ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN
(MINISTERIE VAN WELZIJN, VOLKSGEZONDHEID EN CULTUUR)

Deel 63 no. 24 19 januari 1990 ISSN 0024-0672

A NEW SPECIES OF PALAEMONID SHRIMP, *CHACELLA TRICORNUTA* SPEC. NOV. (CRUSTACEA: DECAPODA: PALAEMONIDAE) FROM THE SOUTHEASTERN GULF OF CALIFORNIA, MEXICO.

by

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Hendrickx, M.E.: A new species of Palaemonid shrimp, *Chacella tricornuta* spec. nov. (Crustacea: Decapoda: Palaemonidae) from the southeastern Gulf of California, Mexico.
Zool. Meded. Leiden 63 (24), 19-i-1990: 325-334. figs. 1-3, ISSN 0024-0672.
Keywords: Crustacea, Decapoda, Caridea, Palaemonidae, *Chacella tricornuta* spec. nov. Gulf of California.

A new species of the palaemonid shrimp genus *Chacella* Bruce is described from the Gulf of California, Mexico, in the eastern Pacific, and represents the second known species of this genus. The type-species, *Chacella kerstitchi* (Wicksten, 1983), was described from a single female captured off the coast of San Carlos, Sonora, in the Central Gulf of California.

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INTRODUCTION

Dasycaris kerstitchi is a small species of bizarre palaemonid shrimp described by Wicksten (1983) on the basis of a single female specimen collected off the coast of San Carlos, near Guaymas, in the Central Gulf of California, Mexico, by Alex Kerstitch. The holotype of this species has since been reexamined by Bruce (1986) who concluded that this small American shrimp could not be referred to the genus *Dasycaris* Kemp, basically because of its lack of flagellate exopods on all three maxillipeds, a character consistantly found in the four known species of *Dasycaris*. Bruce (*op. cit.*) also came to the conclusion that Wicksten's shrimp was morphologically closely related to a small group of seven American and two Indo-West Pacific genera (see Bruce, 1985), still was distinct enough to justify the establishment of a new genus, *Chacella* Bruce.

During sampling operations in the Gulf of California aboard the R/V "El Puma" of the Universidad Nacional Autónoma de México, a small yellowish palaemonid shrimp was collected in a trawl hauled along the east coast of Isla Maria Madre (Tres Marias Islands, Nayarit). This single specimen, an ovigerous female, appeared to represent a second, as yet undescribed species of *Chacella*.

DESCRIPTIVE PART

Chacella tricornuta spec. nov.
(figs. 1-3).

Material. — Holotype: Mexico, Nayarit, Islas Tres Marias, East coast of Isla Maria Madre, 21°38' N, 106°32' W, depth 30-40 m, trawl, 22 March 1985, 1 ovigerous, ♀, carapace length 3.4 mm, total length 13.7 mm (RMNH D 37661, dissected).

Description. — The carapace is smooth and thick; dorsal surface with three subconical, horn-like, prominent teeth. The highest tooth is also the largest and is situated anteriorly in midline, just above the frontal region and behind the orbits; it is curving sligthly forward and its upper part is laterally compressed. The two smaller dorsal teeth are placed laterally, symmetrically at about mid-carapace length.

The orbits are well defined dorsally, less so posteriorly. The carapace extends anteriorly, under the eye, to form an orbital floor. A small knob is present posterior to the orbit. The anterolateral border of the carapace is strongly produced anteriorly, rounded, without spine, forming an obtuse and expanded antennal process united to the orbital floor by a suture. The frontal plate is squarish, without rostrum and with a thin carina on midline; the space between this carina and the lateral margins of the frontal plate is depressed.

The abdominal segments are smooth; the pleura of the three proximal segments are somewhat rectangular, very wide and extended ventrally; the left and right pleura of these segments leaving a narrow gape on the ventral midline. Five conical, prominent teeth are present on the dorsal surface of the abdomen: a pair of low, symmetrical teeth on the first segment, a pair of higher symmetrical teeth, similar in shape to the lateral pair on carapace, on the second segment, and a single medium-sized tooth on midline of the third segment, just above the posterior margin. The abdominal segments 4 and 5 are without teeth or humps. The sixth abdominal segment is about twice as long as deep and about half as long as the telson. The posterolateral extensions of abdominal segments 4 and 5 are rounded. The telson is about 3.5 times as long as its

