BULLETIN
ZOÖLOGISCH MUSEUM

UNIVERSITEIT VAN AMSTERDAM

Vol. 12 No. 10 1990

Amsterdam Expeditions to the West Indian Islands, Report 62*)

THE STYGOBIONT ISOPODS OF THE GENUS *CYATHURA* IN THE DOMINICAN REPUBLIC (CRUSTACEA; ISOPODA; ANTHURIDAE)

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SUMMARY

During the Amsterdam Expedition to the Dominican Republic five samples containing three species of anthurid isopods, two of them new to science, were collected, viz. *Cyathura* (*Stygocyathura*) *salpiscinalis* Botosaneanu & Stock, 1982; *C.* (*S.*) *broodbakkeri* n. sp.; and *C.* (*C.*) *tridentata* n. sp. The latter is the first hypogean representative of *Cyathura* s. str. from the Caribbean.

All the known Hispaniolan species, *C.* (*S.*) *motasi* Botosaneanu & Stock, 1982, excepted, are found in a limited area that during the Tertiary was covered by an inland sea. Here a rapid speciation occurred in two isolated lakes that were cut off from the sea, and from each other, as a result of uplift in this valley.

RESUMEN

Durante la "Expedición Amsterdam a la República Dominicana", se sacaron cinco muestras que contenían isopodos anthuridos. Estos ejemplaros representan tres especies, dos de las cuales son descritas como nuevas, a saber *Cyathura* (*Stygocyathura*) *salpiscinalis* Botosaneanu & Stock, 1982; *C.* (*S.*) *broodbakkeri* n. sp.; and *C.* (*C.*) *tridentata* n. sp. La última, es la primera representativa hipogea de *Cyathura* s. str. del Caribe.

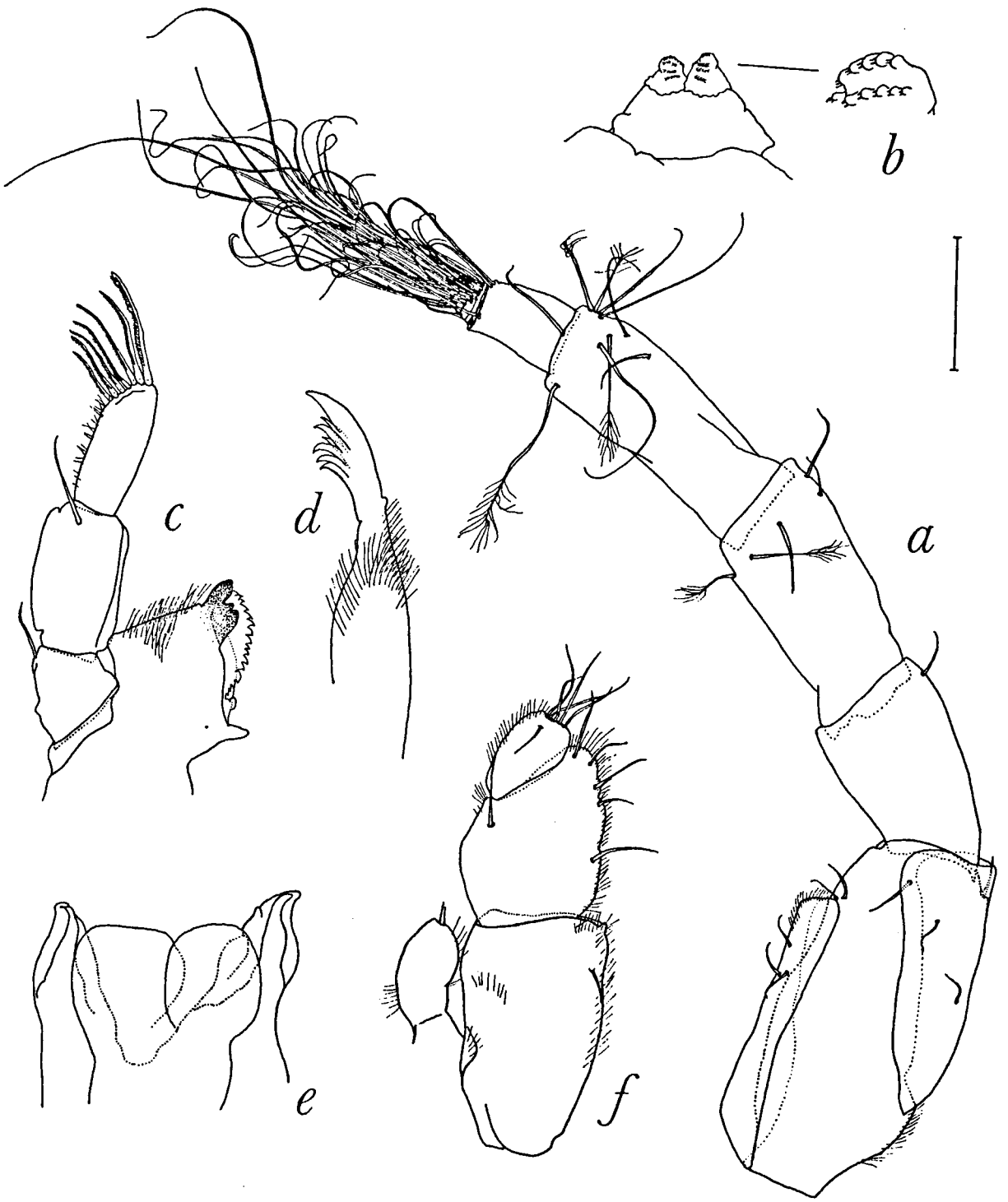
Todas las especies conocidas de la Hispaniola, excepto *C.* (*S.*) *motasi* Botosaneanu & Stock, 1982, han sido encontrados en un área limitada que fue cubierta en el período Terciario por un mar interior. Como resultado del levatamiento de partes de tierra en este valle, dos lagos se separón entre si y del mar, produciendose une rapida transformación de especies.

INTRODUCTION

In their excellent review on the hypogean members of the genus *Cyathura* Norman & Stebbing, 1886, Botosaneanu & Stock (1982) recognize many (new) species from the peri-Caribbean zone, and some from the Indo-Pacific. Subsequently, other stygobiont species have been described from Venezuela (Botosaneanu, 1983) and Cuba (Negoescu Vladescu, 1983), and from the Pacific (Andreev, 1984; Wägele et al., 1987; Botosaneanu, 1988).

During the Amsterdam Expedition to the Dominican

Report 61 is published in Versl. techn. Gegev. I.T.Z., Univ. Amsterdam, no. 55



Figs. 1a - f. *Cyathura* (*Stygocyathura*) *broodbakkeri* n. sp., ♂ (holotype). a, right A2; b, Lbr; c, right Md; d, right Mx1; e, Hyp; f, right Mxp. Scale = 0.1 mm. For abbreviations see text.

Republic (28 October 1987 - 22 January 1988) five samples were collected containing three species of Anthuridea: *Cyathura* (*Stygocyathura*) *salpiscinalis* Botosaneanu & Stock, 1982; *C.* (*S.*) *broodbakkeri* n. sp.; and *C.* (*C.*) *tridentata* n. sp.

