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Shallow water hippolytid shrimps (Crustacea: Decapoda: Caridea) from the Mexican Caribbean coast

Camarones hipolítidos (Crustacea: Decapoda: Caridea) de aguas someras de la costa del Caribe mexicano

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ABSTRACT

A checklist of shallow water shrimps of the family Hippolytidae of the central-southern coast of the Mexican Caribbean is presented. A total of 11 species belonging to 6 genera were collected on beds of *Thalassia testudinum* in Bahía de la Ascensión, Bahía del Espíritu Santo, and the Mahahual reef lagoon, Quintana Roo, Mexico. Genera *Hippolyte* and *Thor* were the most diverse with three species each. An updated geographic distribution along the western Atlantic and other regions is provided for all the species. Outside of the Caribbean province, greatest affinity of the hippolytid fauna is with the Virginian, Carolinian, Texan, and Brazilian provinces. New regional records are given and the occurrence of *Hippolyte pleuracanthus* is cited for the first time in the Mexican Caribbean.

Key words: Hippolytidae, Decapoda, Caridea, Mexican Caribbean.

RESUMEN

Se presenta un listado de los camarones de la familia Hippolytidae de las aguas someras de la costa centro-sur del Caribe Mexicano. Once especies pertenecientes a seis géneros fueron colectadas en praderas marinas de *Thalassia testudinum* en Bahía de la Ascensión, Bahía del Espíritu Santo y la laguna arrecifal de Mahahual, Quintana Roo, México. Los géneros *Hippolyte* y *Thor* fueron los más diversos con tres especies cada uno. Se proporcionan datos de distribución geográfica para todas las especies en la costa del Atlántico americano así como para otras regiones biogeográficas. Además de la provincia Caribeña, la fauna hipolítida recolectada presenta alta afinidad con las de otras provincias zoogeográficas como la Virginiana, la Caroliniana, la Texana y la Brasileña. Se proporcionan nuevos registros locales para las especies y se cita por primera vez la presencia de *Hippolyte pleuracanthus* en el Caribe mexicano.

Palabras clave: Hippolytidae, Decapoda, Caridea, Caribe mexicano.

INTRODUCTION

Crustaceans of the family Hippolytidae are diverse and abundant with more than 40 genera present in the world (Holthuis, 1993). These organisms are characterized by having the first two pairs of pereopods chelated, the first pair not much stronger than the other, the carpus of the second pair subdivided, eyes developed and not covered by the carapace, and the mandibles deeply clefted (Williams, 1984). Hippolytids are common dwellers of algae, sea grasses, gorgonians, sea anemones, holes, caves, muddy substrates, and other near shore areas, but also dwell within deeper zones of the continental shelf and slope (Wicksten, 1990, 2005b).

Knowledge of hippolytid shrimps in the Caribbean Sea has focused mainly on aspects of their taxonomy and distribution. The most complete work was performed by Chace (1972) who cited 26 species for the Caribbean. Markham *et al*. (1990) and Briones-Fourzán and Lozano-Álvarez (2002) published lists of the decapod crustaceans that inhabit the shallow waters of the Mexican Caribbean, including the hippolytids, and provided new records for the area. The deep water caridean shrimps have been studied by Escobar-Briones and Villalobos-Hiriart (2003), who registered 4 species and 3 new bathymetric records for this group.

Despite the aforementioned, few are the carcinological published works on the Mexican Caribbean area, for this reason, the need to generate more studies for this and other groups of crustaceans in this region is a current issue. The objective of the present contribution is to provide a checklist of the hippolytid shrimps collected in seagrass beds of *Thalassia testudinum* König, along the central-southern coast of the state of Quintana Roo, Mexican Caribbean. We describe the findings obtained during this study, including a new record in the area.

MATERIAL AND METHODS

Sampling took place in different stations of Bahía de la Ascensión (19°30'-19°50' N, 87°25'-87°50' W), Bahía del Espíritu Santo (19°12'-19°25' N, 87°41' W), and the Mahahual reef lagoon (18°43'11" N, 87°42'19" W) along the central-southern coast of Quintana Roo, Mexico. The specimens were collected with a Colman-Seagrove sledge net with a 800-µm mesh size in meadows of *T. testudinum* at depths between 0.4 to 1.5 m. The collected crustaceans were fixed with 10% formaldehyde immediately after sampling and were later preserved in 70% ethanol. The substrate included sandy-mud and sandy-rock in both bays, and sand in the Mahahual reef lagoon. Detailed information on the study area was obtained from Suárez and Gasca (1994), Castellanos Osorio and Suárez-Morales (1997), and Suárez-Morales & Rivera Arriaga (1998).

