. U.T.M.: CS 36112 × 312310. 19 Mar. 1990. Stock and Vonk leg.

5 specimens (probably this species). Los Roques (Los Abrigos). Just under the water line, interstitial of coarse sand. U.T.M.: CS 3443 × 31026. 19 Mar. 1990. Stock and Vonk leg.

2 specimens (1 partially damaged, probably this species). Los Roques (Los Abrigos), Tenerife. In interstitial gravel. 23 Mar. 1990. Stock and Vonk leg.

32 specimens (some partially damaged). Puerto de Alcalá; Tenerife. On the beach, in fine gravel. U.T.M.: CS 32014 × 312110. 20 Mar. 1990. Stock and Vonk leg.

3 specimens (probably this species). Alcalá. In small spring on the beach. T: 18°C; cond.: 29.2 mS/cm; Si.: 22 p.p.t. 4 Mar. 1990. Stock and Vonk leg.

12 specimens (partially damaged, probably this species). Alcalá, in the harbour, interstitial of coarse sand. 4 Mar. 1990. Stock and Vonk leg.

22 specimens. Alcalá. On the beach at the low tide line: interstitial of coarse sand. T: 18°C; cond.: 31.7 mS/cm; Si.: 24.5 p.p.t. 4 Mar. 1990. Stock and Vonk leg.

1 female, 2.7 mm. El Prix, Tenerife. cond.: 1779 mS/cm. in a well feeding a seawater swimmingpool. U.T.M.: CS 3613 × 31558; 26 Oct. 1986. Stock leg.

1 male, 1.2 mm; 1 female, 2 mm; 27 paratypes. La Gila, San Sebastian, Gomera. Low tide line of beach, interstitial of fine gravel. U.T.M.: BS 2704 × 311014. 13 Mar. 1990. Stock, Vonk and Sánchez leg.

1 specimen (probably this species). Valle Gran Rey, Gomera. Interstitial of the beach in gravel. U.T.M.: BS 2704 × 311014. 16 Mar. 1990. Stock, Vonk and Sánchez coll.

1 female, 2 mm. Jameos del Puerto (La Restinga), El Hierro, Islas Canarias. In interstitial of lava gravel in anchihaline cave. U.T.M.: BR 20595 × 306077. 13 Sep. 1988. Stock, Boxshall and Sánchez coll.

1 female, 2.1 mm. Jameos del Puerto (La Restinga), El Hierro. In lava debris at low tide on border of cave lake. T: 20.9°C, cond.: 35.6 mS/cm. 30 Apr. 1987. Stock leg.

