

First report of the shrimp genus *Typton* Costa, 1844 (Crustacea, Decapoda, Palaemonidae) in Venezuela

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Abstract: After the review of six unidentified shrimp specimens of the family Palaemonidae, belonging to the reference collection of decapod crustaceans of GICUDONE, two species of the genus *Typton*, *T. carneus* and *T. fapespae*, are reported for the first time in Venezuela. With these new additions, the number of coastal and estuarine marine genera and species of the Palaemonidae family that are known in the country increases to 18 and 39, respectively.

Keywords: Biodiversity; Crustaceans; Caribbean; decapods; Palaemonids; Taxonomy.

1 Introduction

The family Palaemonidae Rafinesque, 1815 is composed by at least 149 genera and more than 1108 species (Bauer, 2004; WoRMS, 2021), inhabiting mainly tropical and subtropical latitudes,

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in freshwater, estuarines and shallow-water benthic marine habitats. Many of the marine species establish symbiotic relationships with other marine invertebrates (Martinelli-Filho et al., 2008; De Grave and Fransen, 2011; Ďuriš et al., 2011; Vera-Caripe et al., 2019).

This family consists of species with a high plasticity of shapes, sizes and colors. Many marine species are free living, and can be found in and on rocks, dead corals, and seagrass beds (Holthuis, 1951). Other species live endozootically in sponges, tunicates and molluscs (Criales, 1984; Horka et al., 2016), while others live epizootically on sponges (Armstrong, 1940; Fransen, 2003; Horka et al., 2016), cnidarians (Heard, 1986; Horka et al., 2016) and echinoderms (Criales, 1984; Horka et al., 2016; Vera-Caripe et al., 2017, 2019). Some species can even be found having infaunal lifestyle, in association with alpheid crustaceans (Decapoda) and echiurans worms (Thalassematidae) (Anker and De Grave, 2019).

In Venezuela, 37 marine coastal and estuarine species from the family Palaemonidae have been reported, belonging to 17 genera (*Anchistioides* Paulson, 1875; *Ancylomenes* Okuno and Bruce, 2010; *Ascidonia* Fransen, 2002; *Brachycarpus* Spence Bate, 1888; *Cuapetes* Clark, 1919; *Gnathophylloides* Schmitt, 1933; *Gnathophyllum* Latreille, 1819; *Holthuisaeus* Anker and De Grave, 2010; *Leander* Desmarest, 1849; *Macrobrachium* Spence Bate, 1868; *Nematopalaemon* Holthuis, 1950; *Neopontonides* Holthuis, 1951; *Palaemon* Weber, 1795; *Periclimenes* Costa, 1844; *Periclimenaeus* Borradaile, 1915; *Pontonia* Latreille, 1829 and *Pseudocoutierea* Holthuis, 1951). The genus *Typton* Costa, 1844, represented by the species *T. carneus* Holthuis, 1951 and *T. fapespae* Almeida, Anker and Mantelatto, 2014, is reported for the first time for the country, contributing to the knowledge of the biodiversity of decapod crustaceans of Venezuela and the Caribbean. Since cryptic species are common among shrimps, a detailed of the species is presented.

2 Materials and Methods

The studied material is deposited in the reference collection of the Carcinology Research Group of the Universidad de Oriente, Nucleus of Nueva Esparta (GICUDONE), located in Boca del Río, Margarita Island, Venezuela.

The samples were studied, sexed and measured using a stereoscopic microscope with a calibrated eyepiece. Sex was determined based on the presence (males) or absence (females) of an appendix masculina (the second pair of pleopods) with corpus obsolete, being essentially represented by two stiff setulose setae protruding beyond appendix interna (in *Typton fapespae*), or 1 to 2 long setae overreaching appendix interna (in *T. carneus*). The length of the carapace (POCL) was measured, taken from the margin of the orbit till end of carapace.

3 Results and Discussions

Six specimens were analyzed, which had been collected from the localities of Boca de Palo, Margarita Island (Nueva Esparta State) (4), Cachicamo Island (1) and Morro Pelotas (1), the latter two located in the Mochima National Park (Mochima NP), Anzoátegui State (Fig. 1).

