©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at

SPIXIANA	21	2	179–186	München, 01. Juli 1998	ISSN 0341-8391

A new genus and species of terrestrial amphipod from Isla Mona in the Caribbean Sea

(Crustacea, Amphipoda, Talitridae)

Douglas G. Smith

Smith, D. G. (1998): A new genus and species of terrestrial amphipod from Isla Mona in the Caribbean Sea (Crustacea, Amphipoda, Talitridae). – Spixiana **21/2:** 179-186

A new genus and species of terrestrial amphipod in the family Talitridae is described from Isle Mona, a small island between the islands of Hispaniola and Puerto Rico in the northern Caribbean Sea. The species demonstrates unique characters among talitrid amphipods and is possibly derived from the beachflea genus *Tethorchestia*.

Douglas G. Smith, Department of Biology, University of Massachusetts, Amherst, MA 01003-5810 and Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138, USA

Introduction

A new genus and species of terrestrial amphipod in the family Talitridae is described. The specimens were collected on Isle Mona, a small island between the islands of Hispaniola and Puerto Rico in the northern Caribbean Sea.

Cariborchestia, gen. nov.

Diagnosis

Sexually dimorphic terrestrial beachfleas inhabiting inland xeric sandy-loam playas (near sea level). Head with large eyes well separated dorsally. Antenna 1 short, not extending beyond proximal margin of last peduncular segment of antenna 2. Antenna 2 geniculate, flagellum with 10 segments. Lacinia mobilis of left mandible 5-dentate, the 5th cusp very reduced, lacinia mobilis of right mandible with large terminal cusps and intervening smaller tubercles on lower ridge, upper ridge margin tuberculate with one large terminal cusp. Maxilliped outer plate with rounded apex densely setose, inner plate apical margin weakly quadrate with two blunt teeth on inner angle and densely setose. Maxilliped palp 3-segmented, segment 3 multi-lobate apically but with no evidence of articulated 4th segment. Gnathopod 1 of female with broad spinose, simple propod, dactyl about one third length of propod. Gnathopod 2 of female basis with sinuous anterior margin, broadest proximally, propod mitten-like, broader distally, dactyl short, subchelate. Pellucid lobes present on propod and carpus. Gnathopod 1 of male subchelate, propod spinose and expanded distally and ventrally with a distinct pellucid lobe, dactyl apposable, length greater than palm. Carpus (segment 5) with well developed pellucid lobe. Male gnathopod 2 strongly subchelate, propod (segment 6) very broad and nearly quadrate. Greater length of palm convex with an inner and outer row of strong spines, dactyl (segment 7) broadly curved with small spines on inner margin. Pereopods cuspidactylate. Pereopods 3 and 4 short and moderately

©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at

spinose, dactyl (segment 7) of pereopod 4 with a distinct cusp. Pereopods 5 through 7 similar, slender, pereopod 7 the largest. Gills dissimilar, gill 2 (of gnathopod 2) elongate with a broad mid-length lobe, gills 3 through 5 truncate, broad without lobes, gill 6 largest of gills, elongate and angular without secondary lobes. Epimeral side plates 1 through 3 with spines along ventral margin, pleopods 1 through 3 greatly and equally reduced, with only a single small tubercle on peduncle. Uropods 1 through 3 spinose, uropod 1 without interramal spine; telson broad with apical notch, with marginal and dorsal spines.

Type-species: *Cariborchestia xerophila*, spec. nov.

Cariborchestia xerophila, spec. nov.
Figs 1-43

Types. Holotype: Ovigerous female, 6 mm, part on 2 slides, Playa de Sardinera, Isla Mona [Museum Comparative Zoology (MCZ), Harvard University] – Allotype: male, 6.5 mm, part on 1 slide, same locality (MCZ) – Paratypes: 2 ovigerous females, 2 adult males, 3 slides, same locality (MCZ), 3 females, 3 males, 5 slides, same locality, Museum of Zoology, University of Massachusetts (UMA). Coll. Smith, D.G., Werley, S. (18-20 March 1996, 22-25 July 1996).

Type locality. A shallow dry sea level playa at the base of the cliffs at Punta Arenas, 0.13 km inland of beach, approximate coordinates: 18°04'56"N, 67°56'17"W, Isla Mona.