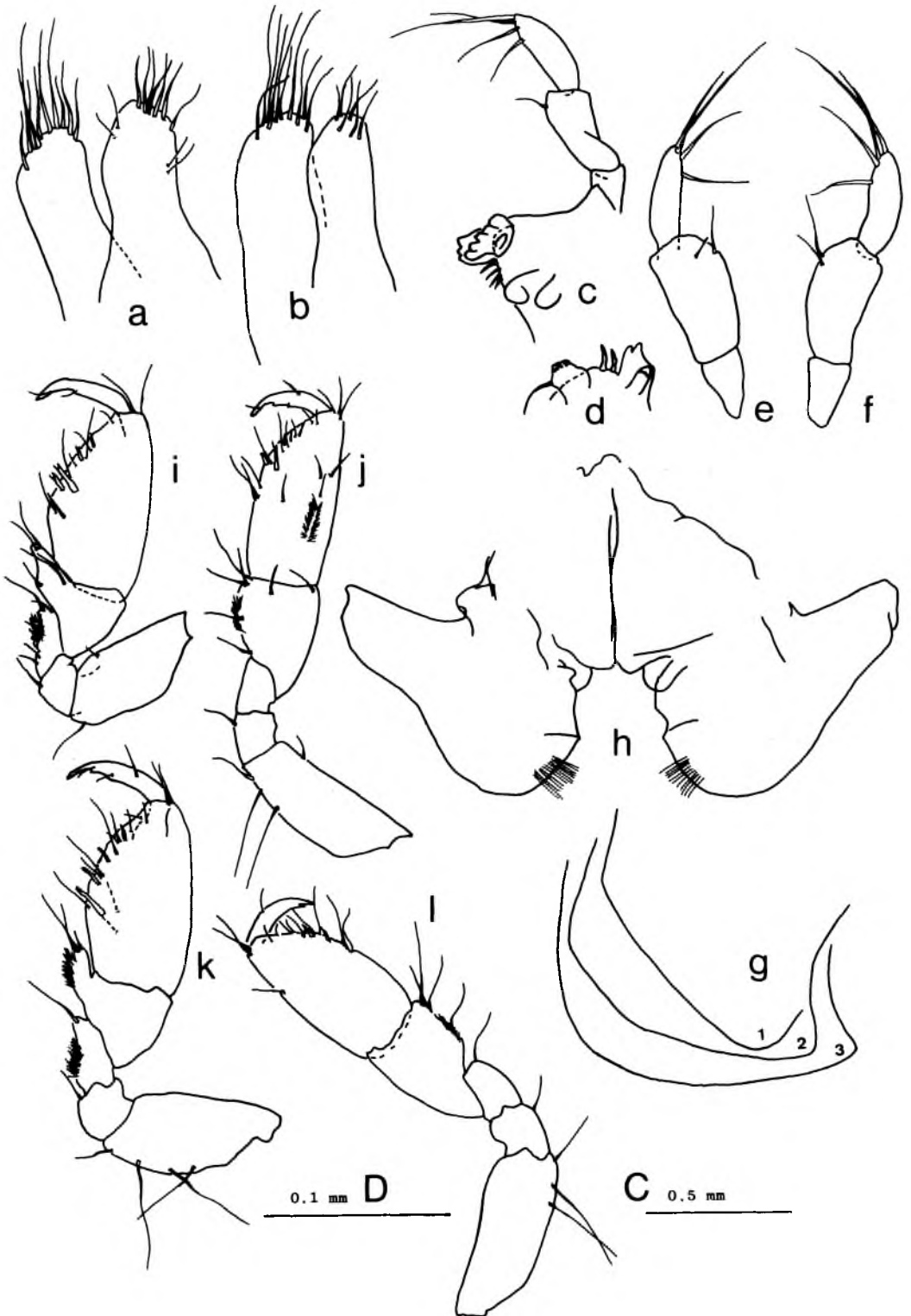
All samples from Tenerife and La Gomera collected by means of a Bou-Rouch biophretical pump (except for the sample from El Prix, which was taken with a Cvetkov net), those from Hierro by the Karaman-Chappuis method.

Accompanying fauna:

Microgastropoda (*Caecum* ?); Planaria; Gnathostomulida; Oligochaeta; Polychaeta; Amphipoda (Melitidae, *Idunella* sp., *Ingolfiella*, *Pseudoniphargus* cf. *fontinalis*), Isopoda (*Jaera*, *Microcerberus*, Cirolanidae, Microparasellidae), Copepoda (Harpacticoida).

Description. — Antenna 1 (fig. 1a). Peduncle 3-segmented; first segment with spinules on dorsal margin. Flagellum 7- to 8-segmented, accessory flagellum 2-segmented (3-segmented in female of San Sabastian) (fig. 1b). Aesthetascs on 3-5 distal segments (not overreaching or slightly overreaching length of corresponding segment).

Fig. 2. *Bogidiella* (*Stygogidiella*) *atlantica* sp. nov., ♂, holotype, Mesa del Mar (a, e, f, h); ♀, allotype, Mesa del Mar (b, k, l); ♂, paratype, 1.2 mm, San Sebastian (c, d, i, j); ♂, paratype, Los Abrigos (g). a, maxilla 2 (♂) (B); b, maxilla 2 (♀) (B); c, left mandible (♂) (F); d, right mandible (♂) (F); e, left mandible palp (♂) (F); f, right mandible palp (♀) (F); g, epimeral plate (♂) (F); h, labium (♂) (D); i, gnathopod 1 (♂) (D); j, gnathopod 2 (♂) (D); k, gnathopod 1 (♀) (D); l, gnathopod 2 (♀) (D).



Antenna 2 (fig. 1c). Peduncle 5-segmented, segment 3 short, in male with 1 spine on ventral margin (in ♀ 1 spine each margin), 4th and 5th segments elongate (equal in length or shorter than corresponding segment). Gland cone narrower at the tip.

Upper and lower lips as illustrated (figs. 1d, 2h).

