First record of the caridean shrimp genus *Bresilia* Calman, 1896 (Crustacea: Decapoda: Bresiliidae) from the East Pacific and description of a new species

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Abstract

A new species of *Bresilia* Calman, 1896, representing the first record of this genus for the East Pacific, is described from deep water off the Pacific coast of Mexico. The new species is close to *B. atlantica* Calman, 1896, the type species of the genus with which it shares the general shape of the carapace and rostrum, the latter with a reduced number of small dorsal teeth, and the shape and relative size of the first pereiopod. It also shares with *B. atlantica* a similar antennular peduncle and a distally very wide scaphocerite. The first maxilliped has a long crescent-shaped exopod, without a flagellum and a strongly reduced caridean lobe, two characters found in *B. atlantica* and in only one other known species of *Bresilia*, i.e., *B. corsicana* Forest & Cals, 1977. The new species can be distinguished from the other seven species of *Bresilia* by the armature of the rostrum (few, very small spines) and a much wider scaphocerite, with an anterior margin twice as wide as the proximal margin.

Key words: Bresiliidae, *Bresilia pacifica* sp. nov., Pacific Mexico

Introduction

Since the family Bresiliidae Calman, 1896, was treated by Holthuis (1993) in its classical review of genera and families of caridean shrimps, many genera he included in the Bresiliidae have been relocated in other families: the genus *Agostocaris* C.W.J. Hart & Manning, 1986, in the Agostocarididae C.W.J. Hart & Manning, 1986; *Discias* Rathbun, 1902, *Kirnasia* Burukovsky, 1988, *Lucaya* Chace, 1939, and *Tridiscias* Kensley, 1983, in the Disciadidae Rathbun, 1902; *Alvinocaris* Williams & Chace, 1982, *Chorocaris* Martin & Hessler, 1990, and *Rimicaris* Williams & Rona, 1986, in the Alvinocarididae; and *Pseudocheles* Chace & Brown, 1978, in the Pseudochelidae De Grave & Fransen (2011), is therefore currently reduced to a small group of two genera (*Bresilia* Calman, 1896, and *Enchantada* Wicksten, 1989) and nine species. *Encantada spinoculata* Wicksten, 1989, the only species of the genus, is so far known only from off the Galapagos Islands (De Grave & Fransen, 2011). The eight species of *Bresilia* are known from Japan, the Tasman Sea, the Mediterranean, the Red Sea, and the East Atlantic (Calado et al. 2004; Bruce 2005; Komai & Yamada 2010, 2011; De Grave & Fransen 2011). Furthermore, due to the relocation of species previously included in the Bresiliidae by De Grave & Fransen (2011), of the three species of "Bresiliidae" reported by Wicksten & Hendrickx (2003) from the eastern tropical Pacific (i.e., *E. spinoculata*, *Discias serrifer* Rathbun, 1902, and *Alvinocaris lusca* Williams & Chace, 1982), only one actually belongs in the family Bresiliidae: *E. spinoculata*.


During sampling operations in deep water off the west coast of the Baja California Peninsula, Mexico, one specimen of *Bresilia* was collected below the Oxygen Minimum Zone (OMZ) below 1200 m depth. It represents the first record of the genus for the entire East Pacific and the second species of Bresiliidae for this region. It is an undescribed species, which is described and illustrated herein as *B. pacifica* sp. nov. The type material is deposited...
in the Regional Collection of Marine Invertebrates (EMU), in Mazatlán, Mexico. Abbreviations: CL, carapace length; TL, total length; St., station.

Systematics

Bresiliidae Calman, 1896

_Bresilia_ Calman, 1896

_Bresilia pacifica_ sp. nov.
(Figs. 1–7)

**Material examined.** Holotype, female (CL 9.2 mm, TL 44.2 mm), TALUD XV cruise, St. 13 (25°02′12″N, 112°54′06″W), off the west coast of the Baja California Peninsula, Mexico, 30 July 2012, benthic sledge, 1210–1245 m depth (EMU-10090). Paratype, female (CL 8.4 mm, TL 41.5 mm), TALUD XVI-B cruise, St. 15 (29°40′24″N, 116°06′W), off the west coast of the Baja California Peninsula, 30 May 2014, benthic sledge, 2010–2046 m depth (EMU-10429).