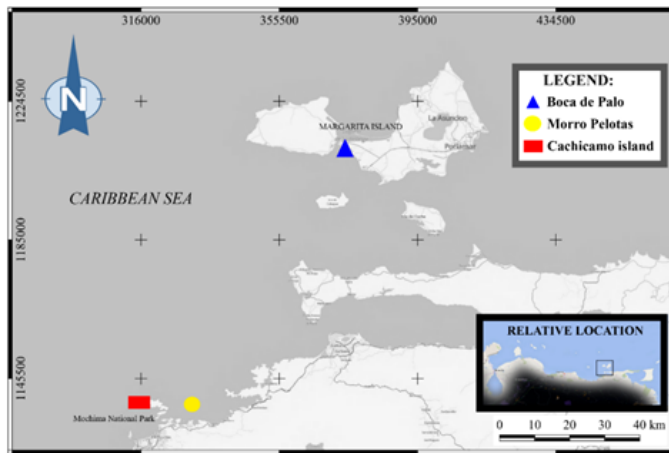


Figure 1: *Typton* collection sites in Venezuela. Base image Bing © 2021; map created in Qgis, 2020. Coordinate system: UTM. Datum: REGVEN: USO 20. Scale 1:573393.

Palaemonidae Rafinesque, 1815.

Typton Costa, 1844.

Typton carneus Holthuis, 1951 (Fig. 2A).

Typton carneus Holthuis, 1951:162 [in part]; Chace, 1972: 46; Abele and Kim, 1986: 17; Ramos-Porto and Coelho, 1998: 340; Coelho et al., 2006: 50; Coelho, 2006: 7; De Grave and Anker, 2017: 31.

Material examined: Boca de Palo, Margarita Island (374600 - 1211153), (GIC-UDO-523), date: 12.II.2008, 3 ovigerous ♀ (POCL 2.0 - 2.2 mm) and 1 ♂ (POCL 1.9 mm), collected in meadows of *Thalassia testudinum* Banks ex König, 1805, between 0.5 m and 1.0 m deep, coll.: María Rojas Vásquez, Emerys Vire. Morro Pelotas, Mochima NP (315479 - 1139341), date: 05.VI.2010, 1 ♂ (POCL 1.6 mm) collected in dead coral at 1.5 m deep, coll.: Jonathan Vera-Caripe.

Description: Carapace smooth, slightly depressed. Rostrum short, simple, slightly curved downwards, reaching the proximal third of ocular peduncle. Paraorbital processes developed, acute, and almost as long as the rostrum. Eyes slightly exceeding the first article of antennular peduncle. Antennule with first segment elongated; stylocerite wide and acute, its length less than half of the first antennular segment; third segment shorter than second. Antenna with very reduced, oval scaphocerite. Mandible with well-developed incisor process. Third maxilliped not reaching the distal margin of the basal segment of the antennule. First pair of pereopods subequal in size and shape; carpus slightly longer than chelae and merus; fingers short and blunt; palm longer than fingers. Second pair of pereopods very unequal in size and shape; carpus extended beyond antennal peduncle. Major cheliped with fingers smaller than the palm, slightly twisted and closing in a vertical plane, distally crossed; dactylus slender, superior margin straight and almost parallel to the ventral margin; pollex slender and with a tooth located on the inner margin of base. Merus slightly longer than carpus, flexor margin with spinules. Ischium as long as merus. Carpus 2/3 length of the palm, with a ventral projection located near the middle of the palm. Minor cheliped with fingers about 2/3 length of the palm, distally subparallel. Merus as long as the ischium and almost as long as the carpus, flexor margin with spinules. Third pair of pereopods extends beyond the antennular peduncle with part of the carpus, propodus and dactylus; carpus slightly shorter than propod; propod about four times the length of the dactylus; dactylus biunguiculated and armed with a small accessory tooth at the apex of the distal spine; distal spine much longer and more robust than proximal spine. Fourth and fifth pair of pereopods very similar to the third but more slender. Abdomen elongated, smooth, with rounded pleura; sixth abdominal segment

without posteromedian tooth. Telson slender; lateral margins slightly convex, tapering distally; dorsal surface with two pairs of spines developed, posterior pair located in the middle of the length of the telson and anterior pair located very close to the proximal margin of the telson. Uropods oval shaped; exopods with entire outer margin, ending in a conspicuous tooth, inner margin with a mobile spine.