Description

Female. Length: 5-6 mm (ovigerous).

General head morphology and antennae as in genus. Upper lip not broad, rounded distally with an apical patch of hairs. Lower lip bilobed, pilose subapically through medial cleft. Maxilla 1 plate narrow, apically with two plumose setae, outer plate with rudimentary palp, apical margin with seven dentate spines. Maxilla 2 inner plate sinuous, with an oblique apical margin covered with many blunt curved spines extending medially to a single large plumose seta. Subapical face with several stout setae. Outer plate distal face and lateral margins pilose, apical margin with many curved blunt spines. Maxilliped as in genus, segment 2 of palp with a distal medial lobe.

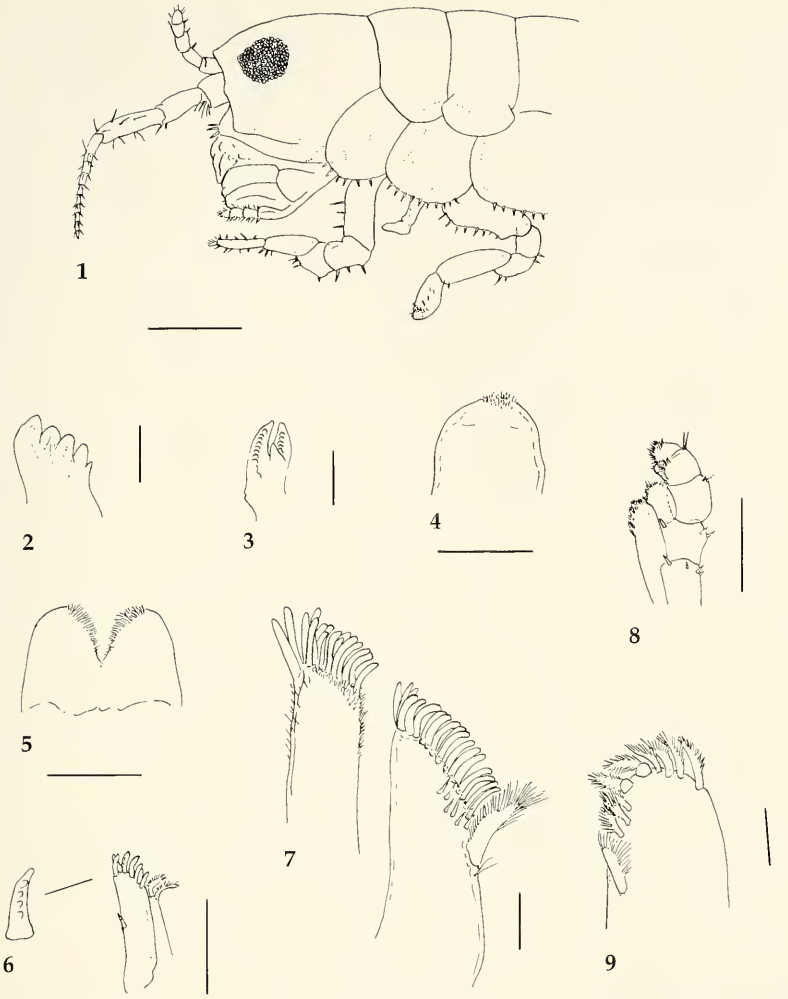
Gnathopod 1. Coxal plate with inner and outer lobes, outer lobe with an oblique ventral margin with spines along anterior ⅔ of margin. Basis (segment 2) distally slightly expanded with posterior and anterior margin spines, propod (segment 6) weakly elliptical with palm poorly defined from posterior margin (non-chelate), posterior margin with double row of stout spines.

Gnathopod 2. Coxal plate quadrate with rounded disto-anterior corner, a strong cusp on posterior margin with a double row of stout ventral spines extending to cusp on posterior margin. Basis (segment 2) broadly expanded on proximal portion with a sinuous anterior margin, anterior margin with eight stout spines. Posterior margin without spines. Carpus (segment 5) with shallow pellucid lobe. Propod (segment 6) with broad pellucid lobe, lateral face with a medial row of spines, dactyl (segment 7) about ½ length of palm (sub-chelate).