Mandible (fig. 2c, d) with 3-segmented palp, 2nd segment swollen with 1-2 distal setae; 3rd segment with 4 long distal setae. Right lacinia mobilis with 5 teeth, incisor tricuspidate. Between incisor and molar 4 short setae; molar small. Left lacinia mobilis short, triangular, without visible denticulations, incisor with 2 teeth, molar rounded with a long lateral setae; 2 setae between incisor and molar.

Maxilla 1 (fig. 1g, h). Palp 2-segmented; with 3 setae on distal margin. Outer lobe with 7 distal spines (2nd and 3rd medialmost spine bifurcate, others unadorned) (in female 1.5 mm from Mesa del Mar, with unadorned spines). Inner lobe with 3 distal setae.

Maxilla 2 (fig. 2a, b). Inner lobe with 9-10 distal setae. Outer lobe with 4-7 distal setae, and few sensorial setules.

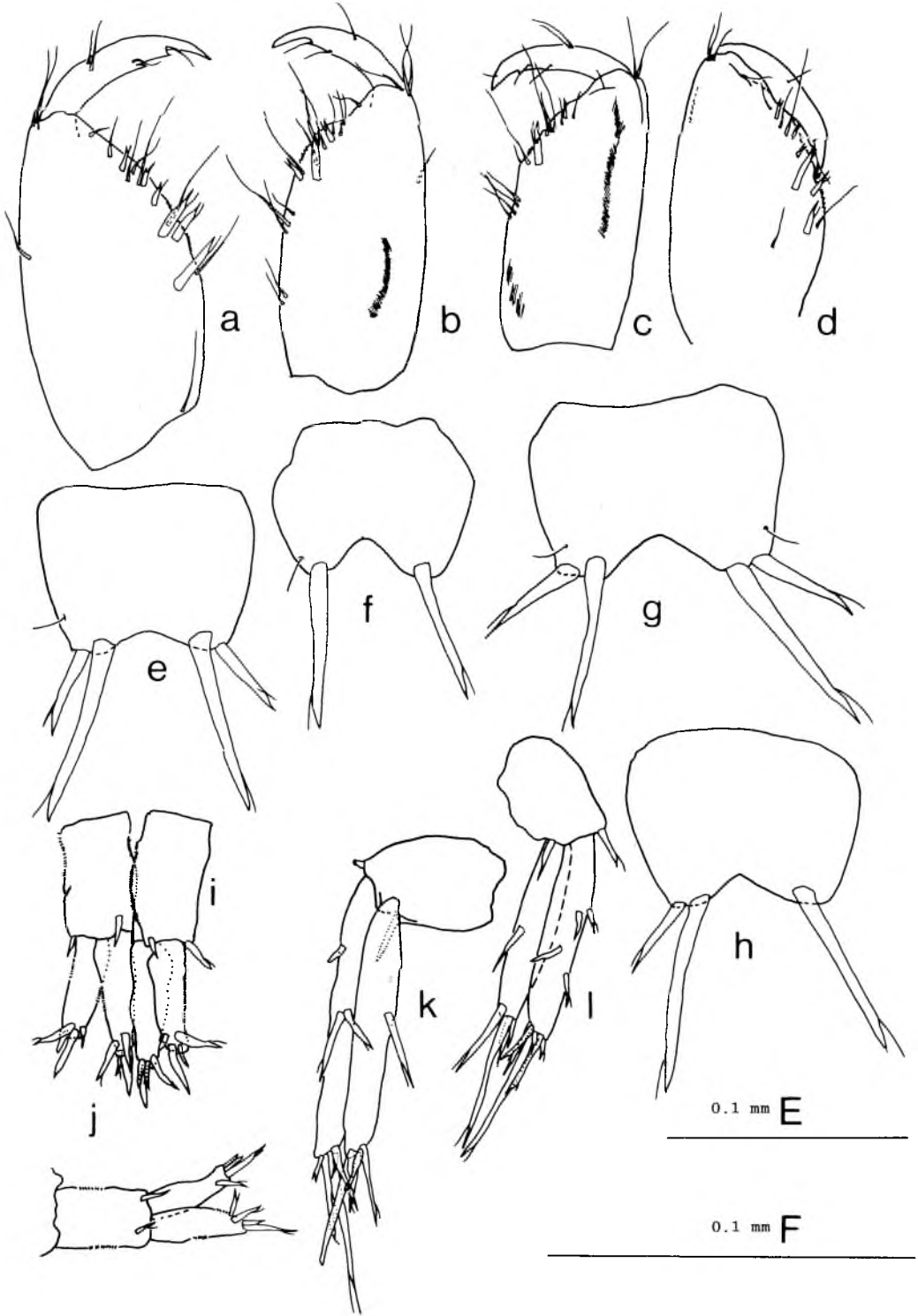
Maxilliped (fig. 1e, f). Small outer lobe and inner lobes. Inner lobe with 2 or 3 bilobed distal spines and 3-6 distal setae. Outer lobe with 3 finger-shaped spines, and with serrate latero-distal margin. Palp with 6-7 lateral setae on 3rd segment; 4th segment with 7 distal and lateral setae; 5th segment with 1 proximal and 1 distal setae. Palp ending in short and slender claw.