The list of species here included follows the classification proposed by Martin and Davies (2001) and is ordered alphabetically. Restricted synonymies, type-locality, material examined, habitat, previous Mexican Caribbean records, and geographic range are cited for each species. In some cases, remarks about taxonomic aspects are given. The number of individuals and collection date for each locality are also reported. Synonymies are based on the original descriptions, classic monographs, and recent literature. The geographic distribution of the species in the American provinces follows Boschi (2000). All specimens are deposited in the collection of the authors' laboratory at the Universidad Nacional Autónoma de México (UNAM).

RESULTS

A total of 71,973 hippolytid shrimps corresponding to eleven species and six genera were examined throughout the study. The genera *Hippolyte* and *Thor* were the most diverse with three species each (Table 1).

Order Decapoda
Suborder Pleocyemata
Infraorder Caridea
Superfamily Alpheoidea
Family Hippolytidae

***Hippolyte obliquimanus* Dana, 1852**

References: *Hippolyte obliquimanus:* d'Udekem d'Acoz, 1997: 470-475 (synonymy and description), figs. 1-2; Rodríguez-Almaraz *et al*., 2000: 863; Wicksten, 2005b: 112, fig. 12.

References: *Hippolyte curacaoensis:* Chace, 1972: 111, figs. 44-45; Williams, 1984: 117, fig. 81; Hernández-Aguilera *et al*., 1996: 39; Christoffersen, 1998: 355; García-Madrigal *et al*., 2002: 146; Wehrtmann & Vargas, 2003: 270.

References: *Hippolyte obliquimana:* Coelho & Ramos, 1972: 152.

Type-locality: Rio de Janeiro.

Previous Mexican Caribbean records*:* Listed as *H. curacaoensis* by García-Madrigal *et al*. (2002) for the area (locality unspecificed).

Distribution: Beaufort and Sneads Ferry, North Carolina (Williams, 1984) to Jim Island, Indian River, Florida (d'Udekem d'Acoz, 1997); from Veracruz state, Gulf of Mexico (Hernández Aguilera *et al*., 1996) to Santa Catarina, Brazil (Christoffersen, 1998). West Indies, from Cuba to Tobago and Curaçao (Chace, 1972).

Material examined: Bahía de la Ascensión, 61 specimens, May 2002; 16 specimens, Jan 2003. Bahía del Espíritu Santo, 20 specimens, May 2001; Mahahual reef lagoon, 187 specimens, July 1997; 499 specimens, November 1998. Collected on mud bottoms with *T. testudinum* close to mangrove zones, 0.4 to 1.5 m depth. First record in these localities.

Habitat: On sand and mud flats (Chace, 1972), frequently associated with marine seagrasses and algae in shallow waters (d'Udekem d'Acoz, 1997).

***Hippolyte pleuracanthus* (Stimpson, 1871)**

References: *Hippolyte pleuracanthus*: Chace, 1972: 118, fig. 48; Gore *et al*., 1981: 490; Williams, 1984: 117, fig. 82; Martínez-Iglesias, 1986: 14, fig. 7; Román-Contreras, 1988: 314; Martínez-Iglesias *et al*., 1996: 36; Eckrich & Holmquist, 2000: 204; Varela *et al*., 2003: 75; Wicksten, 2005b: 116.

Table 1. Hippolytid shrimps collected in the central-southern coast of Quintana Roo and their distribution in the American zoogeographic provinces. BA = Bahía de la Ascensión; BES = Bahía del Espíritu Santo; MRL = Mahahual Reef Lagoon. P = Panamic; Ar = Argentinian; Br = Brazilian; C = Caribbean; T = Texan; Cr = Carolinian; V = Virginian; Bo = Boreal. * First report in the Mexican Caribbean. (Letters in parenthesis represent first record for the locality).

Species	Locality	Zoogeographic provinces							
		P	Ar	Br	C	T	Cr	V	Bo
Hippolyte obliquimanus Dana,1852	(BA); (BES); (MRL)			•	•		•		
Hippolyte pleuracanthus (Stimpson, 1871)	*				•		•	•	
Hippolyte zostericola (Smith, 1873)	BA; (BES); (MRL)	•		•	•		•	•	
Latreutes fucorum (Fabricius, 1798)	BA; (BES); (MRL)			•	•	•	•	•	•
Latreutes parvulus (Stimpson, 1866)	(BA); BES; (MRL)		•	•	•	•	•	•	
Lysmata wurdemanni (Gibbes, 1850)	(BES)				•	•	•	•	
Thor dobkini Chace, 1972	BA; (BES)			•	•	•	•		
Thor floridanus Kingsley, 1878	BA; (BES); (MRL)				•	•	•		
Thor manningi Chace, 1972	BA; BES; (MRL)			•	•	•	•		
Tozeuma carolinense Kingsley, 1878	BA; (BES); (MRL)			•	•		•	•	
Trachycaris rugosa (Bate, 1888)	(BA); (BES); (MRL)				•		•		

Type-locality: Norfolk Harbor, Virginia, and Somers Point, Great Egg Harbor, New Jersey.