Type locality: Dry Tortugas, Florida, USA.

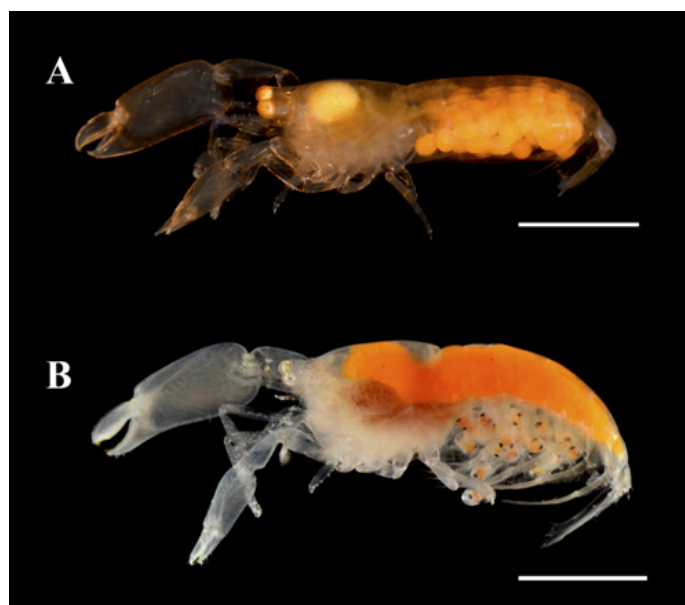


Figure 2: A-*Typton carneus* Holthuis, 1951, ovigerous female. Collected in: Caribbean coast of Panama. Photo credit: Robert Lasley. B-*T. fapespae* Almeida, Anker and Mantelatto, 2014, ovigerous female. Collected in: off the coast of Brazil. Photo credit: Arthur Anker. Scale bar: A= 2.5 mm; B= 3 mm.

Distribution: See Fig. 3. Florida, Texas (USA), Gulf of Mexico, Bahamas, Quintana Roo (Mexico), Cuba, Panama, Virgin Islands (USA and British), Antigua and Barbuda, Saba, Tobago; Ceará, Paraíba, Pernambuco (Brazil) (Holthuis, 1951; Chace, 1972; Felder and Chaney, 1979; Felder et al., 2009; Simões, 2009; Román-Contreras and Martínez-Mayén, 2010; Duris et al., 2011; De Grave and Anker, 2017; Poupin, 2018); Margarita Island and Mochima NP (Venezuela) (present study).

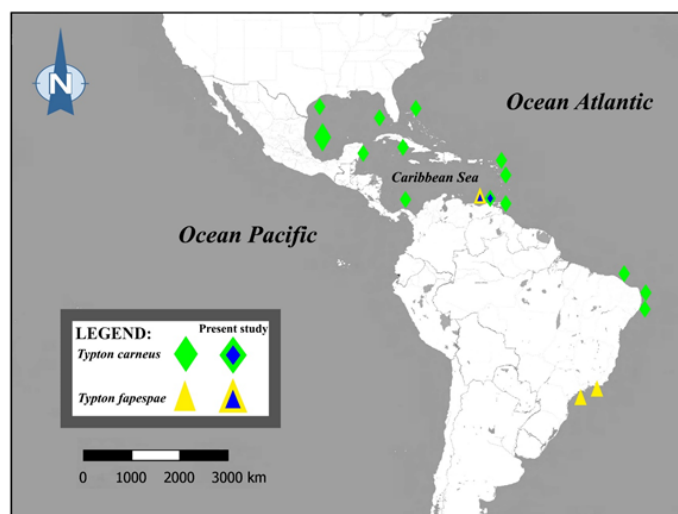


Figure 3: Distribution map of *Typton carneus* Holthuis, 1951 and *T. fapespae* Almeida, Anker and Mantelatto, 2014. Base image Wase map© 2021.