Coxal plates 1 to 7 as illustrated (fig. 5a).

Gn1 (fig. 2i, k). Basis with slightly widened posterior margin, with 0-3 long setae. Ischium with 1 distal seta on posterior margin. Merus with more setae on posterior margin and ciliate on medial margin. Carpus with strong projection on posterior margin. Ciliate margin of propodus in ♀ only (fig. 3a, d), longer than wide; posterior margin of palma serrate, with 2-3 palmar spines (2 longer and 1 short); 3 small spines and some setae. Palmar index: 0.54 (female)-0.60 (male).

Gn2 (fig. 2j, l). Basis straight, posterior margin with 2 long setae. Ischium with 1 disto-posterior seta. Merus with 0-1 disto-posterior setae; carpus without strong projection, posterior margin ciliate, with a few setae. Palmar angle with 1-2 spines; margin with 1 short spine and a few serrations (fig. 3b, c). Palmar index: 0.65 (female)-0.70 (male).

Fig. 3. *Bogidiella (Stygogidiella) atlantica* sp. nov., ♂, holotype, Mesa del Mar (e, i); ♀, allotype Mesa del Mar (j, l); ♀, paratype, 1.5 mm, Mesa del Mar (a, b, h); ♂, paratype, 2 mm, San Sebastian (c, d, f, k); ♀, paratype, 2 mm, San Sebastian (g). a, propodus of Gn1 (♀) (C); b, propodus of Gn2 (♀) (C); c, propodus of Gn2 (♂) (C); d, propodus of Gn1 (♂) (C); e, telson (♂) (B); f, telson (♂) (B); g, telson (♀) (B); h, telson (♀) (B); i, uropod 2 (♂) (E); j, uropod 2 (♀) (D); k, uropod 3 (♂) (E); l, uropod 3 (♀) (D).



Coxal gills on P3-P5. All pereopods without lentiform organs. (P3 to P7 lacking in the holotype.)

P3 (fig. 4c, d). Basis straight, 2 setae on anterior margin and 3 setae on posterior margin. Ischium naked; merus with 2 distal setae; carpus with 3 distal setae. Propodus with 2 distal sigmoid spines.

P4 (fig. 4e, f). Basis as in P3, 1 seta on anterior margin and 2 on posterior margin (1 distal). Ischium with 1 postero-distal seta. Merus, carpus and propodus as in P3. P3 slightly longer than P4. $P5 < P6 < P7$.

P5 (fig. 4g, h). Basis with convex posterior margin, ischium with long seta on antero-distal margin. Merus 1 with antero-distal seta and 1 postero-distal spine. Carpus with 3 distal spines (2 anterior and 1 posterior). Propodus with 2 short distal spines and 2 long posterior spines (the longest as long as claw).

P6 (fig. 4i, j). Basis and ischium as in P5. Merus with 2 setules on anterior margin, rest as in P5. Carpus as in P5 but with 1 spine less.

P7 (fig. 4k, l, m). Segments much stronger than in P5 and P6. Basis wide, with 3 spinules on posterior margin. Merus with central spinule on anterior margin and 1 strong spine on posterior margin, 2 antero-distal spines and 1 seta; 1 postero-distal spine. Carpus strongly armed on distal margin (2-3 spines and 1 setule on anterior margin and 2 spines and 1 setula on posterior margin). Propodus poorly armed (female Mesa del Mar) with 2 long seta (fig. 4k); in the female from San Sebastian with 5 setae and 1 spine (fig. 4m); all on anterior margin. Strongly armed distally. Elongate claw.