Cyathura (*S.*) *broodbakkeri* resembles *C.* (*S.*) *salpiscinalis* and *C.* (*S.*) *motasi* Botosaneanu & Stock, 1982, but the male is clearly distinct. *C.* (*C.*) *tridentata* n. sp. is the first marine interstitial species of *Cyathura* s. str. reported from the Caribbean. It has close similarity with *C.* (*C.*) *rapanuia* Botosaneanu, 1988, from Easter Island, but is clearly different in some important characters.

MATERIAL AND METHODS

The material collected was killed and preserved in the field in a 4 - 6 % formaldehyde solution, buffered by borax (1 gr/l). Afterwards it was transferred into 70% alcohol. The specimens that are (partly) dissected were coloured first by a black chlorazol B cuticular stain. The appendages (in general those of the right side only) were mounted in Faure's medium according to Reyne, sealed against drying out by applying nail polish on nylon basis along the edges of the glass cover-slips.

SYSTEMATICS

Cyathura (*Stygocyathura*) *salpiscinalis* Botosaneanu & Stock, 1982

Material and localities

DOMINICAN REPUBLIC: 2 ♀♀(4.65 mm, partially dissected; 5.76 mm) - sta. 87/640, Prov. de Indepedencia, north of Hato Nuevo, 2.3 km east of Roadfork at La Furnia, 18°30'07" N 71°48'55" W, - 20 m mean sea level; from spring emerging from limestone bottom, with many rounded pebbles (Ø 2 - 7 cm) and gravel; temp. 26.9 °C, 63 % O_2, conductivity 944 µS cm; collected by fiercely stirring a stick deep into the spring and collecting the dislodged material in a handnet (mesh Ø 300 µm); 23 November 1987; leg. H.P. Wagner & N.W. Broodbakker. Zoölogisch Museum Amsterdam (ZMA) Is. 105.436.

DOMINICAN REPUBLIC: 1 ♀ (3.83 mm)- sta. 87/641, Prov. de Indepedencia, 15 m southeast of 87/640, 18°30'05" N 71°48'53" W, - 20 m mean sea level; same type of spring as 87/640, but with many leaves; temp. 26.7 °C, 73 % O_2, conductivity 945 µS/cm; collected by same method as described above for sta. 87/640; 23 November 1987; leg. H.P. Wagner & N.W. Broodbakker. ZMA Is. 105.437.

DOMINICAN REPUBLIC: 2 ♀♀ (3.83 mm; 5.55 mm, latter partially dissected) - sta. 87/642, Prov. de Indepedencia, Boca Cachon, 400 m east of road fork, along south side of road, 18°33'22" N 71°50'08" W, - 30 m mean sea level; from springs emerging from *Acropora* -layer of sediment, much gravel, many pebbles (up to Ø 15 cm) and shells; collected by same method as described above for sta. 87/640; 23 November 1987; leg. H.P. Wagner & N.W. Broodbakker. ZMA Is. 105.438.

Accompanying fauna: Amphipoda (all samples); Oligocheata (all samples); Sipunculida? (87/641); Polychaeta (87/642); and many fishes in springhead (87/641 & 87/642).

Remarks

This species originally was decribed from near the border of the Étang Saumâtre, Haiti (Botosaneanu & Stock, 1982: 23), only a few kilometres from the frontier with the Dominican Republic. Therefore it is not surprising that this species was found also in some springs at the lower slopes of the hills between the Étang Saumâtre and Lago Enriquillo. The above mentioned localities are the first records for the species from the Dominican Republic.