Pereopod 3. Coxal plate quadrate, posterior margin with slight biangulation, ventral margin with 14 short spines. Basis (segment 2) expanding distally, posterior margin with 4 spines, anterior margin with 5 spines, merus (segment 4) expanded slightly proximally, with several marginal spines. Carpus (segment 5) and propod (segment 6) subequal in length, marginally spinose. Dactyl (segment 7) nail about ⅓ length of segment, with one anterior marginal spine above nail. Pereopod 4 similar to pereopod 3 but shorter, carpus (segment 5) distinctly shorter than in pereopod 3, dactyl (segment 7) with a distinct median cusp on posterior margin and with a protuberance just above the nail.

Pereopods 5 through 7. Similar in morphology but differing in size, pereopod 7 the largest, 2 times length of pereopod 5. Basis (segment 2) of pereopod 7 with strong anterior and weak posterior marginal spines, dactyls (segment 7) of pereopods 5 through 7 with a single anterior spine above nail. Oostegites 2 through 5. Linear with rounded distal margins, oostegite 2 with 11 marginal setae, subsequent oostegites with fewer setae. Gills dissimilar, gills 2 and 6 the largest. Gill 2 elongate with a distinct, low secondary lobe at the midpoint of the gill, gills 3 through 5 narrowly triangular in shape, gill 5 the broadest of the three, gill 6 the largest, elongate and slightly twisted, angular but without secondary lobes.