Previous records: First record for the study area.

Distribution: Connecticut (Chace, 1972) to Florida (Gore *et al*., 1981). Cuba (Martínez-Iglesias, 1986; Varela *et al*., 2003) and Puerto Rico (Eckrich & Holmquist, 2000).

Material examined: Bahía de la Ascensión, 9024 specimens, May 2002; 6686 specimens, January 2003; Bahía del Espíritu Santo, 30 specimens, May 2001; 2 specimens, November 2001; Mahahual reef lagoon, 94 specimens, July 1997. On sand and muddy substrate with *T. testudinum*, 0.40 to 0.80 m depth.

Habitat: Species reported abundant in beds of *Zostera*, *Diplanthera* (Williams, 1984) and bottoms covered with *T. testudinum* (Román-Contreras, 1988); down to 5.0 m depth (Martínez-Iglesias *et al*., 1996).

***Hippolyte zostericola* (Smith, 1873)**

References: *Hippolyte zostericola*: Chace, 1972: 118, figs. 49-50; Fausto-Filho, 1975: 79; Markham & McDermott, 1980: 1270; Rodríguez, 1980: 167, fig. 46; Williams, 1984: 118, fig. 83; Román-Contreras, 1988: 314; Wicksten, 1989: 644-645; Markham & Donath-Hernández, 1990: 245; Lemaitre & Álvarez León, 1992: 43; Christoffersen, 1998: 355; Zupo & Nelson, 1999: 181; Román-Contreras & Romero-Rodríguez, 2005: 83; Wicksten, 2005b: 114, fig. 13, pl. 2, fig. B.

Type-locality: Vineyard Sound, Massachusetts.

Previous Mexican Caribbean records: Bahía de la Ascensión (Chace, 1972; Markham & Donath-Hernández, 1990).

Distribution: Massachusetts (Chace, 1972) to Florida (Zupo & Nelson, 1999), along the Gulf of Mexico from Redfish Bay, Texas (Wicksten, 2005b) to Laguna de Términos, Campeche, Mexico (Román-Contreras, 1988; Román-Contreras & Romero-Rodríguez, 2005), and to Ceará, Brazil (Fausto-Filho, 1975). Bermuda (Markham & McDermott, 1980) to Trinidad and Curaçao (Chace, 1972). Also present in the eastern Pacific: San Antonio, Municipio de Robles, Tumaco, western Colombia (Wicksten, 1989; Lemaitre & Álvarez León, 1992).

Material examined: Bahía de la Ascensión, 6030 specimens, May, 2002; 3341 specimens, Jan 2003. Bahía del Espíritu Santo, 2277 specimens, May 2001; 154 specimens, Nov 2001. Mahahual reef lagoon, 1966 specimens, Jul 1997; 3 specimens, Nov 1998. All found on soft sediments, mud and shelly-sand substrates with *T. testudinum*, 0.50 to 1.5 m depth. First record in Bahía del Espíritu Santo and Mahahual reef lagoon.

Habitat: Abundant on beds of *T. testudinum*, *Halodule wrightii* Asch. and *Syringodium filiforme* Kützing (Román-Contreras, 1988; Zupo & Nelson, 1999); sublittoral (Chace, 1972).

***Latreutes fucorum* (Fabricius, 1798)**

References: *Latreutes fucorum*: Chace, 1972: 121; Coelho & Ramos, 1972: 152; Carvacho, 1979: 465; Markham & McDermott, 1980: 1270; Williams, 1984: 119, fig. 84; Román-Contreras, 1988: 314; Markham *et al*., 1990: 422; Martínez-Iglesias *et al*., 1996: 37; Christoffersen, 1998: 355; Rodríguez-Almaraz *et al*., 2000: 863; Wicksten, 2005b: 109, fig. 8; Cardoso, 2006: 16-21, figs. 11-14.

Type-locality: Floating gulfweed (locality unspecified).