Cyathura (*Stygocyathura*) *broodbakkeri* n. sp. Figs. 1 - 4

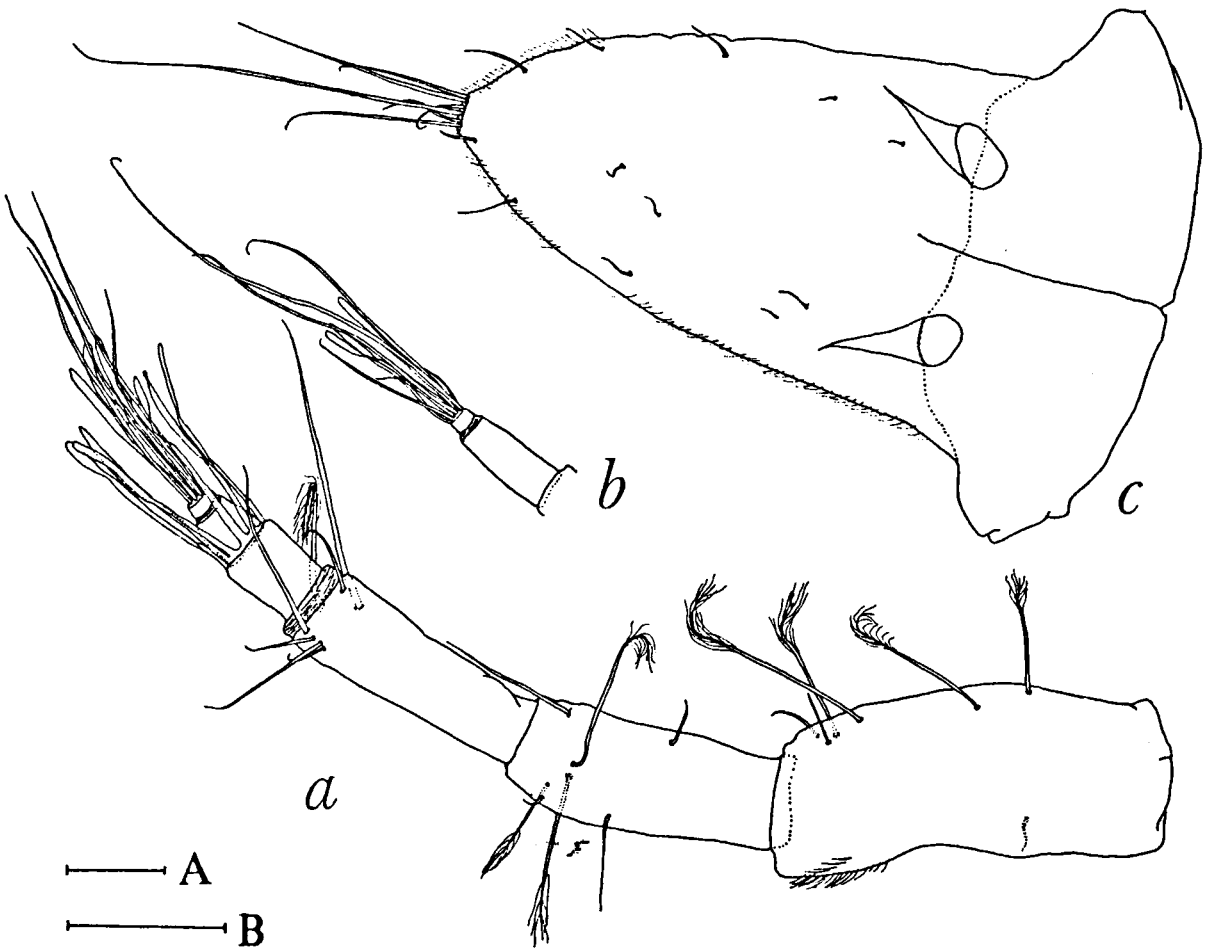
Material and localities

DOMINICAN REPUBLIC: 1 ♂ (holotype, partially dissected), 4 adult ♀♀ (paratypes, of which 1 partially dissected, 1 without cephalon), and 4 immature ♀♀ (paratypes) - sta. 87/633, Prov. de Barahona, Mahagual, ca. 1 km south of Cabral, 18°14'25" N 71°12'48" W, + 20 m mean sea level; opening of spring in limestome sediment in bank at 10 cm above the watersurface; temp. 22.6 ° C, 92 % O_2, conductivity 525 µS/cm; collected by fiercely stirring a stick into the spring at 30 - 40 cm depth and collecting the dislodged material in a handnet (Ø 300 µm); 22 November 1987; leg. H.P. Wagner & N.W. Broodbakker. Holotype ♂ and 5 paratypes ♀♀ in the Zoölogisch Museum Amsterdam, ZMA Is. 105.439 (a. holotype, b. paratypes); 1 ♀ paratype in Museo Nacional de Historia Natural, Santo Domingo; 1 ♀ paratype in the Zoologisk Museum, Copenhagen; and 1 ♀ paratype in Museo Zoologico dell'Università di Firenze (coll. no. MF 12ℭ8).

Accompanying fauna: Crustacea: Amphipoda; Oligochaeta; Plathyhelmintes; Mollusca: Gastropoda.

DESCRIPTION

Body length (rostrum to tip of telson) ♀ holotype 6.23 mm; ♀ paratypes 3.86, 4.32, 4.57, 4.67, 6.30, 8.01, and 8.04 mm, respectively. Live specimens complete-



Figs. 2a - c. *Cyaihura* (*Stygocyathura*) *broodbakkeri* n. sp., ♂ (holotype) and ♀ (paratype). a, right A1 ♂; b, flagellum right A1 ♀; c, T ♂. Figs. 3a, b, scale B; 3c, scale A; both scales represent 0.1 mm. For abbreviations see text.

ly devoid of body pigment, eyes or ocular pigment.

Antennula (A1) (figs. 2a, b): In ♂ 1st peduncular article 2.3 times longer than wide, 4 plumose and 2 short simple setae on the outer margin; 2nd segment shorter, 2.35 times as long as wide, 2 simple setae on the outer, 3 plumose and 2 simple setae on the inner margin; 3rd segment over triple as long as wide, 1 plumose and 2 simple setae on the outer, 4 simple setae on the inner lateral margin; flagellum 3-segmented; 1st segment somewhat longer than wide, subapically 6 aesthetascs; 2nd segment also somewhat longer than wide; 3rd segment very short, apically 3 aesthetascs and 2 pairs of long simple setae. In ♀ 1st and 2nd flagellar segments devoid of setae or aesthetascs; 2nd segment more elongate than in ♂; 3rd segment carries 3 aesthetascs and 6 setae of varying length.

Antenna (A2) (fig. 1a): Peduncle 5-segmented; 2nd

segment with 9 simple setae, 5 on inner, 4 on outer margin; 3rd segment with 1 simple seta on inner margin; 4th segment with 5 setae on distal half (2 being plumose); 5th segment with 1 plumose seta on outer, 5 simple and 3 plumose setae on inner margin, an additional subapical simple seta ventrally; flagellum 5-segmented, 1st segment with 1 simple seta on outer margin, 2 on inner margin; segments 2 to 5 with (sub)apical a row of in number increasing simple setae.

Labrum (Lbr) (fig. 1b): Incised, forming two lobes with rows of 5 tubercles each carrying 2 fine horny spinules.

Mandible (Md) (fig. 1c): First segment of palp small, somewhat longer than wide, 1 simple seta; 2nd segment longer and stronger than 1st, 1 simple seta subapically; 3rd segment also longer than 1st, a row of 7 pectinate setae in ♂, 6 in dissected ♀, in both outer one distinctly larger than others.

First maxilla (Mx1) (fig. 1d): As typical for the genus.

Second maxilla + hypopharynx (Hyp) (fig. 1e): As typical for the genus.

Maxilliped (Mxp) (fig. 1f): First segment with small simple seta on inner margin; very small lobed protuberance forming endite subapically; 2nd segment as usual for the genus, 1 simple seta subapically on outer margin, 1 seta on proximal half of inner margin, and row of 4 subapical setae; 3rd segment nearly twice as wide as long, distomedial angle with 6 simple setae of varying lengths.

Gnathopod (P1) (fig. 3a): Subchelate; basis with 2 plumose setae on outer surface; ischium with small simple seta subapically on ventral margin; merus with 1 simple seta on ventral and dorsal margins; carpus ventrally with rather pointed subapical process, densely covered by setules,1 long and 3 distinctly shorter simple setae; propodus dorsally with 1 long seta on distal half, 2 small setae subapically; palmar margin basally 1 and subapically with 8 simple setae in ♂ (6 in ♀), 10 setae in between; dactylus almost twice length of unguis, former with 2 simple setae and membraneous spur subapically on ventral edge.