©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at

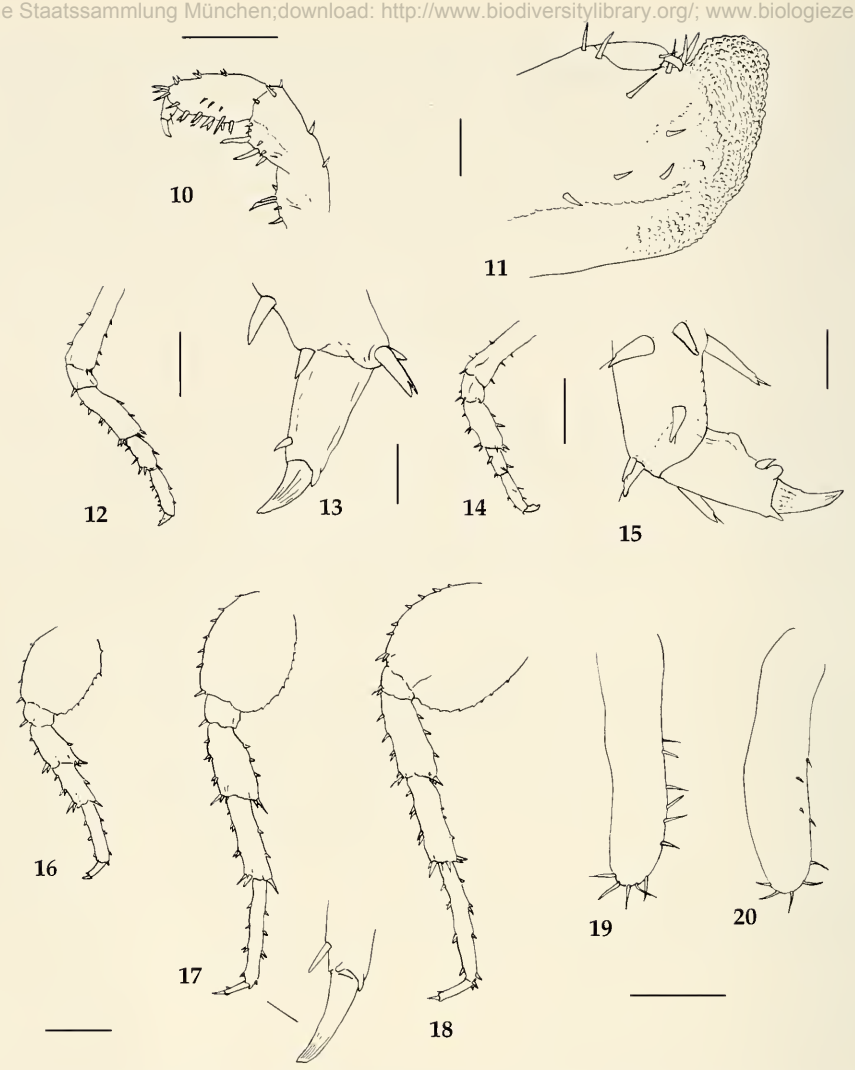


Figs 1-9. *Cariborchestia xerophila*, gen. nov., spec. nov. Female anterior habit and associated appendages. **1.** Habit showing general morphology including eye and antennae. **2.** Left lacinia mobilis. **3.** Right lacinia mobilis. **4.** Upper lip. **5.** lower lip. **6.** Maxilla 1, outer and inner plate, dentate spine enlarged to left. **7.** Maxilla 2 outer and inner plates. **8.** Distal half of right maxilliped. **9.** Inner plate of maxilliped. Scales: **1:** 0.5mm; **2, 3, 7, 9:** 0.05 mm; **4, 5, 6, 8:** 0.25 mm.

Epimeral plate 1. With an oblique ventral margin, with three ventral spines, epimeral plate 2 quadrate, with 6 spines on ventral margin and 3 small spines on posterior margin, epimeral plate 3 broadly quadrate with a distinct disto-posterior angle, ventral margin with eight spines, posterior margin with 5 small spines. Pleopods 1 through 3 very reduced, peduncle with 3 (2-4) small subapical marginal spinules, rami vestigial, represented by a single tubercle-like segment with a single terminal seta.