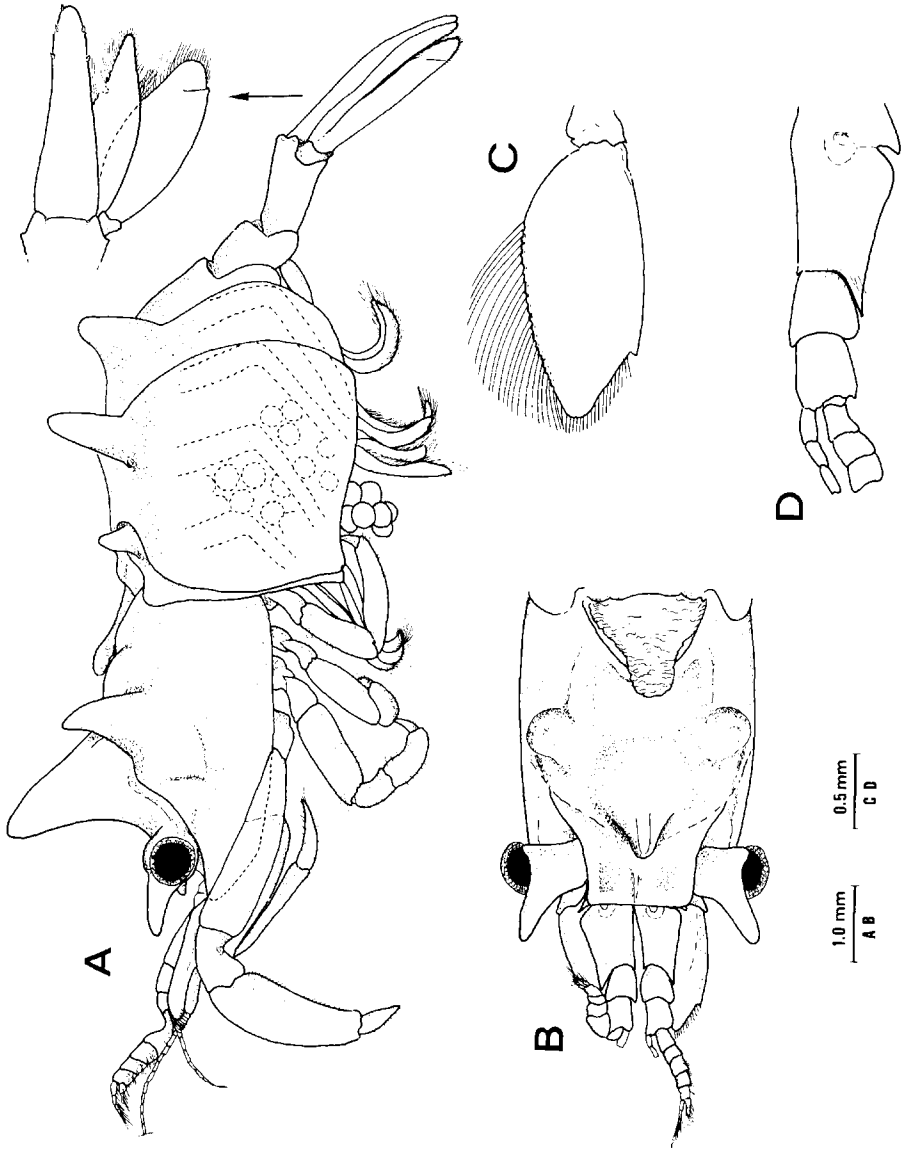

Fig. 1. *Chacella tricornuta* spec. nov., ♀ holotype. A, lateral and dorsal view of telson at same scale; B, carapace, dorsal view; C, scaphocerite, dorsal view; D, antennula, dorsal view.

anterior width, with almost straight lateral margins, and bears two pairs of very small marginal spines, situated in the distal quarter of the telson. The tip of the

telson is rounded, damaged; two very small terminal spines are visible on the left, and one on the right.

The eyes are well developed, with hemispherical cornea. The ocular peduncle is stout, cylindrical, extended laterally, and with a strong subconical anterodorsal knob, directed obliquely forwards.