**Description.** Body (Figs. 1, 2) moderately slender, subcylindrical, integument firm, no tegumental scales. Rostrum (Fig. 2A–D) slender, moderately high, slightly widening at base, about 0.6 times carapace length, slightly directed upward, reaching distal margin of second segment of antennular peduncle; dorsal margin with 8 small teeth, anteriormost subterminal, proximal 3 set more closely than others and located posterior to orbital margin, basally articulated; ventral margin slightly convex, armed with two small teeth distal to the midlength (one distal tooth in the paratype); lateral carina weak, merging into orbital margin. Carapace (Fig. 2A) smooth, glabrous; dorsal margin slightly convex in posterior half; orbital margin (Fig. 2C) evenly concave; antennal tooth relatively long, sharp (Fig. 1C); pterygostomial tooth strong, distinctly exceeding antennal tooth (Fig. 2C).

**FIGURE 1. Bresilia pacifica_ sp. nov.** Holotype female (CL 9.2 mm, TL 44.2 mm) (EMU-10090).
FIGURE 2. *Bresilia pacifica* sp. nov. Holotype female (CL 9.2 mm, TL 44.2 mm) (EMU-10090). A, Body, lateral, appendages omitted; B, rostrum and eye, detail, lateral; C, anterior portion of carapace and appendages, lateral; D, anterior portion of carapace with appendages, dorsal; E, epistome and antennal peduncle, ventral; F, telson and uropods, dorsal. Scale bars: 2 mm for A, 1 mm for B–F.
Abdomen (Fig. 2A) smooth, without pigment; third segment produced posteriorly, tergum not markedly elevated, but strongly sloping posteriorly; pleura 1–3 broadly rounded; pleuron 4 with posterolateral extension forming rounded lobe, unarmed; pleuron 5 convex with 2 blunt teeth on posterolateral margin; sixth segment with convex posterolateral margin and a sharp laterodorsal tooth; posteroventral angle blunt.

Telson (Fig. 2F) broken (holotype), at least 5 pairs of small dorsolateral spines. Telson of paratype with 11 pairs of small dorsolateral spines, posterior margin wide, straight, with 8 pairs of setae of similar length.

Eyestalk subpyriform; cornea not dilated, not wider than eyestalk anterior margin, eye about 0.15 times carapace length, without ocellar spot.
FIGURE 4. *Bresilia pacifica* sp. nov. Holotype female (CL 9.2 mm, TL 44.2 mm) (EMU-10090), A, B, D, E. Paratype female (CL 8.4 mm, TL 41.5 mm) (EMU-10429), C. A, right third maxilliped, ventral; B, right first pereiopod; C, close up of fingers, chitinous spines dark-coloured; D, right second pereiopod; E, same, proximal portion. Scale bars: 1 mm.
Antennular peduncle (Fig. 2D) not reaching distal margin of antennal scale. First segment longer than two distal segments combined; stylocerite tapering to acute tip, slightly overreaching distal margin of first segment. Second segment about 0.5 length of first. Third segment about 0.5 length of second. Outer flagellum uniramous, subequal in length to peduncle; inner flagellum shorter and slender than outer flagellum.

Antennal peduncle (Fig. 2C–E) with stout basicerite bearing ventrodistal tooth. Scaphocerite large, about 0.5 times as long as carapace, broadly rounded and strongly widened distally, anterior width 2.0 times proximal width; lateral margin straight, distolateral tooth slender, not reaching distal margin of lamella. Carpocerite nearly reaching distal one-third of scaphocerite. Flagellum broken.

Epistomial process (Fig. 2E) a sharp, relatively short spine.

Mandible (Fig. 3A) small, feebly calcified; palp 2-segmented, proximal segment with 3 distal setae, distal segment shorter than proximal, with long subdistal setae and short terminal setae; molar process reduced, laminar, tapering to subacute point; incisor process broad, armed with 15 small subtriangular teeth and 1 larger tooth at upper angle on subtruncate distal margin.

Maxillule (Fig. 3B) with palp curving, 2 terminal and 1 subterminal setae; upper lacinia broad, with 17 short, lanceolate marginal teeth and 10 stout submarginal setae, 8 setae on dorsal margin and 12 setae on ventral margin; lower lacinia slender, with 4 + 2 distal setae and 3 stout terminal setae.

Maxilla (Fig. 3C) with elongate, styliform palp, bearing 2 short terminal setae; basal endite bilobed, distal lobe subrectangular, with 7 terminal setae, proximal lobe subtriangular, with 15 setae on lower margin; coxal endite simple, with 16 marginal setae; scaphognathite well developed, more than 4 times as long as wide, fringed with plumose setae, 15 very long on posterior margin.
First maxilliped (Fig. 3D) with endites incompletely fused, distal lobe with 24 plumose setae, proximal lobe without setae; endopod very slender, not overreaching distal margin of exopod; exopod crescent-form, fringed with numerous plumose setae, without flagellum, caridean lobe weakly developed; epipod large, faintly bilobed.