Uropod 1 penduncle. With dorsal spine rows, inner row with 3 proximal and 2 distal spines, outer row with 5 spines, inner ramus with 3 dorsal spines and 4 (3-5) terminal spines, outer ramus without spines. Uropod 2 peduncle with 4 (3-5) dorsal spines, rami subequal in length with 2 (2-3) dorsal spines and 3 (2-4) terminal spines. Uropod 3 peduncle with 2 dorsal spines, ramus with 4 (3-4) terminal spines. Telson broadly elliptical, wider than long with a slight apical notch, disto-lateral margin with 13 (11-14) spines, dorsal surface with 2 spines, each near lateral margin.

©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at



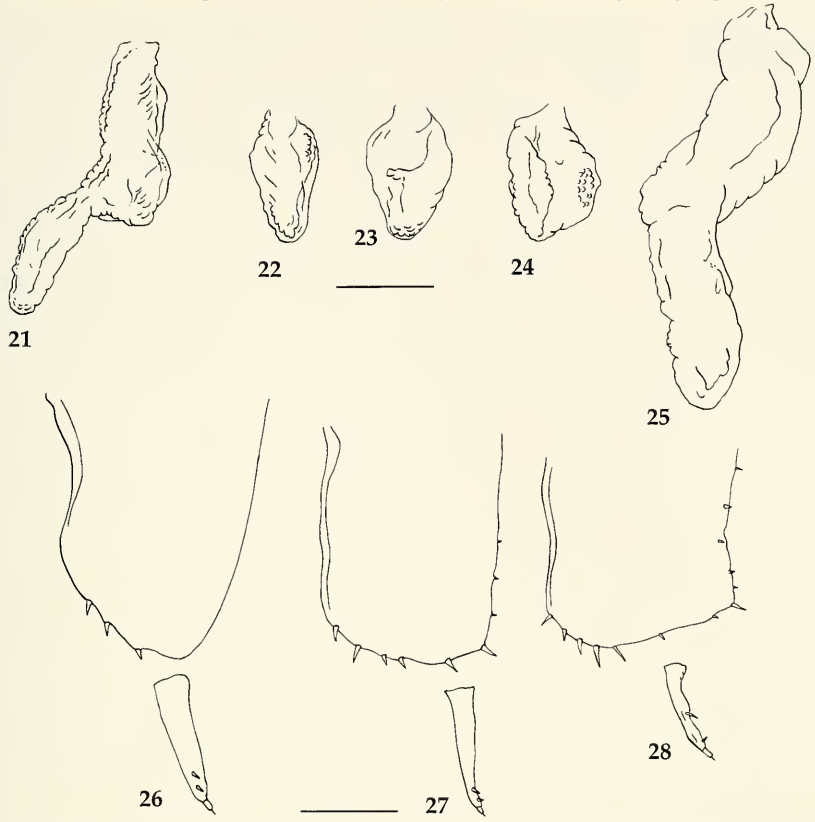
Figs 10-20. *Cariborchestia xerophila*, gen. nov., spec. nov. Female thoracic appendages. **10.** Gnathopod 1. **11.** Gnathopod 2, Propod and dactyl. **12.** Pereopod 3. **13.** Enlargement of dactyl of pereopod 3. **14.** Pereopod 4. **15.** Enlargement of dactyl of pereopod 4. **16.** Pereopod 5. **17.** Pereopod 6, enlargement (X4) of dactyl below. **18.** Pereopod 7. **19.** Oostegite 2. **20.** Oostegite 3. Scales: **10, 19, 20:** 0.25 mm; **11, 13, 15:** 0.05 mm; **12, 14, 16-18:** 0.5 mm.