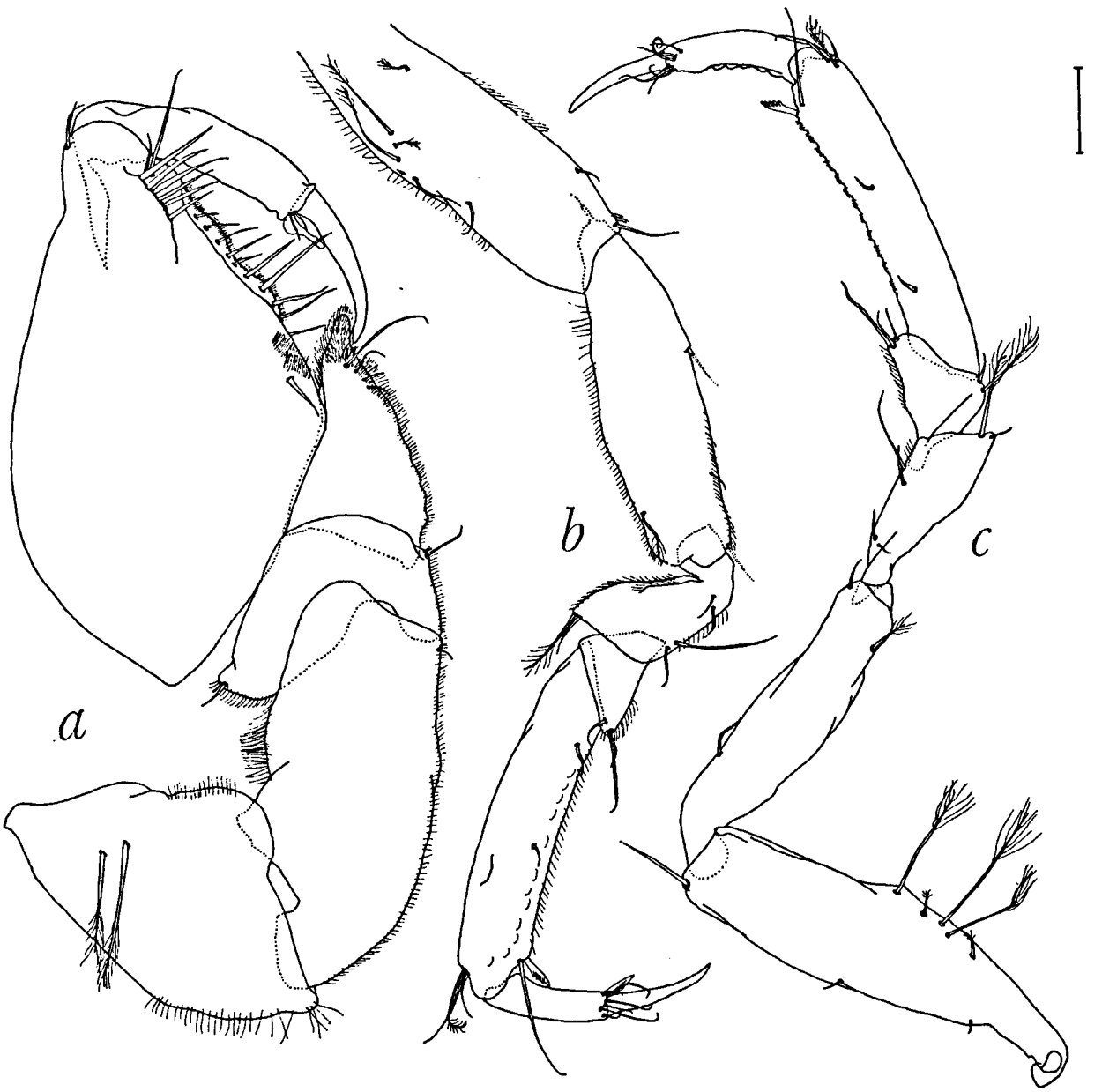
Pereiopods (P2 - P7) (figs. 3b, c): P2 and P3 similar; basis with oblique row of 5 plumose and 1 simple setae halfway dorsal margin, 1 plumose and 2 simple setae on ventral margin, plumose on proximal half, 1 simple subapical seta on distal half; ischium with 1 plumose seta on distal half of dorsal margin, ventrally 3 simple setae present, 1 situated on proximal half, 1 on distal half, 1 subapically; merus with 2 setae (1 plumose, 1 simple) subapically on dorsal margin, 4 simple setae on ventral margin; carpus with 3 setae subapically on ventral margin; propodus with 1 ventrolateral simple seta on proximal half, 1 on distal half ventrolaterally and 1 dorsolaterally, subapically 3 dorsal setae (central one being plumose), 2 simple setae and a spur ventrally; dactylus subapically with spur and 6 simple setae (3 long and 3 short); length of unguis two thirds that of dactylus. P4 almost similar to P2 and P3, except an additional simple seta on dorsal margin of carpus, while P5 - P7 have 2.

Pleopods (Pl.1 - 5) (figs. 4a - d): Pleopod 1 (Pl.1) operculate, 15 plumose setae on outer margin and subapical part of inner margin; pleopod 2 (Pl.2) in ♀ with long, slender expodite, equal in length to endopodite; endopodite with 2 plumose setae subapically on inner margin, 1 plumose seta on proximal half of outer margin; endopodites of pleopods 3 - 5 like that of 2nd, but smaller, exopodites smaller than endopodites. Appendix masculina slightly longer than exopodite, apically pointed, on inner margin of distal half a backwards bended lobe that is tuberculate subapically, apically a distinct sharp spine; exopodite covered with rows of minute short setae arranged in groups of 3 - 5.

Uropod (U) (fig. 4e): Protopodite with 3 simple seta on outer margin, subapically 1 plumose seta on both inner and outer margin; endopodite with 11 setae of varying lengths on inner margin, preceeded proximally by 6 plumose setae; exopodite rather narrow, somewhat flattened, with 9 simple setae apically.

Pleonites: Pleonites 1 - 5 free, each dorsolaterally and ventrolaterally with 1 simple seta, directed posteriad.

Pleotelson (T) (fig. 2c): Pleonite 6 and telson fused, thus forming pleotelson; 1.5 times as long as wide; basal portion with median ridge and pair of submedian statocysts; dorsally ornamented with 6 irregularly placed short simple setae, 3 pairs laterally (implantation of each pair alternating), apically 6 setae of unequal lengths.



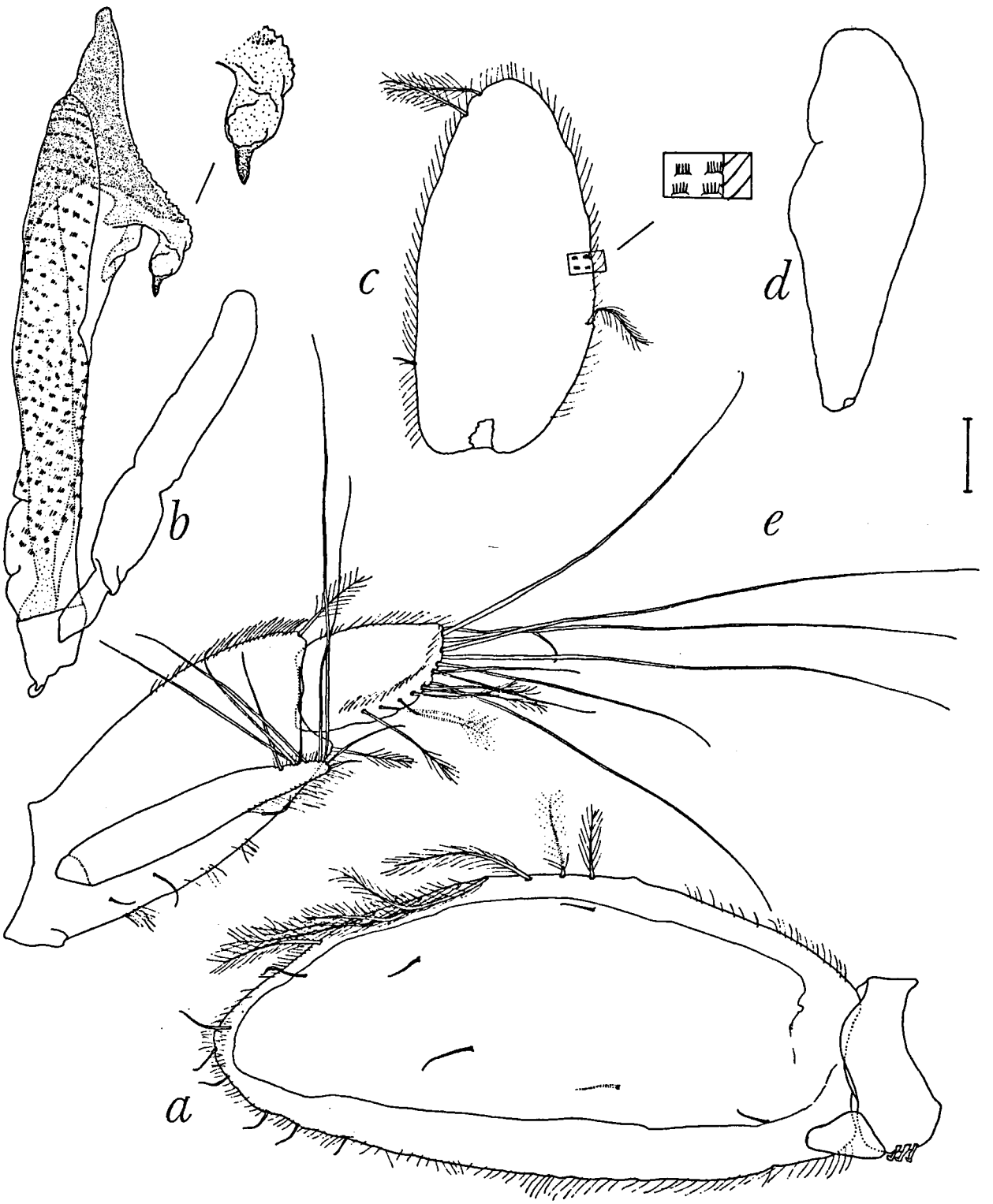
Figs. 3a - c. *Cyathura* (*Stygocyathura*) *broodbakkeri* n. sp., ♂ (holotype). a, right P1; b, right P3; c, right P6. Scale = 0.1 mm indicated. For abbreviations see text.