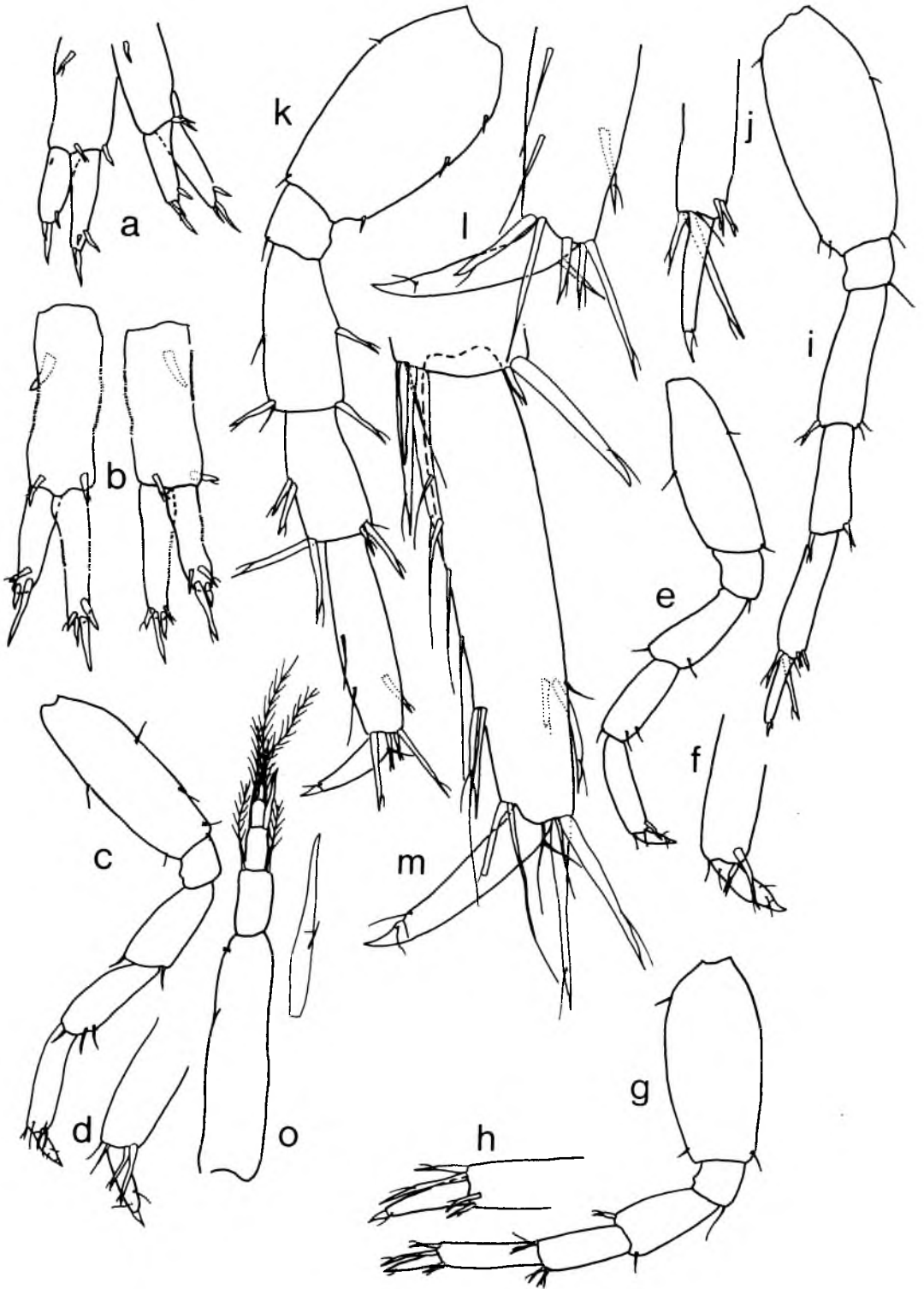
Pleopods (figs. 4o, 5b-f) uniramous in both sexes, without endopodite. Exopodite 3-segmented, each segment with 1 seta on its disto-medial and disto-lateral border, except for 2nd pleopod of male having a modified element on 2nd segment (sclerotized in the basal part and with a minute setule on medial margin).