Previous Mexican Caribbean records: Puerto Morelos, Isla Cozumel, and Bahía de la Ascensión (Chace, 1972; Markham *et al*., 1990). First record in Bahía del Espíritu Santo and Mahahual reef lagoon.

Distribution: Newfoundland, Canada, to Bahía, Brazil (Christoffersen, 1998; Cardoso, 2006), includes the Gulf of Mexico (Román-Contreras, 1988; Rodríguez-Almaraz *et al*., 2000). Bermuda (Markham & McDermott, 1980) and Cuba (Martínez-Iglesias *et al*., 1996) to Carriacou Island (Chace, 1972); also present in the eastern Atlantic from the Azores to Cape Verde Islands (Chace, 1972; Christoffersen, 1998).

Material examined: Bahía de la Ascensión, 1097 specimens, May 2002; 750 specimens, Jan 2003. Bahía del Espíritu Santo, 39 specimens, May 2001; 125 specimens, Nov 2001. Mahahual reef lagoon, 7903 specimens, Jul 1997; 3984 specimens, Nov 1998. In mud sandy substrate with turtle grass, 0.4 to 1.5 m depth.

Habitat: Associated with floating *Sargassum* (Chace, 1972); on seagrass (*Thalassia*), on mangrove roots (Markham *et al*., 1990); between calcareous algae and beds of *Halodule*, in shallow water down to 50 m (Coelho & Ramos, 1972).

***Latreutes parvulus* (Stimpson, 1866)**

References: *Latreutes parvulus*: Chace, 1972: 124; Coelho & Ramos, 1972: 153; Bowen *et al*., 1979: 252; Carvacho, 1979: 465; Christoffersen, 1982: 95; Williams, 1984: 120, fig. 85; Bauer, 1985: 152; Román-Contreras, 1988: 314; Markham *et al*., 1990: 422; Martínez-Iglesias *et al*., 1996: 37; Christoffersen, 1998: 355; Rodríguez-Almaraz *et al*., 2000: 864; Wicksten, 2005b: 110, fig. 9.

Type-locality: St. Joseph Island, Texas.

Previous Mexican Caribbean records: Puerto Morelos (Markham *et al.,* 1990) and Bahía del Espíritu Santo (Chace, 1972). New record in Bahía de la Ascensión and Mahahual reef lagoon.

Distribution: Between New Jersey and Virginia (Bowen *et al*., 1979); Gulf of Mexico (Román-Contreras, 1988; Rodríguez-Almaraz *et al*., 2000) to Buenos Aires, Argentina (Christoffersen, 1982, 1998); West Indies from Cuba (Martínez-Iglesias *et al*., 1996) to Guadeloupe (Carvacho, 1979). In the eastern Atlantic, from Spanish Sahara to Congo coasts and Annobon Island (Christoffersen, 1982, 1998).

Material examined: Bahía de la Ascensión, 230 specimens, May 2002; 83 specimens, January 2003. Bahía del Espíritu Santo, 16 specimens, May 2001; 27 specimens, November 2001. Mahahual reef lagoon, 91 specimens, July 1997; 10 specimens, November 1998. On mud and sand mixed with calcareous material, 0.50 to 1.50 m depth.

Habitat: Estuarine and marine waters, on mud, sand, clay, and shell fragments (Christoffersen, 1982); calcareous algae (Coelho & Ramos, 1972); among sponges and dead coral (Williams, 1984); on *Halodule*, *Zostera* (Christoffersen, 1982) and *T. testudinum* grass flats (Bauer, 1985); shallow water down to 124 m (Christoffersen, 1982).

***Lysmata wurdemanni* (Gibbes, 1850)**

References: *Lysmata wurdemanni*: Chace, 1972: 129; Williams, 1984: 127, fig. 90; Markham *et al*., 1990: 422; Hernández Aguilera *et al*., 1996: 41; Wicksten, 2005b: 103, fig. 3, pl. 1, fig. A; Rhyne & Lin, 2006: 169, figs. 1-4, pls. 1A, 2.

Type-locality: Key West Lakes, Florida.

Material examined: Bahía del Espíritu Santo, 10 specimens, May 2001; 5 specimens, Nov 2001. Collected on sand substrate with turtle grass meadows, 0.70 to 1 m depth.

Previous Mexican Caribbean records: Puerto Morelos and Bahía de la Ascensión (Chace, 1972; Markham *et al*., 1990). First record in Bahía del Espíritu Santo.