Derivatio nominis

The new species is named in honour of Dr Nico Broodbakker (London), who accompagnied the author during the first half of the fieldwork period in the Dominican Republic, and collected the material on which this study is based.

Remarks

As could be expected the new species resembles most closely the earlier described *C.* (*S.*) *motasi* Botosaneanu & Stock, 1982, and *C.* (*S.*) *salpiscinalis* Botosaneanu & Stock, 1982, both from Haiti. The differences between the three species are shown in table I. Very peculiar is the observation of minute spinules on the exopodite of Pl.2. In the ♂ this character is distinctly more obvious than in the ♀, in the latter these spinules are only occasionally observed. The cuticular staining is especially designed to stain se-



Figs. 4a - e. *Cyathura* (*Stygocyathura*) *broodbakkeri* n. sp., ♂ (holotype) and ♀ (paratype). a, left Pl.1 ♀; b, left Pl.2 ♂; c, exopodite left Pl.2 ♀; d, endopodite left Pl.2 ♀; e, left U ♂. Scale = 0.1 mm. For abbreviations see text.

TABLE I

Salient differences between the Hispaniolan *Stygocyathura* species

species / characters	*motasi*	*salpiscinalis*	*broodbakkeri*
flagellum segments A1	♂: 4, ♀: 2	♂: 4, ♀: 2	♂: 3, ♀: 3
flagellum segments A2	♂: 4, ♀: 4	♂: 5, ♀: 5	♂: 5, ♀: 5
pectinate setae 3rd segment Md	11	11	6 - 7
marginal setae Pl.1	16 plumose, 7 simple	18 plumose	10 plumose, 6 simple
ventral setae on Pl.1	none	none	6
lobe of appendix masculina	conical with setae	tuberculate	weakly tuberculate, large apical spine

tae, so these spinules might be also present in the unstained specimens of the other species of this genus, although not visible.

One of the characters said to distinguish *Stygocyathura* from *Cyathura* s. str. is the absence of rectinacula on the basipodite of Pl.1; this, however, is not correct. Not only the new species described above has rectinacula, but these are also observed in the re-examined type material of *C. (S.) motasi* Botosaneanu & Stock, 1982; *C. (S.) salpiscinalis* Botosaneanu & Stock, 1982; *C. (S.) curassavica* Stork, 1940; *C. (S.) hummelincki* Botosaneanu & Stock, 1982; *C. (S.) parapotamica* Botosaneanu & Stock, 1982; *C. (S.) cuborientalis* Botosaneanu & Stock, 1982; *C. (S.) specus* Bowman, 1965; *C. (S.) univam* Botosaneanu, 1983; *C. (S.) fijiensis* Wägele, Coleman & Hosse, 1987; and *C. (S.) papuae* Wägele, Coleman & Hosse, 1987, all kept in the collection of the Zoölogisch Museum, Amsterdam.

Cyathura (Cyathura) tridentata n. sp.

Figs. 5 - 7

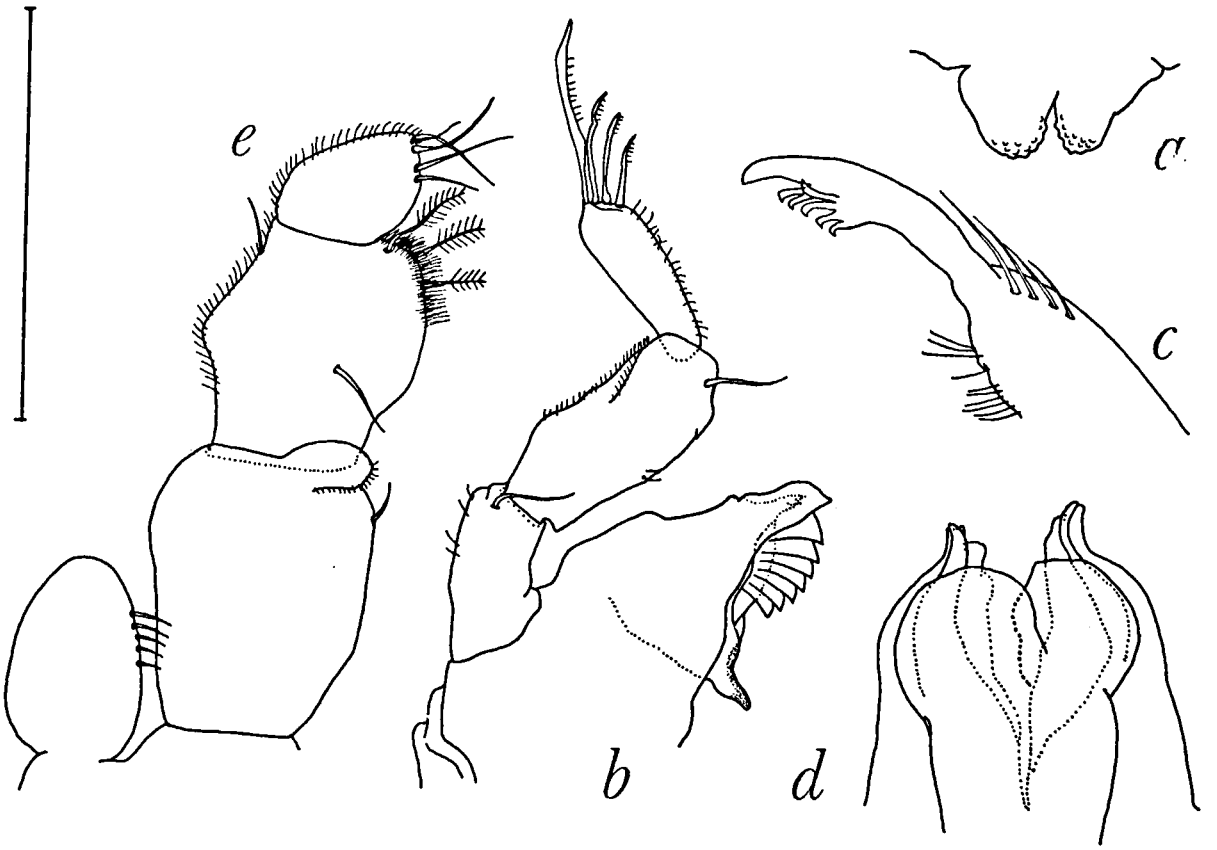
Material and localities

DOMINICAN REPUBLIC: 1 holotype ♀ , 1 paratype ♀, without cephalon (both specimens partially dissected) - sta. 87/632, Prov. de Barahona, La Cienaga, at beach 100 m northeast of the river Canada Baialla, 18°03'52" N 71°06'17" W, at mean sea level; in intertidal zone of beach, pebbles (Ø 0.2 - 2 cm); temp. 29.5 °C, 100 % O_2, conductivity 34.9 mS/cm; collected with the aid of a Bou-Rouch biophreaticalpump; pipe-depth 0.75 m; 21 November 1987; leg. H.P. Wagner & N.W. Broodbakker. Holotype ♀ and fragmented paratype ZMA Is. 105.440 (a. holotype, b. paratype).