Male. Length: 5-6.5 mm.

Demonstrating characters of the genus and female. Different (sexually dimorphic) from the female in the following ways: gnathopod 1 subchelate, carpus (segment 5) with a pronounced pellucid lobe on disto-posterior margin with several spines around base of lobe. Propod (segment 6) expanded distally with a distinct pellucid lobe, disto-lateral surface with several spines, dactyl (segment 7) about ⅔ length of palm of propod.

Gnathopod 2 basis (segment 2). Constricted proximally, lateral margins distally parallel, posterior margin with 3 (3-4) small spines, anterior margin with 5 small spines on distal ⅔ of margin. Propod (segment 6) greatly enlarged, quadrate, powerfully subchelate, palm margin with a slight concavity near insertion of dactyl, otherwise strongly convex and spinose, with a row of unnotched spines on

©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at



Figs 21-28. *Cariborchestia xerophila*, gen. nov., spec. nov. Female gills and epimera with corresponding pleopodia. **21.** Gill 2. **22.** Gill 3. **23.** Gill 4. **24.** Gill 5. **25.** Gill 6. **26.** Epimeron 1. **27.** Epimeron. **28.** Epimeron 3. Scales equal 0.25 mm.

either side of occlusal surface, both spine rows comprised of alternating long and short spines. Dactyl (segment 7) curved, extending beyond disto-posterior corner of propod, occlusal surface with a row of small spines.

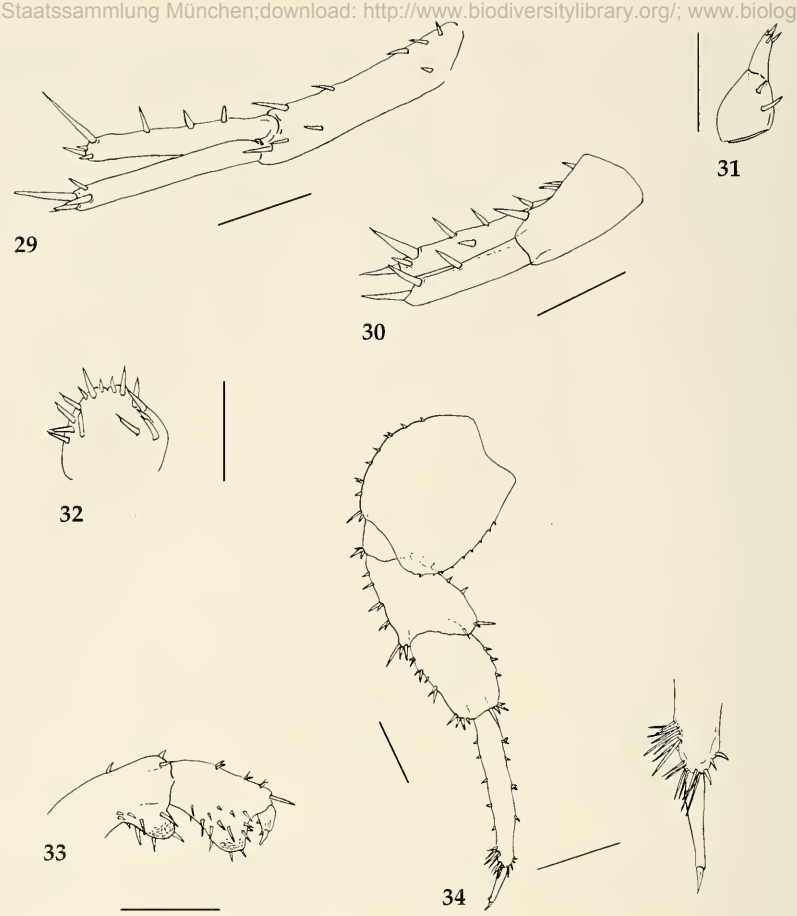
Pereopod 6 merus (segment 4). Slightly expanded distally. Pereopod 7 merus (segment 4) broad and expanded distally, carpus (segment 5) broad, each segment with several anterior and posterior marginal spines. Propod (segment 6) with discontinuous patches of long, thin spines and setae along antero-distal and distal margin.