**FIGURE 6.** Bresilia pacifica sp. nov. Holotype female (CL 9.2 mm, TL 44.2 mm) (EMU-10090). A, right fourth pereiopod, lateral; B, ischium, enlarged, mesial; C, merus, enlarged, mesial; D, dactylus enlarged, lateral. Scale bars: 1 mm for A, 0.5 mm for B, C.
Second maxilliped (Fig. 3E) with endopod sub-pediform, all segments distinct except ischium and basis which are fused; ischium and merus with long setae in inner margin; carpus without setae; propodus about twice as long as dactylus, with 15 stiff setae on outer margin, setae shorter distally; dactylus with numerous setae on outer margin, 4 stouter distal setae, and 2 stronger, short setae subdistally. Exopod well developed, flagellum-like, reaching nearly to distolateral end of carpus; coxa with elongate, sickle-shaped epipod; podobranch absent.

Third maxilliped (Fig. 4A) with long, slender endopod. All segments unarmed, with fringe of setae. Ultimate and penultimate segments subequal in length; antepenultimate segment longest, 2.5 times as long as ultimate; basis and ischium incompletely fused; coxa with small, triangular papilla-like epipod; exopod well developed, flagellum-like, reaching distal margin of antepenultimate segment.
A NEW SPECIES OF *BRESILIA* FROM PACIFIC MEXICO

**First pereiopod** (Fig. 4B) overreaching antennal scale by about 0.3 of chela length. Articulation between basis and ischium distinct. Ischium and merus cylindrical, unarmed. Carpus subtriangular, unarmed. Chela slender, unarmed, about 0.5 as long as carapace; ventral margin almost straight, a short row of setae on the posteroverentral margin; palm oval in cross section; fingers laterally compressed, little deflexed, forming deep concavity on outer side, about as long as palm; fixed finger laterally compressed; cutting edge of fixed finger with a chitinous plate with fossae; cutting edge of dactylus with chitinous spines that fit into fixed finger fossae (Fig. 4 C). Exopod flagellum-like, reaching proximal one-third of merus.

Second pereiopod (Figs. D–E) slender, longer than first pereiopod, overreaching antennal scale by length of fingers. Ischium, merus and carpus unarmed; merus about twice as long as ischium; carpus about 0.5 as long as chela; fixed finger slightly deflexed, distal portion with minute spinules, two subterminal teeth and one stout short setae; dactylus longer than palm, slightly longer than fixed finger, slightly curved, cutting edge unarmed, tip with 3 short setae; exopod flagellum-like, falling short of distal margin of ischium, unsegmented, setose in about distal third.

Third to fifth pereiopods (Figs. 5–7) slender, long, lacking exopod, generally similar. Third pereiopod (Fig. 5) with ischium having row of 4 spines latero-ventrally in distal half; merus slightly more than twice as long as ischium, with row of 5 spines subequally spaced along ventro-lateral margin; carpus unarmed, about 0.6 times as long as propodus; propodus unarmed; dactylus long, about 0.5 length of carpus, slightly curving, terminating in long unguis, bearing 9 short accessory spinules over entire length of flexor margin.

Fourth pereiopod (Fig. 6) with ischium having row of 6 spines latero-ventrally; merus less than twice as long as ischium, with 1 proximal ventro-lateral spine; carpus unarmed, about 0.7 times as long as propodus; propodus unarmed; dactylus about 0.5 times length of carpus, slightly curving, terminating in long unguis bearing 10 (3 missing) accessory spinules on flexor margin.

Fifth pereiopod (Fig. 7) with ischium having row of 3 proximal spines and 1 spine at mid-length latero-ventrally; merus less than twice as long as ischium, with one distal latero-ventral spine; carpus unarmed, about 0.5 as long as propodus; propodus unarmed; dactylus long, about 0.5 length of carpus, slightly curving, terminating in long unguis, the latter bearing 10 (5 missing) spinules on flexor margin.

Uropodal endopod shorter than exopod; exopod almost twice as wide as exopod, with one lateral spine flanked with an inner movable spine (Fig. 2 F).

**Distribution.** Known from two localities, off the west coast of the Baja California Peninsula (Fig. 8), Mexico.

**Etymology.** The new species is named after the Pacific Ocean, where it was collected, to emphasize its close resemblance with *Bresilia atlantica*.