Distribution: West coast of U.S.A. from Long Island, New York (Rhyne & Lin, 2006), to Brazos Santiago Pass, South Padre Island, Texas (Wicksten, 2005b); continental shelf of Campeche (20°50′ 4″N, 91°28′12″W) southwestern Gulf of Mexico (Hernández Aguilera *et al*., 1996); Puerto Morelos to Bahía del Espíritu Santo, Quintana Roo, Mexico (Markham *et al*., 1990; present study).

Habitat: On rocky shores (Chace, 1972), stone jetties, and among sponges and hydroids, surface down to 37 m (Williams, 1984).

Remarks: This species was recently redescribed by Rhyne and Lin (2006), who restricted the southern geographical distribution of *L. wurdemanni* to Port Aransas, Texas. However, there are previous records from the southwestern Gulf of Mexico and the Mexican Caribbean (see Chace, 1972; Hernández Aguilera *et al*., 1996). The specimens examined by us in the present study agree with Rhyne and Lin's (2006) species diagnosis in having a similar rostral formula; 27-32 carpal segments in the second pereopod (one specimen has 34 segments); 3 or 4 spines on the flexor margin of third pereopod

dactyli (one specimen with 5 spines); and the morphometrical ratio length and height of second antennular peduncle (1.25-1.66 in this material and 1.2-1.7 in Rhyne and Lin's specimens). The main variations observed were three blunt teeth in the right mandible of our specimens, a character not evident in figure 3B shown by Rhyne and Lin (2006) for *L. wurdemanni*; the morphometrical ratio between cephalothorax and dactylus length of the fifth pereopod in our material was 5.78 compared to 9.0 in that reported by Rhyne and Lin (2006). As most of the diagnostic species characters fit well with those of *L. wurdemanni* sensu Rhyne and Lin (2006), we conclude that the shrimps examined by us belong to this species.

***Thor dobkini* Chace, 1972**

References: *Thor dobkini* Chace, 1972: 133-135, fig. 57; Williams, 1984: 134, fig. 94; Martínez-Iglesias, 1986: 18, fig. 9A; Román-Contreras, 1988: 314; Markham *et al.*, 1990: 423; Hernández Aguilera *et al.*, 1996: 41; Martínez-Iglesias *et al.*, 1996: 37; Wicksten, 2005b: 105, fig. 5; Coelho *et al.*, 2006: 53.

Type-locality: Punta Rassa (near mouth of Caloosahatchee River), Lee County, Florida.

Previous Mexican Caribbean records: Markham *et al.* (1990) reported *T. dobkini* from Vigía Chico, Bahía de la Ascensión; also reported by Chace (1972) in the same bay.

Distribution: From Shackleford Banks, Beaufort, North Carolina to Louisiana (Chace, 1972); Isla Sacrificios, Veracruz (Hernández Aguilera *et al.*, 1996) and Laguna de Términos, Campeche (Román-Contreras, 1988), southwestern Gulf of Mexico; Bahía de la Ascensión, Quintana Roo, Mexico (Chace, 1972; Markham *et al.*, 1990) to Alagoas, Brazil (Coelho *et al.*, 2006). Golfo de Batabanó and Archipiélago Sabana-Camagüey, SW and NE of Cuba, respectively (Martínez-Iglesias *et al.*, 1996).

Material examined: Bahía de la Ascensión, 73 specimens, May 2002; 209 specimens, Jan 2003. Bahía del Espíritu Santo, 4127 specimens, May 2001; 50 specimens, Nov 2001. In *T. testudinum* meadows with soft sediments, 0.60 to 1 m depth. First record in Bahía del Espíritu Santo.

Habitat: Mud and sand substrates with or without vegetation, rocky bottoms with sponges and corals (Martínez-Iglesias *et al.*, 1996), in *Sargassum* (Markham *et al.*, 1990); shallow water down to 19 m (Williams, 1984).

***Thor floridanus* Kingsley, 1878**

References: *Thor floridanus*: Rathbun, 1902: 116; Chace, 1972: 136, fig. 58; Williams, 1984: 135, fig. 95; Abele & Kim, 1986: 22, 244, 245, figs. h-j; Markham *et al.*, 1990: 423; Martínez-Iglesias *et al.*, 1996: 37; Escobar-Briones & Villalobos-Hiriart, 2003: 112; Wehrtmann & Vargas, 2003: 272; Wicksten, 2005a 32; Wicksten, 2005b: 105, fig. 6.

Type-locality: Key West, Florida.

Previous Mexican Caribbean records: Cabo Catoche (Rathbun, 1902); Laguna Nichupté (Markham *et al.*, 1990); Isla Mujeres, Isla Cozumel, and Bahía de la Ascensión (Chace, 1972); six miles south of Punta Herrero and west-central side of Banco Chinchorro (Escobar-Briones & Villalobos-Hiriart, 2003).