Discussion

Ecology

The nature of the inland habitats of Isla Mona, including the area where the specimens described in this paper were collected, has been discussed by Smith and Wier (In review). Specimens of *C. xerophila* were collected in pit fall traps with insects in the following orders (families); Coleoptera (Scolytidae, Staphylinidae), Collembola (Hypogastruridae, Entomobryidae), Dermaptera (Cabiidae), Hymenoptera (Formicidae), and Orthoptera (Gryllidae, Gryllacrididae). Also, a species of the mite family Oribatidae was in the collections. *Cariborchestia xerophila* collected in March were mostly juveniles. A single adult ovigerous female in sample contained 3 eggs. Collecting in July produced 18 subadult and adult males and 20 subadult and adult females, ovigerous females contained 2-3 eggs.

©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at



Figs 29-32. *Cariborchestia xerophila*, gen. nov., spec. nov. Female urosome appendages. **29.** Uropod 1. **30.** Uropod 2. **31.** Uropod 3. **32.** Telson. **Figs 33-34.** Allotype male. **33.** Gnathopod 1. **34.** Pereopod 7, distal propod margin and dactyl enlarged (X2.5) to right. Scales: **29-33:** 0.25 mm; **34:** 0.5 mm.

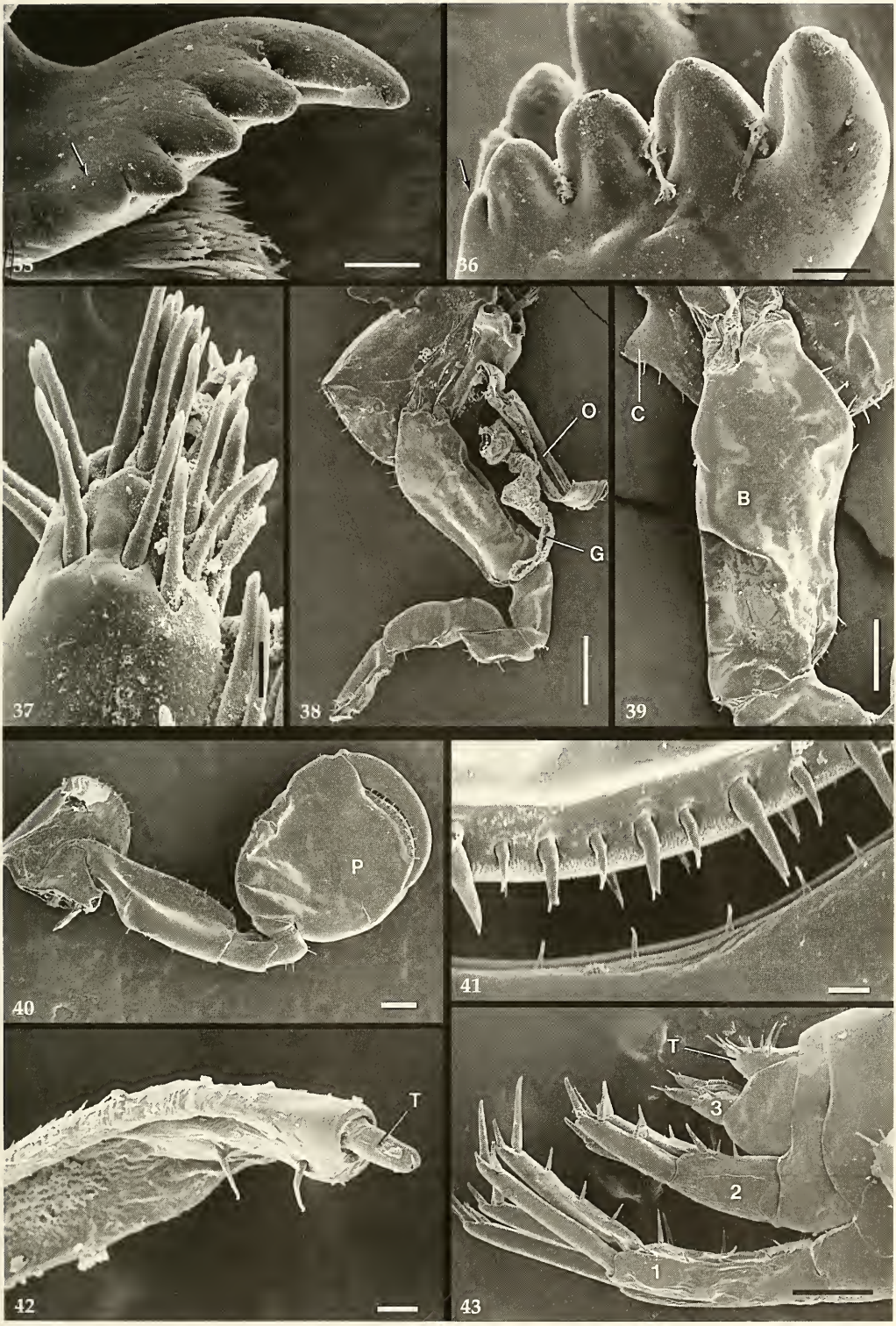
Relationships

Cariborchestia xerophila is presently known only from Isla Mona and is possibly endemic to the island. The species contains several characters which make it clearly distinct among described talitrid genera. *Cariborchestia* is unique in the possession of spines developed along the ventral margin of epimera 1-3 (Figs 26-28). The species is classified among the non-substrate modifying cuspidactylate beachfleas (Bousfield, 1984) as it possesses a 5-dentate left lacinia mobilis (Figs 2, 35, 36) but clearly is terrestrial in habit both in its location on the island and the presence of enlarged complex gills (Figs 21, 25) and

Figs 35-39. *Cariborchestia xerophila*, gen. nov., spec. nov. Female feeding appendages and gnathopod 2. **35-36.** Left lacinia mobilis, arrows denote reduced 5th tooth. **37.** Segment 3 of maxilliped palp. **38.** Gnathopod 2, G=gill 2, O = oostegite 2. **39.** Gnathopod 2, B = basis (segment 2), C = cusp on posterior margin of coxal plate. Scales: **35-37:** 0.01 mm; **38:** 0.25 mm; **39:** 0.1 mm. ▷

Figs 40-43. *Cariborchestia xerophila*, gen. nov., spec. nov. Male appendages. **40.** Gnathopod 2, P=propod (segment 6). **41.** Enlargement of palm of propod and dactyl (segment 7) occlusal margin. **42.** Pleopod 1 with simple terminal tubercle (T). **43.** Urosome with uropods 1-3 and telson (T). Scales: **40:** 0.1 mm; **41, 42:** 0.01 mm; **43:** 0.25 mm.

©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at



©Zoologische Staatssammlung München;download: http://www.biodiversitylibrary.org/; www.biologiezentrum.at

highly reduced pleopodia (Figs 26-28, 42), each a strong indication of terrestriality (Hurley 1968, Friend & Richardson 1986). The fifth cusp of the lacinia mobilis in *C. xerophila* is reduced in size and thus would thus be treated as vestigial in the genus using Bousfield's (1982, 1984) scheme for the evolution of the family. The combination of strong sexual dimorphism in male gnathopods (Fig 40) and pereopod7 (Fig 34) and non-ramate pleopodia 1-3 can not be found in any other known beachflea genus including the otherwise similar genus *Macarorchestia* recently described from caves in the Azore Island group (Stock 1989).