Uropod 1 (fig. 4a, b) biramous, peduncle with a strong proximo-ventral spine (in ♀ some times accompanied by small spinule) and 2 distal spines (1+1). Endopodite longer than exopodite, rami with distal spines only (3-4 spines).

Uropod 2 (fig. 3i, j) biramous, short peduncle with 2 distal spines (sometimes lacking in ♀). Rami subequal, with 4 distal spines.

Uropod 3 (fig. 3k, l) biramous, short peduncle with 2 laterodistal spines, Rami subequal, with strong distal armature, longest spine on exopodite and endopodite always twice longer than other spines. Exopodite armed with 1-2

Fig. 4. *Bogidiella* (*Stygogidiella*) *atlantica* sp. nov., ♂, holotype, Mesa del Mar (b, o); ♀, allotype, Mesa del Mar (a, c, d, e, f, g, h, i, j, k, l); ♀, paratype, 2 mm, San Sebastian (m). a, uropod 1 (♀) (D); b, uropod 1 (♂) (E); c, pereopod 3 (♀) (D); d, detail of propodus P3 (♀) (E); e, P4 (♀) (D); f, detail of propodus P4 (♀) (F); g, P5 (♀) (D); h, detail of propodus P5 (♀) (F); i, P6 (♀) (D); j, detail of propodus P7 (♀) (F); k, P7 (♀, Mesa del Mar); l, dactylus P7; m, propodus of P7 (♀, San Sebastian) (F); o, pleopod 2 with modified element (♂) (D).