Remarks: This species is widely distributed in the American Atlantic and the Caribbean, where it

can be found in coarse sand bottoms and shell remains, close to meadows of *Thalassia testudinum* K. D. Koenig, 1805 (Holthuis, 1951; Román-Contreras and Martínez-Mayén, 2010), as well as in dead coral (Chace, 1972), but in general the genus is sponge symbionts (Bruce, 1976). Moreover, according to the Duris et al. (2011), the species *T. carneus* have a strong association with fire sponges *Tedania (Tedania) klausii* Wulff, 2006 and *T. (Tedania) ignis* (Duchassaing and Michelotti, 1864), association that can be symbiotic or parasitic.

Typton fapespae Almeida, Anker and Mantelatto, 2014 (Fig. 2B).

Typton fapespae Almeida, Anker and Mantelatto, 2014: 111, Figs. 1-5; Pachellet et al., 2015: 319. *Typton gnathophylloides*-Nalesso et al., 1995: 96; Duarte and Nalesso, 1996: 143; Amaral et al., 2010: 249 [not *T. gnathophylloides* Holthuis, 1951].

Material examined: Cachicamo Island, Mochima NP (330228 – 1138194), (GIC-UDO-547), date: 28.X.2010, 1 ovigerous ♀ (POCL 2.7 mm), collected in dead coral at 3 m deep, coll.: Jonathan Vera-Caripe.

Description: Carapace smooth, slightly depressed. Rostrum acute distally, slightly curving upwards, reaches the base of the cornea. Paraorbital processes developed, shorter than the rostrum and flexed upward. Orbit feebly marked, without inferior orbital angle, without antennal spine; pterygostomial margin produced anteriorly, rounded and slightly angular. Antennular peduncle slender, stylocerite short and narrow. Antenna with a mesial glandular tubercle; basicerite robust, laterally unarmed; scaphocerite vestigial; carpuccerite slender, does not exceed the distal margin of the antennular peduncle. First pair of pereopod subequal in size and shape, slender; ischium unarmed, merus slightly longer than carpus; carpus subcylindrical, distally wide; chela with subcylindrical palm, slightly compressed; fingers robust, subspatulate, feebly bidentate at the apex. Second pair of pereopods very unequal in shape and size. Major cheliped much longer and more robust than the minor one; chela as long as the cephalothorax and abdomen together; ischium subequal to merus in length, unarmed; merus slightly longer than wide (subquadrate); chela elongated, palm smooth, slightly compressed laterally, transversely suboval, tapering distally, its length about twice its maximum width; dactylus laterally compressed, apices strongly curved and corneous; lateral and mesial margins entire and concave. Minor cheliped with ischium slightly longer than merus, unarmed; merus longer than wide, carpus slightly shorter than palm; palm smooth, non-setose, transversely suboval; dactylus compressed, apex curved, with a blunt anterolateral tooth; pollex excavate in the cutting margin, apex simple. Third pair of pereopods robust; propodus with five irregularly spaced spines on ventral margin, a pair of these near the base of the dactylus; dactylus biunguiculate, unguis much wider at the base than the accessory tooth; ventral margin slightly concave and crenulated. Fourth pair of pereopods similar to the third; propodus with three pairs of spines on the ventral margin and one pair of robust spines on distal margin; dactylus biunguiculate, unguis much wider at the base than the accessory tooth, ventral margin conspicuously crenulate. Fifth pair of pereopods clearly more slender than third and fourth pair; with ischium, merus and carpus unarmed; propodus with ventral margin with one subdistal and one distal spines; dactylus biunguiculated; with strong secondary unguis, subacute, pointing ventrally, terminal unguis well demarcated, compressed; with ventral margin slightly convex, distally crenulated. Abdomen elongated, smooth; first five somites with rounded pleura; posterodorsal margin of the sixth somite with a strong tooth, acute and subtriangular, posterolateral angle produced in a strong tooth, posteroventral angle blunt. Telson slender; lateral margins slightly convex, tapering distally; dorsal surface with two pairs of spines developed, inserted at about 0.16 (anterior

pair) and 0.66 (posterior pair) of telson length. Uropods with unarmed protopod; exopod armed on the distolateral margin with four (on the left) and five (on the right) fixed teeth.