Accompanying fauna: Crustacea: Isopoda (Asellota), Amphipoda, Decapoda; Polychaeta; Nematoda; Mollusca: Gastropoda.

DESCRIPTION

Body length (from rostrum to tip of telson) ♀ holotype 2.9 mm. Live specimen completely devoid of body



Figs. 5a - e. *Cyathura* (*Cyathura*) *tridentata* n. sp., ♀ (holotype). a, Lbr; b, right Md; c, right Mx1; d, Hyp; e, right Mxp. Scale = 0.1 mm. For abbreviations see text.

pigment, of eyes or of ocular pigment.

Antennula (A1) (fig. 6a): First peduncular article as long as wide, 2 plumose and 1 simple setae on outer lateral margin; 2nd segment shorter, somewhat longer than wide, 4 plumose setae on outer, 1 plumose and 1 simple setae on inner margin; 3rd segment about twice as long as wide, 3 plumose and 1 simple setae on outer, 1 plumose seta on inner margin; flagellum 2-segmented; 1st segment remarkably elongate; segment 2 very short, apically with 3 aesthetascs, 3 long, and 2 short setae, latter five being unequal in length.

Antenna (A2) (fig. 6b): Peduncle 5-segmented; 2nd and 3rd peduncle segments 1 simple seta on inner margin; 4th segment with 2 simple setae; 5th segment with 1 plumose seta on outer, 4 simple and 1 plumose setae on inner margin; flagellum 5-segmented; segments 2 and 4 with subapical row of simple setae; segment 5 apically a larger number of irregular long simple setae.

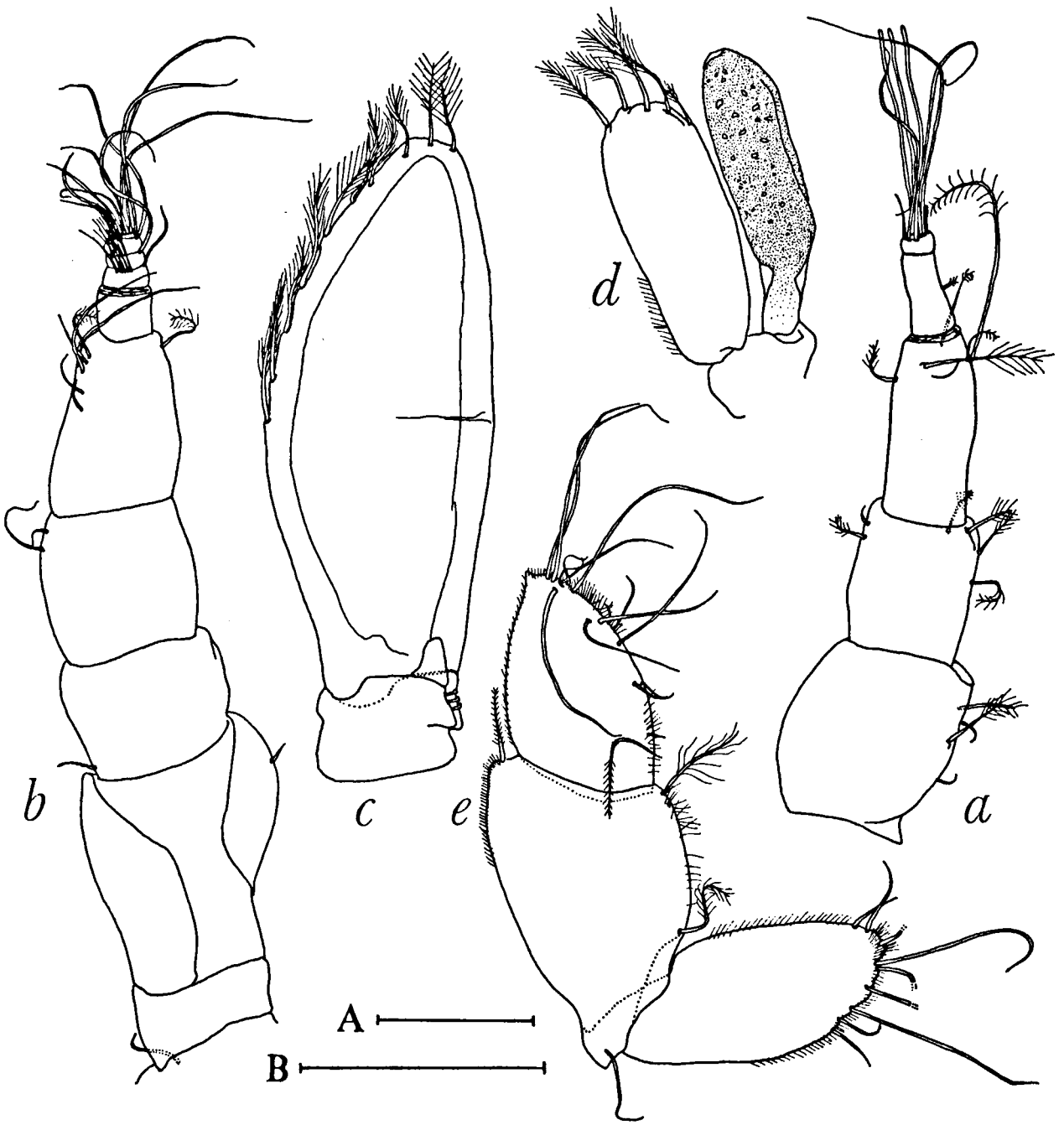
Labrum (Lbr) (fig. 5a): Incised, forming 2 lobes with fine tubercles apically.

Mandible (Md) (fig. 5b): First segment of palp small, somewhat rectangular in shape, with 1 simple seta; 2nd segment longer and stronger than 1st, with 1 simple seta subapically; 3rd segment somewhat longer than 1st, with row of 4 pectinate setae, outer one distinctly larger than others.