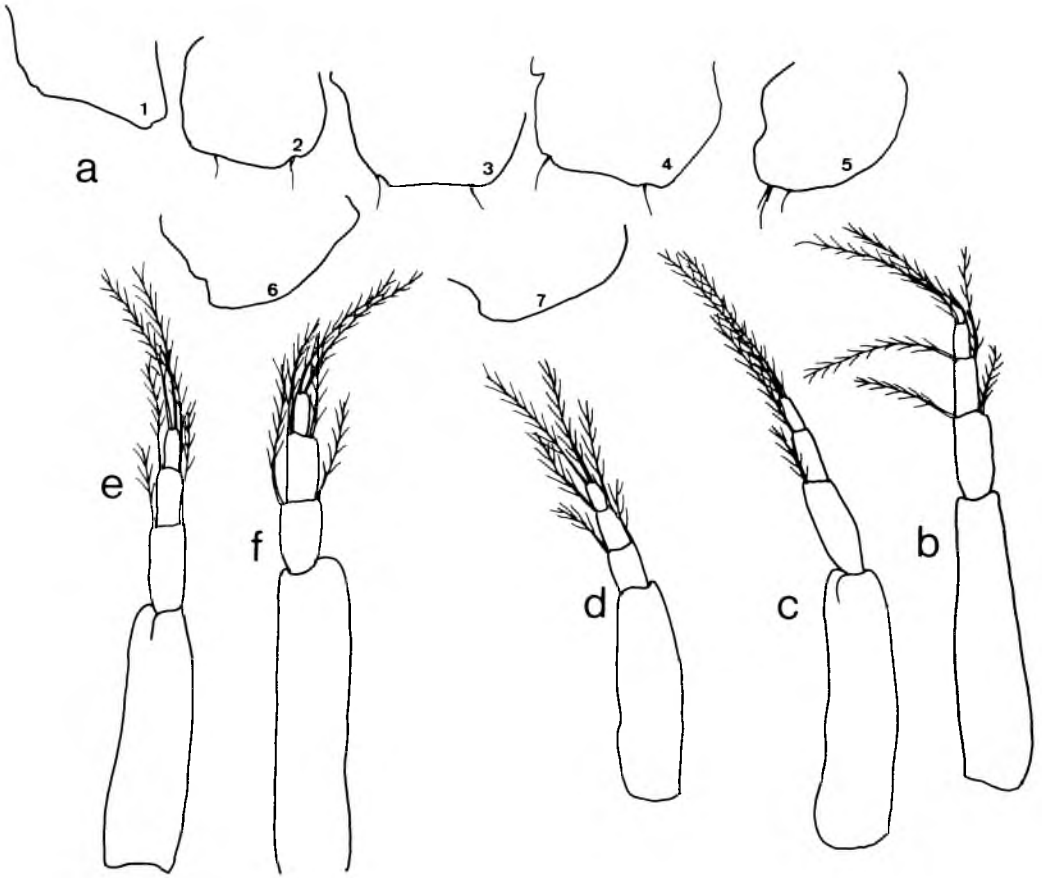


Fig. 5. *Bogidiella (Stygogidiella) atlantica* sp. nov., ♂, holotype, Mesa del Mar (e, f); ♀, paratype 2 mm, San Sebastian (a, b, c, d). a, coxal plates (1-7) (♀) (D); b, pleopod 2 (♀) (D); c, pleopod 1 (♀) (D); d, pleopod 3 (♀) (D); e, pleopod 1 (♂) (D); f, pleopod 3 (♂) (D).

groups of medial spines (each group with 2-3 spines) and some (1-2) isolated spines. Endopodite with 1 medial spine only.

Telson (fig. 3e-h) without sexual dimorphism, wider than long, with 2 long distal spines, tapering; concave distal margin; 1-2 short spines on latero-distal margin.

Derivatio nominis. — The specific name, *atlantica*, refers to the Atlantic Ocean, since the specimens were collected at the ocean shore.

REMARKS

The new species differs from the species of the subgenus in the following way:

B. (S.?) cerberus Bou & Ruffo, 1979, differs in the shape of the telson, the

armature of the pereopods and U3, and in the extremely elongated propodus of Gn1.

B. (S.) lavillai Grosso & Claps, 1984, possesses lentiform organs on the pereopods, and differs in the shape of the telson and the shape of the modified element on the 2nd segment of the 2nd male pleopod.

B. (S.) horcomollensis Grosso & Fernandez, 1988, differs in the same way as *B. (S.) lavillai*.

B. (S.) perla Stock, 1981, possesses lentiform organs and has a different telson shape.

B. (S.) bredini Shoemaker, 1954, has a strongly armed palmar margin, a different shape of the telson and a different configuration of the modified element on the 2nd male pleopod.

B. (S.) virginialis Stock, 1981, differs in the shape of the telson, the length and the armature of P7; the armature of the 2nd segment of A2, the shape of the spines on the inner lobe of Mxp, the ornamentation of the spines on the outer lobe of Mxp.

B. (S.) uniramosa Stock & Ronde-Broekhuizen, 1987, lacks aesthetascs on A2; has a different ornamentation of the spines on the outer lobe of Mx1, the 2nd segment of the mandible palp is swollen in *B. atlantica*; the spines on the inner lobe of Mxp are simple (bilobed in *B. atlantica*); the general armature of the palmar margin in Gn1 is different, the propodus of Gn2 is slightly more elongated than in *B. atlantica*, P7 has more slender articles and the general armature on the basis of the pereopods is less strong in the new species. Other differences are found in the ornamentation of the modified element of the 2nd segment of the 2nd male pleopod, the general armature of the rami of U3, and the presence of lateral spines on the telson (without such spines in *B. atlantica*).

B. (S.) purpuriae Stock, 1988 lacks aesthetascs on A2, the 2nd segment of mandible palp is swollen in *atlantica*; the spines on outer lobe of Mx1 have a different ornamentation; the general ornamentation of the pereopods is less distinct than in *B. atlantica*; articles of P7 are more slender; the ornamentation of the modified element on the 2nd segment in the 2nd male pleopod is different, like that of *B. uniramosa* (fig. 3, cf. Stock, 1988); U1 is more strongly armed on the peduncle (less strongly on the distal and medial margin in *B. atlantica*), the lateral spines on the telson are of subequal length in *B. purpuriae*, whereas there are 2 short and 2 long spines in *B. atlantica*.

ZOOGEOGRAPHICAL REMARKS

The species of the subgenus were found in Greece (?), the West Indies (Virgin Islands, Barbuda, Margarita Islands), Tucuman (Argentina) and the Canary Islands.

This distribution can be explained by the break-up of Pangea and subsequent speciation according to the regression model (Stock, 1981; Grosso & Claps, 1985).

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