The antennular peduncle is sligthly longer than the scaphocerite. The proximal segment is less than twice as long as wide, and the outer margin is sligthly concave and entire. The distolateral angle is produced, sharp; there is no medial tooth ventrally. The statocyst is normally developed, in dorsal view partly masked by the front. The stylocerite is short, subacute, not reaching the proximal third of the basal segment of the antennule. The intermediate segment is short, as long as wide, and the distal segment is sligthly longer than the intermediate, but narrower. The upper flagellum is biramous, with the proximal five segments fused; the free part of the shorter ramus consists of two segments; the longer ramus has six segments. The lower flagellum is slender, with about twelve segments.

The antenna presents an armed basicerite; the carpocerite is about 2.5 times as long as broad. The scaphocerite is about 2.3 times as long as wide, with a distinct distolateral tooth overreached by the strongly anteriorly produced lamella. The antennal flagellum is long, about 1.7 times the length of the carapace.

The mandible is normally developed, without a palp. The incisor process is slender, falciform and finely serrate on the outer margin. The molar process is slender and ends in an oval plate; it bears two subterminal conical teeth on the margins, and a few short terminal setae.

The maxillula has a distinctly bilobed, non setose palp, the lower lobe ending in a small hooked seta. The upper lacinia is well developed, basally expanded, distally truncated, and armed with a series of eight terminal subconical teeth, six short and two long, and an additional subterminal spine.

The maxilla has a short, non setose palp. The basal endite is vestigial, without setae. The scaphognathite is broad, about 2.5 times as long as wide.

The first maxilliped has a slender, short, strap-like, non setose palp. The basal endite is broad, the medial border is provided with numerous long and short plumose setae. The caridean lobe of the exopod is large, broad, of similar size as the basal endite, and has numerous long plumose setae; there is a long, strap-like flagellum on the median margin, with four plumose setae distally. The epipod is medium-sized, bilobed, with triangular lobes.

The second maxilliped is of normal shape. The dactyl of the endopod bears long and short setae along the medial border. The propod, carpus and ischiomerus are normal; the basis is without an exopod. The coxa has a large subrect-

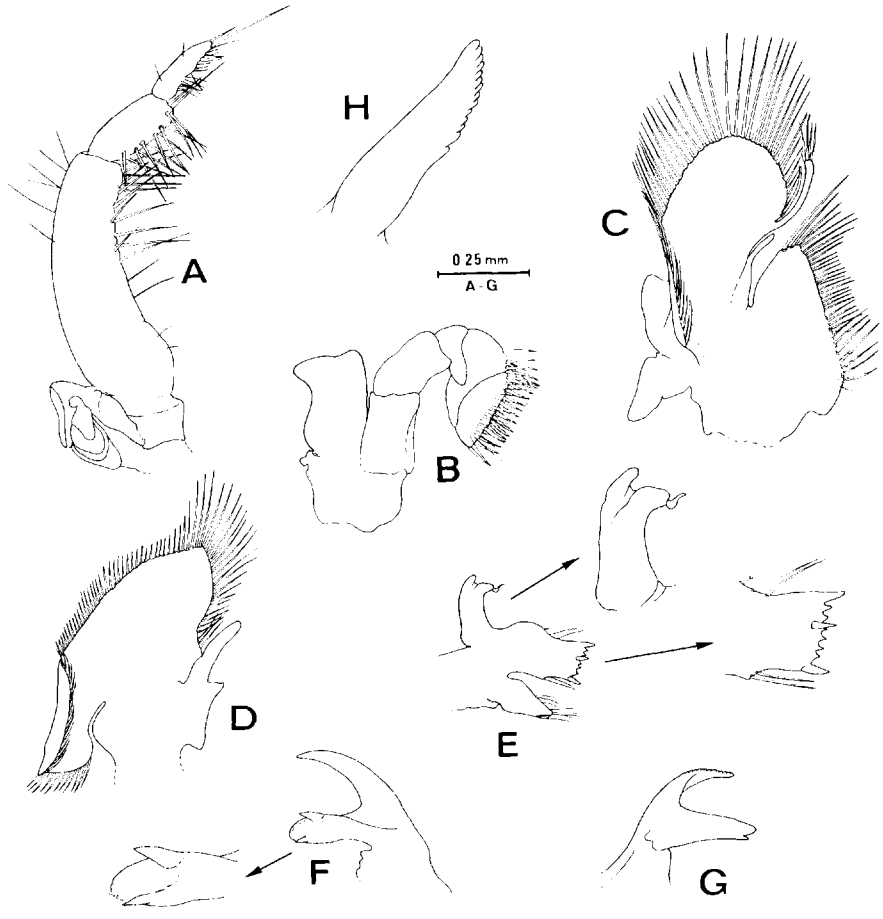

Fig. 2. *Chacelle tricornuta* spec. nov., ♀ holotype. A, third maxilliped; B, second maxilliped; C, third maxilliped; D, maxilla; E, maxillula and detail of palp and upper lacinia; F-H, mandible, and detail of molar process.

angular epipod with a sinuous outer margin; there is no podobranch.