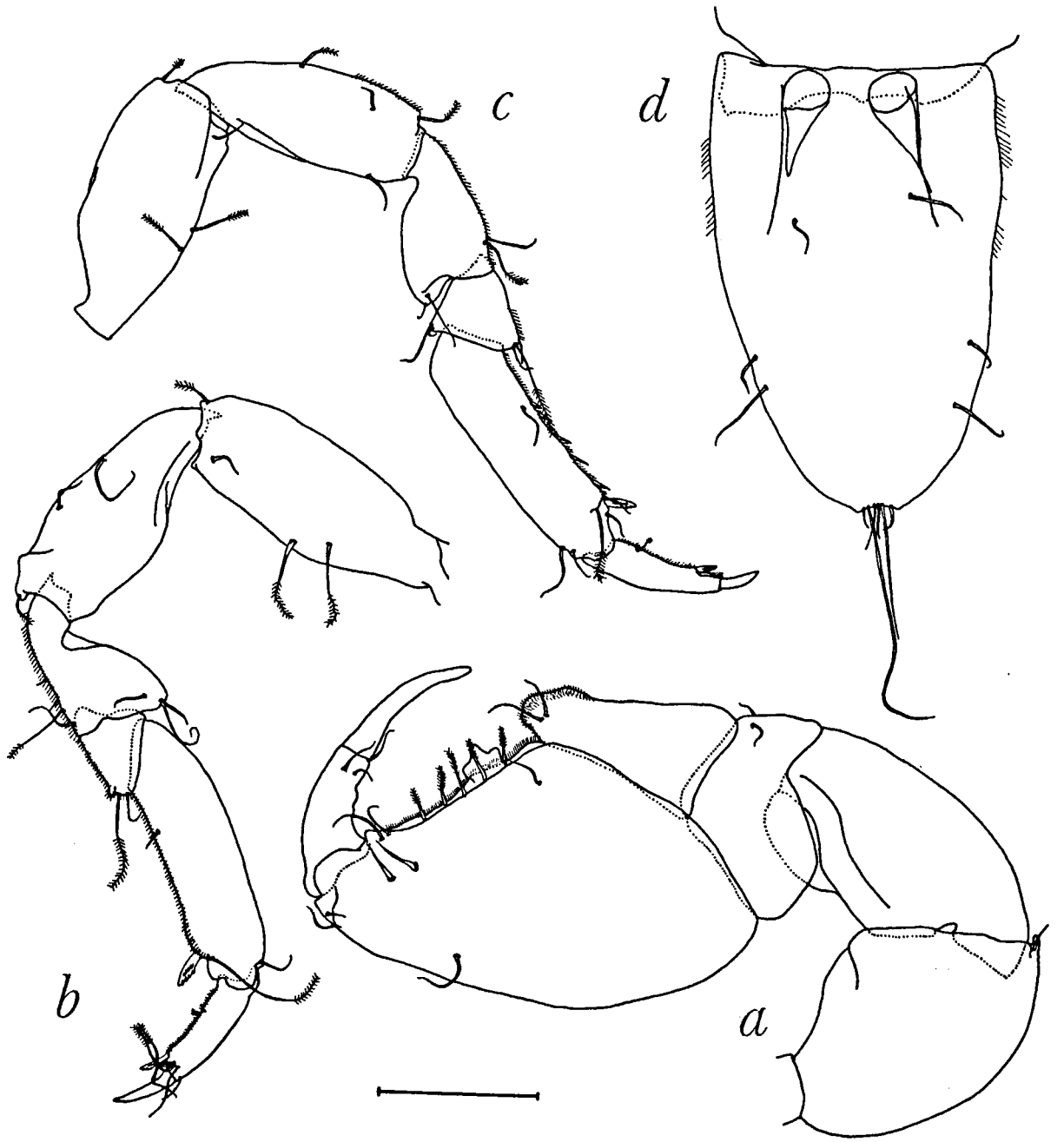
First maxilla (Mx1) (fig. 5c): As typical for the genus.

Second maxilla + hypopharynx (Hyp) (fig. 5d): As typical for the genus.

Maxilliped (Mxp) (fig. 5e): First segment with small simple seta on inner margin, and distinctly lobed pro-



Figs. 6a - e. *Cyathura (Cyathura) tridentata* n. sp., ♀ (holotype and paratype). a, right A1; b, right A2; c, left Pl.1 (♀ paratype); d, left Pl.2 (♀ paratype); e, right U (exopodite flexed sideways). Figs. 7a, b, scale B; 7c - e, scale A; both scales represent 0.1 mm. For abbreviations see text.



Figs. 7a - d. *Cyathura* (*Cyathura*) *tridentata* n. sp., ♀ (holotype). a, right P1; b, right P3; c, right P6; d, T. Scale = 0.1 mm
For abbreviations see text.

tuberance (endite) subapically; 2nd segment as usual for the genus, halfway ventrally with simple seta, a simple seta subapically on outer margin, 3 plumose setae subapically on inner margin; 3rd segment distinctly wider than long, disto-medial angle with 5 simple setae.

Gnathopod (P1) (fig. 7a): Subchelate; basis with 1 simple seta subapically on ventral margin; merus with 2 simple setae on ventral margin; carpus ventrally with subapical protrusion, 2 long simple setae, densely covered by fine setae; propodus dorsally with 1 long seta near middle, 2 small setae subapically, palmar margin basally with 1, subapically 4 simple setae, 5 pennate spines and tridentate protruding crest in

between; dactylus and unguis of about same length, former 3 simple setae subapically on ventral margin.

Pereiopods (P2 - P7) (figs. 7b, c): P2 and P3 similar, basis with 2 plumose setae halfway ventral margin, subapically 1 plumose seta dorsally and 1 simple seta ventrally; ischium with 3 simple setae halfway (2 dorsal, 1 ventral), 1 plumose seta subapically on dorsal margin; merus with pair of plumose setae subapically on dorsal margin, a pair of simple setae on ventral margin; carpus with 3 setae (central one being plumose) subapically on ventral margin; propodus with 1 simple seta ventrally on proximal half, 1 subapical dorsal simple seta, 2 setae (1 simple, 1 plumose) and a spur ventrally; dactylus with minute plumose seta on proximal half, subapically with spur and 5 setae (3 simple, 2 plumose); unguis about half as long as dactylus. P4 almost similar to P2 and P3, except an additional simple seta on dorsal margin, while P5 - P7 have two.

Pleopods (Pl.1 - 5) (figs. 6c, d): Pleopod 1 (Pl.1) operculate, 10 plumose setae on outer margin; pleopod 2 (Pl.2) with long slender exopodite of length equal to endopodite; endopodite with 5 plumose setae apically; endites of pleopods 3 - 5 like that of the 2nd, but smaller, exopodites smaller than endopodites.

Uropod (U) (fig. 6e): Protopodite with plumose setae, 1 on proximal half of inner margin, 1 subapically on both inner and outer margin; endopodite with 16 simple setae of varying length and 1 plumose seta on inner margin, outer margin apically ending in a rather sharp pointed tip; exopodite broad and flattened, 9 simple setae apically.

Pleonites: Pleonites 1 - 6 separate; pleonites 1 - 5 dorsolaterally and ventrolaterally with 1 simple seta, directed posteriad.

Telson (T) (fig. 7d): Long and slender, 1.5 times as long as wide; basal portion with 2 submedian ridges and pair of submedian statocysts; pair of dorsal simple setae, two pairs laterally and more distally, 6 apical setae of unequal lengths.

Derivatio nominis

The specific epithet is derived from the tridentate protruding crest on the palmar margin.

Remarks

This is the first blind representative of *Cyathura* s. str. from interstitial habitats in the Caribbean. Up to now thalassostygobiont species of *Cyathura* s. str. have been known only from the Pacific region, viz. *C.* (*C.*) *numeae* Wägele, 1982, from New Caledonia, and *C.* (*C.*) *rapanuia* Botosaneanu, 1988, from Easter Island.