Type locality: Praia do Cabelo Gordo, São Sebastião, São Paulo, Brazil.

Distribution: See Fig. 3. São Paulo and Rio de Janeiro (Brazil) (Almeida et al., 2014; Pachellet et al., 2015), Cachicamo Island, Mochima NP (Venezuela) (present study).

Remarks: According to Almeida et al. (2014), *T. fapespae* can be found in association with sponges. The only specimen analysed in this study was collected from dead coral. Dead coral is one of the substrates that hosts the largest number of decapod crustacean species (Rodríguez, 1986; Lira, 1997, 2004; Vera-Caripe et al., 2013; Vera-Caripe and Lira, 2019), and of other invertebrates such as sponges, polychaetes and molluscs; the collected specimen probably abandoned its possible host (sponge), during the sampling and handling of the substrate, and took refuge in the cavities of the coral rock where it was found.

Typton fapespae was previously only known from the coast of São Paulo and Rio de Janeiro, Brazil (Almeida et al., 2014; Pachellet et al., 2015). The present record in Venezuelan waters represents the first report for the Caribbean Sea. The discovery of the species *T. carneus* and *T. fapespae* in Venezuelan waters represent the first report of the genus and species for the country, increasing to 18 genera and 39 species the number of coastal marine and estuarine shrimps of the Palaemonidae family known in Venezuelan waters.

● **Key to differentiate the species of the genus *Typton* present in the West Atlantic:**

- 1A. Sixth abdominal somite with a strong median tooth on the posterodorsal margin (Lateral branch of the uropod strongly serrated on distolateral margin).....*T. fapespae*.
- 1B. Sixth abdominal somite without a median tooth on the posterodorsal margin.....2.
- 2A. Telson with posterior pair of dorsal spines arising anterior to midpoint of segment. Lateral branch of the uropod strongly serrated on distolateral margin.....*T. prionurus*.
- 2B. Telson with posterior pair of dorsal spines arising at, or posterior to, midpoint of segment. Lateral branch of uropod with lateral margin entire, not serrate distally or weakly serrated.....3.
- 3A. Antennal spine broad, toothlike.....4.
- 3B. Antennal spine acute, spiniform.....5.
- 4A. Minor second pereopod with dorsal margin of the chela dactylus, strongly convex; both fingers are slightly less than half as long as the palm. Antennal spine with tip sharp. Dactylus of the third to fifth pereopods weakly biunguiculate, little pronounced, with ventral margin unarmed.....*T. tortugae*.
- 4B. Minor second pereopod with dorsal margin of the chela dactylus, moderately convex; both fingers are noticeably longer than half-length of the palm. Antennal spine with tip blunt. Dactylus

- of the third to fifth pereopods strongly biunguiculate, and armed with a row of minute spinules along the ventral (flexor) margin (Lateral branch of the uropod weakly serrated on distolateral margin).....*T. jonkayei*.
- 5A Dactylus of the third pereopod distinctly bifid.....6.
- 5B. Dactylus of the third indistinctly bifid.....7.
- 6A. Rostrum distinctly longer than antennal spines.....*T. vulcanus*.
- 6B. Rostrum about as long as antennal spines.....*T. gnathophylloides*.
- 7A. Rostrum not deepening near midlength. Mandible with incisor process reduced. Lateral branch of uropod with lateral margin nearly straight in distal half.....*T. distinctus*.
- 7B. Rostrum deepening near midlength. Mandible with well-developed incisor process. Lateral branch of uropod with lateral margin rather regularly convex throughout.....*T. carneus*.

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Conflict of interests

The authors declare that there are no competing interests.

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