The third maxilliped is short and robust, the endopod moderately setose. The ischiomerus is fused to the basis; their combined length is about 3.4 times their width and their medial margin is sparsely provided with simple setae, except for the distal part where the setae are more numerous and stronger. Ventrally, at the point of fusion of the ischiomerus and basis, there is a short row of very small setae. The penultimate segment of the endopod is robust, about 1.4 times as long as broad, and with strong simple setae along the median margin and two strong terminal simple setae. The terminal segment is slender,

sligthly shorter than the penultimate segment, about 2.7 times as long as broad, provided with short setae along the median margin and with two stronger terminal setae. The penultimate and terminal segments are about 0.30-0.35 times as long as the ischiomerus. The coxa has a moderately large oval epipod, and a distinct lamellar arthrobranch. There is no exopod.

The first perciopods are slender, exceeding the anterior point of the scaphocerite by about 1/3 the length of the carpus, and the chela; the merus and carpus are of the same length, about twice as long as the ischium. The palm of the chela is sligthly compressed, about 2.2 times longer than deep; the fingers are moderately slender and shorter than the palm, the cutting edges entire and

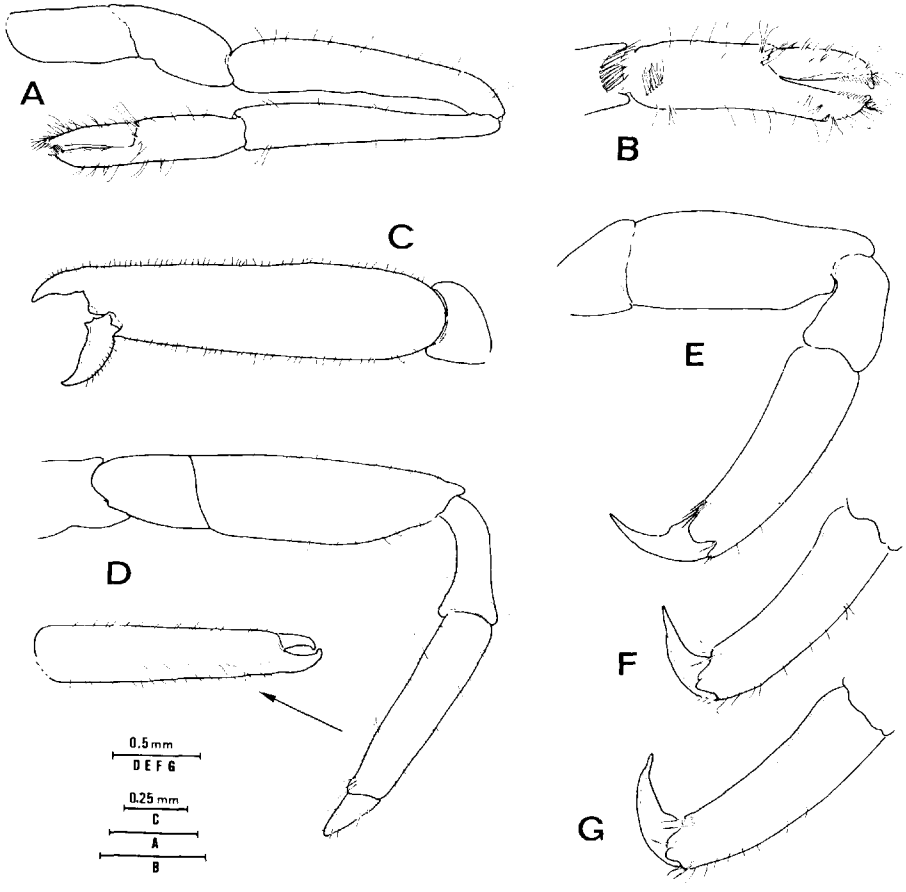

Fig. 3. *Chacella tricornuta* spec. nov., ♀ holotype. A, first pereiopod; B, chela of first pereiopod; C, chela of large (right) second pereiopod; D, second small (left) pereiopod; E, third pereiopod; F, propodus and dactylus of fourth pereiopod; G, propodus and dactylus of fifth pereiopod.

feebly spatulate, with hooked tips and a cluster of short subterminal setae. The carpus is about 1.5 times as long as the chela, broadening distally.