Distribution: Black Rocks off New River, North Carolina (Williams, 1984; Escobar-Briones & Villalobos-Hiriart, 2003) to Florida (Abele & Kim, 1986); West Flower Garden Bank, Texas (Wicksten, 2005a), to Puerto Viejo, Limón, Costa Rica (Wehrtmann & Vargas, 2003); Archipiélago Sabana-Camagüey, NE of Cuba (Martínez-Iglesias *et al.*, 1996).

Material examined: Bahía de la Ascensión, 4751 specimens, May 2002; 2329 specimens, January 2003. Bahía del Espíritu Santo, 4543 specimens, May 2001; 847 specimens, November 2001. Mahahual reef lagoon, 763 specimens, July 1997. Collected in turtle grass meadows, 0.5 to 1.5 m depth. First report of the species in Bahía del Espíritu Santo and Mahahual reef lagoon.

Habitat: Sandy and muddy bottoms, with or without vegetation (Martínez-Iglesias *et al.*, 1996), seagrass flats of *Thalassia* (Markham *et al.*, 1990); reported down to 300 m (Escobar-Briones & Villalobos-Hiriart, 2003).

***Thor manningi* Chace, 1972**

References: *Thor manningi* Chace, 1972: 137, figs. 59-61; Markham & McDermott, 1980: 1270; Rodríguez, 1980: 170, fig. 49; Criales, 1984: 314; Williams, 1984: 137, fig. 96; Martínez-Iglesias, 1986: 19, fig. 9B; Christoffersen, 1998: 354; Wicksten, 2005b: 107, fig. 7.

Type-locality: English Harbour, Antigua Island.

Previous Mexican Caribbean records: Bahía de la Ascensión and Bahía del Espíritu Santo, Quintana Roo (Chace, 1972). First record for Mahahual reef lagoon.

Distribution: Beaufort, North Carolina to Bahía del Espíritu Santo, Quintana Roo, Mexico (Chace, 1972); Paraíba to Sao Paulo, Brazil (Christoffersen, 1998); Bermuda (Markham & McDermott, 1980); in the Antilles recorded in Tobago and Curaçao (Chace, 1972).

Material examined: Bahía de la Ascensión, 1413 specimens, May 2002; 365 specimens, Jan 2003. Bahía del Espíritu Santo, 482 specimens, May 2001; 34 specimens, Nov 2001. Mahahual reef lagoon, 1997 specimens, Jul 1997; 349 specimens, Nov 1998. In beds of *Thalassia* and sand mixed with broken shells, 0.5 to 1.5 m depth.

Habitat: Abundant on dead coral and grass flats, sometimes in association with anemones (Chace, 1972) and crinoids (Criales, 1984); sand and mud bottoms covered with *T. testudinum* (Martínez-Iglesias, 1986); shallow water down to 44 m (Chace, 1972).

***Tozeuma carolinense* Kingsley, 1878**

References: *Tozeuma carolinense*: Chace, 1972: 141; Coelho & Ramos, 1972: 153; Rodríguez, 1980: 171, fig. 50; Markham & McDermott, 1980: 1270; Williams, 1984: 138, fig. 97; Markham *et al*., 1990: 423; Hernández Aguilera *et al*., 1996: 42; Martínez-Iglesias *et al*., 1996: 37; Christoffersen, 1998: 354; Wicksten 2005b: 111, fig. 10; pl. 2 fig. A.

Type-locality: Fort Macon, North Carolina.

Previous Mexican Caribbean records: Puerto Morelos and Isla Cozumel (Markham *et al*., 1990); Bahía de la Ascensión (Chace, 1972; Markham *et al*., 1990). First record for Bahía del Espíritu Santo and Mahahual reef lagoon.

Distribution: Vinyard Sound, Massachusetts (Williams, 1984) to Sao Paulo, Brazil (Christoffersen, 1998), included the Gulf of Mexico to Yucatán (Williams, 1984; Hernández Aguilera *et al*., 1996); Bermuda (Markham & McDermott, 1980); Cuba (Martínez-Iglesias *et al*., 1996) to Saint Lucia Island and Curaçao (Chace, 1972).

Material examined: Bahía de la Ascensión, 307 specimens, May 2002; 1447 specimens, Jan 2003. Bahía del Espíritu Santo, 1724 specimens, May 2001; 496 specimens, Nov 2001. Mahahual reef lagoon, 566 specimens, Jul 1997; 142 specimens, Nov 1998. Associated to *T. testudinum*, at 1 m depth.