Cyathura (*C.*) *tridentata* can be clearly distinguished from *C.* (*C.*) *numeae* by numerous characters (character states of *C. numeae* in parentheses), the most evident being: A2-flagellum 5-segmented (2 sensu Botosaneanu, 1988: 303); Md lamina dentata with 7 serrations (8 -9); lobed endite present on disto-internal angle of 1st segment of Mxp (absent); disto-internal angle of 2nd segment of Mxp with 3 plumose setae (3 simple); palmar margin of gnathopodal propodus ♀ with 3-dentate crest (just convex).

The new species can be distinguished from *C. rapanuia* (character states of *C. rapanuia* in parentheses) by A1-flagellum 2-segmented (3); Md palp with 4 pectinate setae (5 -7); Md lamina dentata with 7 serrations (15 - 16); lobed endite on disto-internal margin of 1st segment of the Mxp (endite present as separate segment with distally 2 distinct setae); disto-internal angle of 2nd segment of the Mxp with 3 plumose setae (2 simple); tridentate crest on palmar margin of gnathopodal propodus ♀ (triangular).

As this is the first thalassostygobiont representative of *Cyathura* s. str. reported from the Caribbean, and as it is clearly distinct from all other blind *Cyathura* s. l. species hitherto described (although the ♂ is not yet known), it seems appropriate to describe this material as a new species.

DISCUSSION

The discovery of a second *Stygocyathura* species in the valley wherein the Étang Saumâtre (Haiti), Lago Enriquillo and Laguna del Rincon (Dominican Republic) are situated is remarkable. *Cyathura* (*C.*) *tridentata* n. sp. was also found near this valley, along the southeastern coast of the Barahona Province in the marine interstitial. At the easternmost part of this valley, at Jérémie (Haiti), another *Cyathura* was found as well (Botosaneanu & Stock, 1982), but this heavily

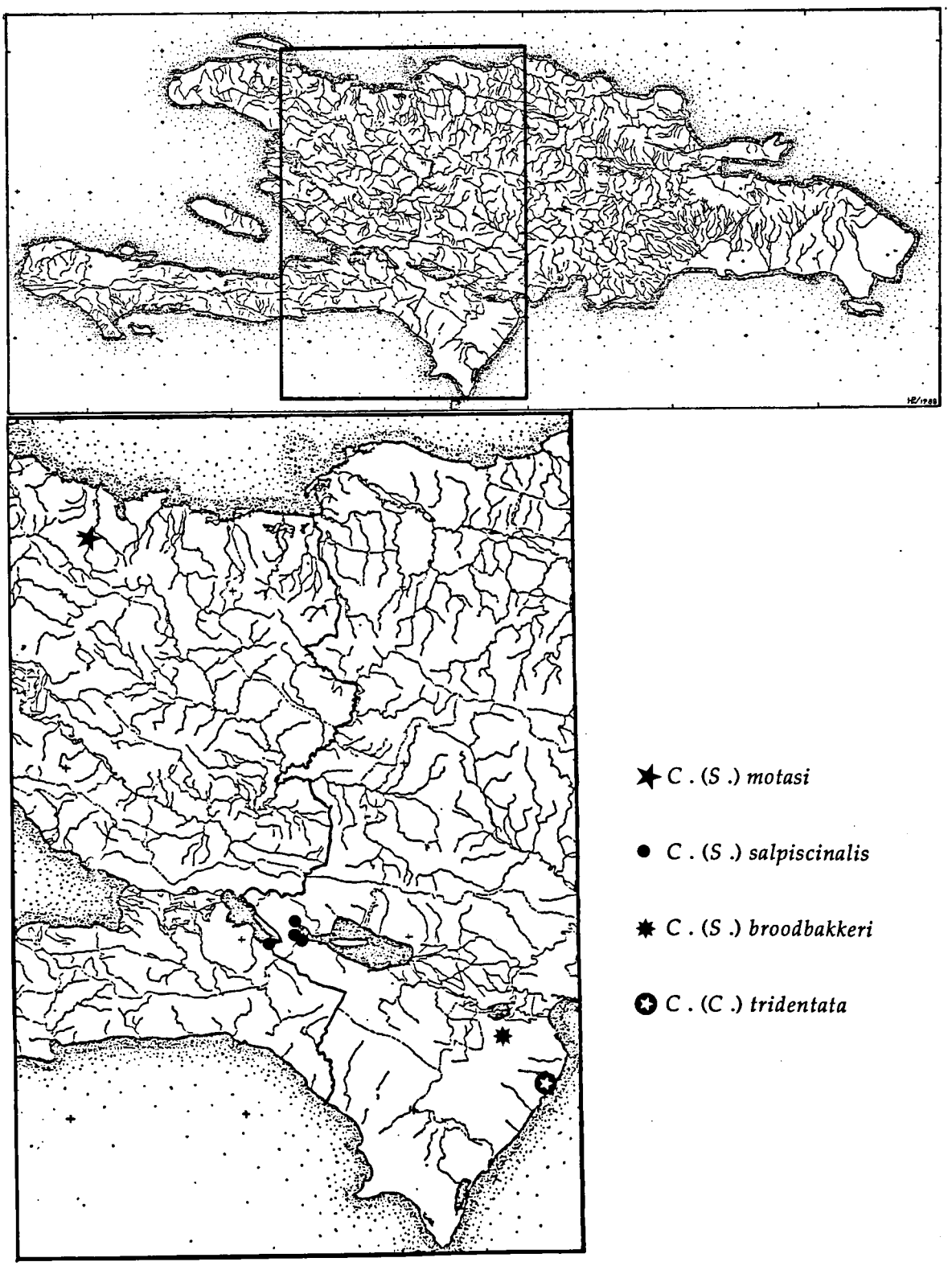


Fig. 8. Localities of the Hispaniolan stygobiont *Cyathura* species.

damaged material probably represents an epigean taxon. Thus, *C. (S.) motasi* excepted, all three species treated in the present paper inhabit this valley (for distribution see fig. 8) and adjacent areas that in the mid-Miocene period partly formed an inland sea of the Caribbean Sea. Due to geological activity (uplift of land in general, and in particular between Lago Enriquillo and Laguna del Rincon, and between Laguna del Rincon and the present-day coast) this inland sea was cut off from open sea, leaving two isolated lakes (Étang Saumâtre and Lago Enriquillo forming one, Laguna del Rincon the other). The present lakes were formed by quick evaporation of water, leaving behind limestone deposits of upper-Miocene (southern and northern slopes of the lakes), and Pliocene and Pleistocene (between Étang Saumâtre and Lago Enriquillo) age (Osiris de León, 1983). The two ancient saltwater lakes yielded isolated populations of Cyathura , which resulted in rapid radiation of the ancestral form into *C. (S.) salpiscinalis* and *C. (S.) broodbakkeri*.

ACKNOWLEDGEMENTS

I am most grateful to Prof. Dr J. H. Stock and to my wife Elsa for critically reading the manuscript and commenting upon it. I am also obliged to Dr L. Botosaneanu for a valuable discussion on this topic, and to Drs T. Checa Romero for making the Spanish translation of the summary. The fieldwork on which the present study is based has been financed by a grant received from the Foundation of Fundamental Biological Research (BION), which is subsidized by the Netherlands Organization of Scientific Research (NWO).

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First draft received: 20 November 1989
Final draft received: 25 April 1990
Distributed: 16 Juni 1990