The second pereiopods are smooth, robust and similar in shape, but the right one is considerably larger than the left one. In both chelae, the palm is subcylindrical, the cutting edges entire; the large chela is about 3.9 times longer than deep and the smaller chela about 4.7 times. The fingers of the large chela are slightly curved and the moving finger is slightly stronger than the fixed finger; the fingers are about 4.3 times shorter than the palm. The fingers of the small chela are also slightly curved, with a short hooked tip, and 6.5 to 7.5 times shorter than the palm. The carpus of both second pereiopods is much shorter than the palm, robust, strongly bent and broadened distally; in both appendages, the merus is long, robust, laterally compressed in its proximal half. It is about 0.6 as long as the chela and about 4.4 times longer than wide in the large cheliped; as long as the chela and about 5 times longer thans wide in the small cheliped. The ischium and basis are laterally compressed, and present no special features.

The ambulatory pereiopods are of normal development and about equal in size and shape. They are robust, moderately short, and slightly compressed laterally. The meri are broad in all three legs, about 2.3 times longer than deep. The carpi are about half the length of the propodi. The propodi are slightly curved, about 3.5 times longer than broad. The dactyli are simple, stout, acute, with unguis indistinct and equal to about one third of the length of the propodi; the ventral border is strongly concave and unarmed, with a proximal sinuosity. The carpus, merus and ischium are unarmed, without special features.

The protopodite of the uropod is unarmed. The lateral border of the exopod is convex, without a distolateral tooth (a minute spinule is present). The endopod is of about same length as the exopod, the lamella being narrower and more acute. The exopod and endopod are about 2.5 times and 3.4 times longer than broad, respectively.

Etymology.—The specific name of this species of *Chacella* is formed by the combination of the Latin *tri* (three) and *cornuta* (horn) to emphasize the presence of three horns on the dorsal part of the carapace.

Habitat.—There is no specific information regarding the habitat of *Chacella tricornuta*. The species was collected at 30-40 m, on mixed bottom. The morphology of the ambulatory pereiopods, however, indicates that *C. tricornuta* is a clinging species and it might well be another of those bizarre palaemonid associates of Coelenterata (Bruce, 1986) a suggestion supported by the uniform yellowish color of the living specimen and by the presence of dorsal protuberances that resemble the tentacles of some Anthozoa.

Discussion. — Including *C. tricornuta*, only two species of *Chacella* have been described so far, both from a single female collected in the Gulf of California, on the West coast of Mexico. Although *C. tricornuta* presents bizarre morphological features making it very distinct from *C. kerstitchi* (Wicksten, 1983) (e.g. the five dorsal teeth on the abdomen, the presence of three large "horns" or teeth on the carapace and the very large pleura of the three proximal segments of the abdomen), it shares many characters with the type-species of the genus. Among the most significant are: — the absence of a rostrum; — the presence of a broadly expanded and transversely truncate frontal region; — the presence of dorsal prominent teeth on the carapace; — the presence of well developed orbita, with blunt postorbital tubercle and a reduced inferior orbital angle; — the absence of hepatic spine and pterygostomial notch; — the presence of a strongly produced antennal process; — the presence of a large anterodorsal process on the ocular peduncle; — the presence of elongated pleura in the fourth and fifth abdominal segment; — the similarity of pereiopods 1, 3, 4 and 5 (pereiopods 2 of *C. kerstitchi* unknown); — the similarity of thoracic sternites, without median spine and with acute lateral processes on sternite 4, but with a shorter sternite 3.

Small additional differences are found in the structure of the antennula (i.e. no proximal tooth on the outer margin of the proximal segment in *C. tricornuta*, an acute tooth present in *C. kerstitchi*) and of the antenna (i.e. presence of a distolateral tooth on the outer margin of the scaphocerite and on the carpocerite in *C. tricornuta*, none of these tooth present in *C. kerstitchi*), but these appendages are otherwise similar.