Habitat: On sandy-mud grass flats of *T. testudinum* (Martínez-Iglesias *et al*., 1996) and *Sargassum* (Markham *et al*., 1990); calcareous algae (Coelho & Ramos, 1972); shallow water down to 75 m (Chace, 1972).

***Trachycaris rugosa* (Bate, 1888)**

References: *Platybema rugosus* Bate, 1888: 579, pl. 104, fig. 2.

References: *Trachycaris rugosa*: Criales, 1992: 562-570, figs. 1-5; Cardoso, 2006: 26.

Type-locality: 18°38'30" N, 65°5'30" W; off Culebra Island, West Indies.

Previous Mexican Caribbean records: Cabo Catoche (Criales, 1992).

Distribution: South Carolina and Florida; Cabo Catoche, Quintana Roo, Mexico to Santa Marta, Colombia; from Cuba to Barbados, Antilles (Criales, 1992).

Material examined: Bahía de la Ascensión, 9 specimens, May 2002; 8 specimens Jan 2003. Bahía del Espíritu Santo, 2 specimens, May 2001; 1 specimen, Nov 2001. Mahahual reef lagoon, 174 specimens, Jul 1997; 5 specimens, Nov 1998. In meadows of *T. testudinum* and sandy bottom, 0.60 to 0.90 m depth. First record in these last localities.

Habitat: In rocks and coralline substrates (Criales, 1992); at *ca*. 713 m (Bate, 1888).

Remarks: The material examined herein agrees in general with Criales's (1992) description. The main differences observed in our specimens are the presence of one spine on the basal antennal peduncle instead of two, and the palp of the maxillula is distinctly bilobed.

DISCUSSION

The number of hippolytid species herein recorded is lower than that reported by Markham *et al*. (1990) (14 species) in the Caribbean coast of Quintana Roo. This is explained because those authors collected from diverse habitats with different sampling techniques, and the studied area was larger.

Hippolyte pleuracanthus is the only species of the family representing a new record, being the coast of the Mexican Caribbean its southernmost range limit of distribution in the western Atlantic. Chace (1972) pointed out that *H. pleuracanthus* and *H. zostericola* are very closely related species, and confusion exists concerning the status of these species. The species can be distinguished principally by rostrum length, larger than the antennular peduncle in females of *H. zostericola* with respect to *H. pleuracanthus*. For males, the length of the rostrum in *H. zostericola* reaches almost the distal margin of the second peduncular segment, whereas in *H. pleuracanthus* it is shorter than, or equal to the first segment. In the specimens herein examined these characteristics were observed, corroborating the identification of this material as *H. pleuracanthus*.

The specimens cited as *Trachycaris restrictus* (Milne-Edwards, 1878) by Briones-Fourzán and Lozano-Álvarez (2002) and Escobar-Briones and Villalobos-Hiriart (2003) for the Mexican Caribbean probably belongs to *T. rugosa*, but this must be confirmed. Criales (1992) stated that *T. rugosa* is distributed in the western Atlantic and *T. restricta* in the eastern Atlantic; however, Cardoso (2006) collected specimens of the latter species from the Brazilian coast; specimens of *Trachycaris* collected in the Western Atlantic require, therefore, careful examination.

Regarding the patterns of species distribution, *Hippolyte obliquimanus*, *H. pleuracanthus*, *Lysmata wurdemanni*, *Thor dobkini*, *T. floridanus*, *T. manningi*, *Tozeuma carolinense*, and *Trachycaris rugosa* are restricted to the Western Atlantic (Criales, 1992; Wicksten, 2005b); *Latreutes fucorum* and *L. parvulus* are distributed on both sides of the Atlantic (Christoffersen, 1998), whereas *Hippolyte zostericola* is an amphi-American species (Wicksten & Hendrickx, 2003).

The hippolytid fauna collected belongs to the Caribbean province which extends from the mouth of the Orinoco River, Venezuela,

to Cabo Rojo, Gulf of Mexico (21°36N'), including the Caribbean Islands and southern Florida, from Cape Romano (25°54'N) in the Gulf of Mexico to Cape Canaveral in the Atlantic Ocean (Boschi, 2000; Briggs, 1974). In this zone, water temperature ranges from 20 to 25 °C in winter and between 28 and 30 °C in summer (Boschi, 2000). Markham *et al*. (1990) stated that most crustacean fauna of Quintana Roo occurs throughout the Caribbean Sea. Of the 11 species recorded by us in Bahía de la Ascensión, Bahía del Espíritu Santo and Mahahual reef lagoon, 5 (45.5%) have also been reported from Costa Rica and Venezuela (Rodríguez, 1980; Wehrtmann & Vargas, 2003); whereas all species collected in the present study are distributed also in Cuba (see Martínez-Iglesias *et al*., 1996).