Two somewhat similar genera, *Macarorchestia* discussed above and *Platorchestia* from northern Pacific beaches with sexually dimorphic gnathopods and pereopod 7, are geographically remote from *Cariborchestia* and are suggested to have separate origins. Lindeman (1991) citing recent geological investigation on the origin of the West Indian islands developed an historical perspective on the origin of terrestrial amphipods in the Central American and Caribbean regions. Lindeman (1990, 1991) determined using morphological study and parsimony methods that the landhopper genera *Caribitroides* and *Cerrorchestia* from Central America and Jamaica arose from a palustral ancestor close to the palustral *Chelorchestia*. Following Lindeman's (1991) hypothesis, *Cariborchestia* would have evolved from some as yet undiscovered or extinct palustral ancester, inhabiting either brackish mangrove swamps or formerly occurring fresh water habitats. Smith and Wier (in review) have postulated the occurrence of permanent freshwater during the island's history as suggested by the existence of a surface derived cave dwelling species of shrimp.

Despite the attractiveness of Lindeman's (1991) theory, *Cariborchestia* does not appear to be closely related to either *Caribitroides* or *Cerrorchestia* morphologically or ecologically (see Lindeman, 1990, for descriptions of these genera) and would appear to have had a different origin. An alternative hypothesis suggests that the ancestors of *Cariborchestia* possibly were part of the proto-antillean supralittoral beachflea fauna represented today in the region by *Tethorchestia* with which *Cariborchestia* shares several characters especially the unique features of the development of spines and setae on the propod (segment 6) of pereopod 7 in the male (Fig 34).

Acknowledgements

The collections would not have been possible without the assistance of Dr. Edward Klekowski, Sean Werley, and Andrew Wier. I am grateful to the staff of Isla Mona, especially Mssrs. Eduardo Centron and Angel Cruz Medina, for their logistic support and cooperation. Dr. Edward L. Bousfield kindly provided useful comments on an earlier draft of the paper. The project was supported in part by a grant from the Margaret E. and Howard E. Bigelow Fund, University of Massachusetts, Amherst.

References

Bousfield, E. L. 1982. The amphipod superfamily Talitroidea in the northeastern Pacific region. I. Family Talitridae: Systematics and distributional ecology. – Nat. Mus. Nat. Sci., Ottawa. Publ. Biol. Oceanography, No. **11:** 75 pp.

– – 1984. Recent advances in the systematics and biogeography of landhoppers (Amphipoda: Talitridae) of the Indo-Pacific region. In F. J. Radovsky, P. H. Raven, S. H. Sohmer, eds. Biogeography of the Tropical Pacific. – Bernice Bishop Mus. Spec. Publ. **72:** 171-210

Friend, J. A. & A. M. M. Richardson 1986. Biology of terrestrial amphipods. – Ann. Rev. Ent. **31:** 25-48

Hurley, D. E. 1968. Transition from water to land in amphipod crustaceans. – Amer. Zool. **8:** 327-353

Lindeman, D. 1990. New terrestrial amphipods (Crustacea: Amphipoda: Talitridae) from Mexico and Central America. – Canad. J. Zool. **68:** 2323-2337

– – 1991. Phylogeny and zoogeography of the New World terrestrial amphipods (landhoppers) (Crustacea: Amphipoda: Talitridae). – Can. J. Zool. **69:** 1104-1116

Smith, D. G. & A. M. Wier. In press. On some Inland Crustacea and their habitats of Mona Island in the northern Caribbean region. Stud. Neotropical Fauna Environment.

Stock, J. H. 1989. A new genus and species of Talitridae (Amphipoda) from a cave in Terceira, Azores. – J. Nat. Hist. **23:** 1109-1118

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Spixiana, Zeitschrift für Zoologie

Jahr/Year: 1998

Band/Volume: 021

Autor(en)/Author(s): Smith Douglas G.

Artikel/Article: A new genus and species of terrestrial amphipod from Isla Mona in the Caribbean Sea (Crustacea, Amphipoda, Talitridae) 179-186