The problem of comparing the mouthparts is more delicate. According to Bruce (1985, 1986), the "... absence or marked reduction of the flagella of all maxillipeds...", and in some cases the "... presence of an... exhalant notch at the antero-ventral angle of the branchiostegite...", are characteristics of a group of eight genera (including *Chacella*) found exclusively in tropical American waters and of two genera (*Miopontonia* and *Pontonides*) found in the Indo-Pacific. Both *C. kerstitchi* and *C. tricornuta* lack a pterygostomial notch, but *C. tricornuta* has a well developed flagellum on the exopod of the first maxilliped, while according to Bruce (1986: 486 and Fig. 2G) *C. kerstitchi* has a "... small acute process at position of obsolete flagellum..." on the "caridean lobe" (i.e. on the exopod of the first maxilliped). The term "obsolete flagellum", as used by Bruce (*loc. cit.*), is somewhat confusing. In his definition of the genus *Chacella*, Bruce (1986: 485) includes "... first maxilliped ... without flagellum..." while in his discussion of the taxonomic position of the genus (*op.cit.*, 486) he says that "*Chacella* lacks the following features found in *Veleronia*... (3) rudimentary flagellum on caridean lobe". According to Holthuis

(1951: 195), however, the genus *Veleronia* has a "... first maxilliped with the exopod without flagellum" (i.e. not rudimentary, but lacking!), and this is confirmed in the description by Holthuis (*op.cit.*, 147 and 200) of the two known species, *V. serratifrons* and *V. laevifrons*. Thus, while there is actually no flagellum in *Veleronia*, there is a rudimentary (*C. kerstitchi*) or well developed (*C. tricornuta*) flagellum on the exopod of the first maxilliped of *Chacella*. An almost identical situation is found within the genus *Neopontonides* (see Bruce, 1985: 177 and key): one species (*N. principes*) has no exopodal flagellum and 2 species (*N. beaufortensis* and *N. dentiger*) have one. Although in the case of *Neopontonides* there seem to be enough additional arguments that suggest the separation into two distinct genera (see Bruce, *loc. cit.*), it would rather seem advisable in the present case to include the new species within *Chacella*, and to consider the "reduced or well developed flagellum on the exopod of first maxilliped" a characteristic of this genus.

Other small diferences in mouth parts are: — the epipod on the first maxilliped is considerably smaller in *C. tricornuta.*; — the epipod on the second maxilliped is much longer than the basis in *C. tricornuta*, about equal to the basis in *C. kerstitchi*; — the artrobranch on the coxa of the third maxilliped is less rudimentary in *C. tricornuta* and distinctly presents four blades; — the basal endite of the maxilla is reduced to a short subrectangular process in *C. tricornuta* and is well developed in *C. kerstitchi*; — the notch of the palp of the maxillula is deeper in *C. tricornuta*, the upper lacinia is larger, distincly truncate distally, and has more teeth in this species; — the mandible is similar, but the molar process is weaker and the incisor process more acute in *C. tricornuta.*

None of these differences, however, are at present judged sufficient to justify the creation of a new genus.

ACKNOWLEDGEMENTS

I am grateful to the Muséum National d'Histoire Naturelle, Paris, for the facilities provided while working at the Laboratoire d'Arthropodes and to Drs. D. Guinot and A. Crosnier for their help and hospitality. I thank Drs. J. Bouillon and M. Jangoux, Université Libre de Bruxelles, for the facilities provided during my stay at the Laboratoire de Biologie Marine and Mercedes Crodero H. for the aid in preparing and typing the manuscript. This study was partly supported by CONACyT, Mexico (ICECXNA-021926) and the DGPA, UNAM.

REFERENCES

Bruce, A.J., 1985. Notes on some Indo-Pacific Pontoniinae, XLII. *Miopontonia yongei* gen. nov., sp. nov., from the Australian north west shelf (Decapoda, Caridea). — Crustaceana 48 (2): 167-178.

Bruce, A.J., 1986. *Chacella*, a new palaemonid shrimp genus proposed for *Dasycaris kerstitchi* Wicksten, 1983 (Crustacea: Decapoda: Natantia). — J. Crust. Biol. 6 (3): 485-490.

Holthuis, L.B., 1951. A general rivision of the Palaemonidae (Crustacea: Decapoda: Natantia) of the Americas. I. The subfamilies Euryrhynchinae and Pontoniinae. — Occas. Papers Allan Hancock Found. 11: 1-332.

Wicksten, M.T., 1983. Shallow water caridean shrimps of California, Mexico. — Allan Hancock Monogr. in Mar. Biology 13: 1-59.