The extended geographic range of the species herein reported includes distinct regions. In this case, besides the Caribbean province, the hippolytid fauna collected also displays great affinity with the Virginian (54.54%), the Carolinian (90.90%), the Texan (54.54%), and the Brazilian (63.63%) provinces (Table 1).

The distribution of the organisms may depend on the influence of environmental factors (Boschi, 2000). In this respect, Briggs (1995) argued that widespread patterns of many species are associated principally with temperature, which controls their distribution in the ocean. Considering that the crustacean fauna of Quintana Roo is tropical (Markham *et al*., 1990) and that warm and warm-temperate conditions prevail in the cited provinces (Briggs, 1974), this could explain the presence of the hippolytid fauna in these regions.

Including *H. pleuracanthus*, in the Mexican Caribbean occur 18 species of shallow waters hippolytids (Markham *et al*., 1990; Briones-Fourzán & Lozano-Álvarez, 2002), whereas in the Mexican Pacific (Gulf of Califonia included) 19 species have been recorded (Wicksten, 1983; Wicksten & Hendrickx, 2003). In contrast, the region with the least number of species of hippolytids recorded is the eastern coast of Mexico with only 13 species known (Hernández Aguilera *et al*., 1996; Wicksten, 2005 b) (Table 2).

On the other hand, considering different ecosystems present along the coast of the Mexican Caribbean and that the distribution pattern of several species in the area is very extensive, the diversity of this family of crustaceans is probably underestimated

Table 2. Diversity of shallow water hippolytid species in the Mexican littorals.

Species	Pacific coast of Mexico (Including Gulf of California)	Gulf of Mexico	Mexican Caribbean coast
Eualus subtilis Carvacho & Olson, 1954	•		
Exhippolysmata oplophoroides (Holthuis, 1948)		•	
Heptacarpus palpator (Wicksten & Hendrickx, 1992)	•		
Heptacarpus yaldwynae (Wicksten & Hendrickx, 1992)	•		
Hippolyte californiensis Holmes, 1895	•		
Hippolyte nicholsoni Chace, 1972		•	
Hippolyte obliquimanus Dana, 1852		•	•
Hippolyte pleuracanthus (Stimpson, 1871)			•
Hippolyte williamsi Schmitt, 1924	•		
Hippolyte zostericola (Smith, 1873)		•	•
Janicea antiguensis (Chace, 1972)			•
Latreutes antiborealis Holthuis, 1952	•		
Latreutes fucorum (Fabricius, 1798)		•	•
Latreutes parvulus (Stimpson, 1866)		•	•
Lebeus scrippsi Wicksten & Méndez, 1982	•		
Lebeus vicinus montereyensis Wicksten & Méndez, 1982	•		
Lebeus washingtonianus (Rathbun, 1902)	•		

Table 2. *Continued*

Species	Pacific coast of Mexico (Including Gulf of California)	Gulf of Mexico	Mexican Caribbean coast
Lysmata argentopunctata Wicksten, 2000	•		
Lysmata californica (Stimpson, 1866)	•		
Lysmata galapagensis Schmitt, 1924	•		
Lysmata grabhami (Gordon, 1935)			•
Lysmata gracilirostris Wicksten, 2000	•		
Lysmata intermedia (Kingsley, 1878)		•	•
Lysmata nayaritensis Wicksten, 2000	•		
Lysmata trisetacea (Heller, 1861)	•		
Lysmata wurdemanni (Gibbes, 1850)		•	•
Parhippolyte cavernicola Wicksten, 1996	•		
Parhippolyte sterreri (Hart & Manning, 1981)			•
Thor algicola Wicksten, 1987	•		
Thor amboinensis (De Man, 1888)		•	•
Thor cordelli Wicksten, 1996	•		
Thor dobkini Chace, 1972		•	•
Thor floridanus Kingsley, 1878		•	•
Thor manningi Chace, 1972		•	•
Tozeuma carolinense Kingsley, 1878		•	•
Tozeuma cornutum A. Milne-Edwards, 1881			•
Trachycaris restricta (A. Milne-Edwards, 1878)	•		•
Trachycaris rugosa (Bate, 1868)			•

(Vargas & Cortés, 1999). Therefore, carry out additional faunal inventories in the region is recommendable to provide basic information for future biological and ecological studies as well as the preservation of this faunal group.

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