**Ecology.** The two specimens were collected at depths of 1210–1245 and 2010–2046 m. Parameters measured at the bottom level are: 0.58 and 1.84 ml O₂/l; 2.26 and 3.98°C. *Bresilia pacifica* sp. nov. occurs under the OMZ core which is widely extended in the East Pacific and off the coast of western Mexico (Hendrickx & Serrano 2010).

**Remarks.** With only eight species left within the genus *Bresilia*, it is easy to compare the new species with previously described species. *Bresilia pacifica* sp. nov. appears closest to *B. atlantica* Calman, 1896, the type species of the genus, in the general shape of the carapace and rostrum with relatively few dorsal teeth, and the shape and size of the first pereiopod, although in *B. atlantica* the lower margin of the palm is more angular than in the new species, and in *B. pacifica* sp. nov. there is a short row of setae (grooming apparatus) on the posteroventral margin of the chela (the type material of *B. atlantica* was not examined and these setae might be present in that species). The new species also shares with *B. atlantica* a similarly shaped antennular peduncle and a distally widening scaphocerite (distally twice or almost twice the proximal width). The third and second maxillipeds are also very similar in both species, and these also feature a first maxilliped with a long crescent-shaped exopod without flagellum and with a weakly developed lobe ("caridean lobe") at base of exopod (i.e., the external lobe of the exognath of Calman, 1896), and similar endites (distal lobe with 24 plumose setae, proximal lobe without setae in the new species vs. >25 and no setae, respectively, in *B. atlantica*). The absence of a flagellum on the first maxilliped exopod has also been noted by Forest & Cals (1977) for *B. corsicana* Forest & Cals, 1977 ("sans flagelle et sans incision où indication de lobulation sur son bord externe"). Their illustration of the first maxilliped also allows to observe that there is no marked setose broadening or lobe at base of exopod, as in *B. atlantica* and *B. pacifica* sp. nov. The maxillule and maxilla are also very similar in *B. atlantica* and *B. pacifica* sp. nov.: about 10 marginal teeth plus 6–7 submarginal setae on the upper lacinia and 3 stout distal setae on the lower lacinia in *B. atlantica* vs. 17 tooth and 10 setae on the upper lacinia and a similar number of distal stout setae (3) on the lower lacinia in *B. pacifica* sp. nov.
FIGURE 8. Distribution of *Bresilia pacifica* sp. nov. in the eastern Pacific.

Compared to *B. gibbosa*, *B. pacifica* sp. nov. is differentiated by a rostrum with a few small dorsal teeth vs. many medium-sized rostral teeth and a series of large, movable spines, on the anterior half of the carapace in the former. *Bresilia briankensleyi* Bruce, 2005, *B. saldanhai*, *B. corsicana* and *B. rufioculus* also feature larger dorsal tooth on the entire length of the rostrum, not found in *B. pacifica* sp. nov. In all these species, the scaphocerite is much slender, never with an anterior margin twice as wide as the proximal margin, as observed in *B. pacifica* sp. nov. and also in *B. atlantica*.

The presence of a sharp, short but well defined epistome process in *B. pacifica* sp. nov. also adds another member to the group of species of *Bresilia* featuring this process. Species which have been confirmed as having this process are *B. plumifera*, *B. saldanhai*, *B. briankensleyi*, *B. antipodarum*, *Bresilia* sp. (Bruce 2005), *B. gibbosa*, and *B. rufioculus* (Komai & Yamada 2010, 2011).

Komai & Yamada (2010) distinguished two informal species groups within *Bresilia*. The first group (*B. antipodarum* species group) is characterized by a long epistomial process, an exopodal flagellum on the first maxilliped, and a strongly produced tergum of the third abdominal somite (see Komai & Yamada 2010, 2011). Species included are: *B. plumifera*, *B. saldanhai*, *B. briankensleyi*, *B. antipodarum*, *B. gibbosa*, plus *B. rufioculus* (described one year later by Komai & Yamada 2011). The second group (*B. atlantica* species group) includes the type species of the genus, *B. atlantica*, and *B. corsica*: characters are the lack of a long epistomial process and of an exopodal flagellum on the first maxilliped, and a smooth, gently convex tergum of the third somite. The newly described *B. pacifica* sp. nov. fulfills the second condition (i.e., no flagellum on exopod of first maxilliped), but possesses an epistomial spine (although not very long) and a moderately produced third tergite. It would therefore seem necessary to analyze other characters within the genus *Bresilia* in order to decide if the formal division of this taxa would be justified or not based on these characters.
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