

Epizoic barnacles (Cirripedia:Crustacea) in a coastal lagoon, Southern Gulf of Mexico

SCIENTIFIC NOTE

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ABSTRACT

Three species of barnacles had reported in estuarine ecosystems of the Grijalva-Usumacinta basin in the Gulf of Mexico, which mainly attributed to limited sampling effort. The species were capture in Mecoacán Lagoon during dry, transition and rainfall seasons. *Amphibalanus venustus* distribution expanded to an estuarine ecosystem, while *A. improvisus* and *A. eburneus* were previously record in Mecoacán Lagoon. The three species were epibionts of gastropods, bivalves, and barnacles. *Megabalanus tintinnabulum* was not register in this study.

Key words: Distribution, estuarine, Balanomorpha

RESUMEN

Tres especies de balanos habían sido reportadas en los ecosistemas estuarinos de la cuenca Grijalva-Usumacinta en el Golfo de México, lo que se atribuye principalmente al limitado esfuerzo de muestreo. Las especies fueron capturadas en la laguna Mecoacán durante las temporadas

de sequía, transición y precipitación. La distribución de *Amphibalanus venustus* se amplió a un ecosistema estuarino, ya que *A. improvisus* y *A. eburneus* fueron previamente registradas en laguna Mecoacán. Las tres especies fueron epibiontes de gasterópodos, bivalvos y balanos. *Megabalanus tintinnabulum* no fue capturada en este estudio.

Palabras clave: Distribución, estuarino, Balanomorpha

INTRODUCTION

Barnacles are sessile crustaceans that have a high morphological diversity with a cosmopolitan distribution in estuarine and marine environments. They are associated with almost all hard substrates available, natural or artificial; but some species are parasites or symbionts (Celis 2004, Gittings 2009, van Syoc and Newman 2010).

In the Southern Gulf of Mexico have been registered 10 of the 12 species of barnacles reported for the North of the same marginal sea (Celis 2009). But in coastal ecosystems the basin of Grijalva-Usumacinta rivers, records barnacles are limited to

Epizoic barnacles in Gulf of Mexico.

González G, Sánchez AJ*, Florida R, Hernández C, Álvarez-Pliego N and Salcedo, MA.

three species in Pantanos de Centla and the Carmen-Machona and Mecoacán coastal lagoons (Florido et al. 2000, Celis and Álvarez 2008, Tepetlan and Aldana-Aranda 2008, Montalvo et al. 2010). The low number of records, attributed mainly to the few studies on barnacles in the Southern Gulf of Mexico, supports the updating of the species of epizoic barnacles in Mecoacán Lagoon.

MATERIALS Y METHODS

The Mecoacán Lagoon (93° 04' and 93° 14'W, 18° 16' and 18° 26'N) is shallow and it is communicated with the Southern Gulf of Mexico through an inlet located in its North section. The Escarbado-González, Seco and Cuxcuchapa rivers drain into the East, Northwest and Southeast of the lagoon (Domínguez et al. 2003). The salinity variation shows a spatial gradient from the Southeast to the North, with an intra-annual fluctuation between 0.5 and 29 psu (Domínguez et al. 2003), is associated with the temporal fluctuation of the flow of these rivers. Based on the above, La Bocana (93° 7.97'W and 18° 26.40'N), Boca Negra (93° 6.83'W and 18° 24.75'N) and Boca Arrastradero (93° 4.16'W and 18° 24.22'N) were selected as sampling sites. In 2012, the barnacles sampling design included three locations and three tows per site in three seasons, which sum 27 tows with a shrimp commercial net of 2.54 cm mesh. Sampling was done in the dry (March), transition (July) and rainy (September) seasons.

The specimens were preserve in 80% alcohol and they were identify through the taxonomic keys proposed by Gittings et al. (1986); Celis et al. (2007) and Farrapeira (2008). Each species included its curatorial data. The distribution was emphasize in the Western Atlantic and it was detail for Southern Gulf of Mexico. In the examined material was indicated the number of organisms, average in millimeters (mm) of the length (LC), width (AC) and height (HC)

of the carinal plates, barnacle's hosts species was settled, and salinity range. Organisms preserved in biological collection of Laboratorio de Humedales of División Académica de Ciencias Biológicas, UJAT.

RESULTS

In total, 87 living organisms were review from three *Amphibalanus* species. Among these, the presence of *A. venustus* means the expanding of its geographical distribution in an estuarine ecosystem in the Southern Gulf of Mexico. Most specimens (81) were capture in communication channel with the sea (La Bocana), and six organisms in the zone of intermediate influence of tidal currents and river discharge (Boca Negra). None barnacle was capture in the area of direct influence of river flow.

Amphibalanus eburneus (Gould 1841) (Figure 1a)

Distribution

Cosmopolitan (Farrapeira 2010). In the Western Atlantic from the Northeastern coast of the United States of America to Brazil (Henry and McLaughlin 1975, Lippson and Lippson 1984, Farrapeira et al. 2009). Southern Gulf of Mexico: Laguna Madre, Laguna de Tamiahua, La Blanquilla reef, Boca del Río, Laguna Carmen-Machona, Laguna Mecoacán and Laguna de Términos (Henry and McLaughlin 1975, Celis 2004, 2009; Celis et al. 2007, Tepetlan and Aldana-Aranda 2008).

Examined material

One specimen in Boca Negra and six in La Bocana. LC average 9.53, 4.9-15.9 mm; AC average 8.97, 6.39-13.71 and HC average 7.54, 4.9-13.46 mm. Barnacles were caught on *Melongena corona*

Epizoic barnacles in Gulf of Mexico.

González G, Sánchez AJ*, Florido R, Hernández C, Álvarez-Pliego N and Salcedo, MA.

(Gmelin 1791) and *Brachidontes exustus* (Linnaeus 1758) shells between 20 and 22 psu.

Amphibalanus improvisus (Darwin 1854)
(Figure 1b)

Distribution

Cosmopolitan (Farrapeira 2010). Southern Gulf of Mexico: coastal and estuarine zones of Texas, Boca del Río, Laguna Carmen-Machona and Laguna San Pedrito in Pantanos de Centla (Gittings et al. 1986, Florido et al. 2000, Celis 2004, Celis et al. 2007, Tepetlan and Aldana-Aranda 2008, Montalvo et al. 2010).

Examined material

LC average 7.05 mm, 1.93-11.95 mm; AC average 6.23 mm, 1.28-9.44 mm and HC average 3.51 mm, 0.59-4.85 mm. Four specimens in Boca Negra and 43 in La Bocana between 22 and 31 psu on *Melongena melongena* (Linnaeus 1758), *M. corona* and *B. exustus*.

Amphibalanus venustus (Darwin 1854)
(Figure 1c)

Distribution

Cosmopolitan (Farrapeira 2010). In the Western Atlantic from the Northeastern of United States of America to Brazil (Henry and McLaughlin 1975, Farrapeira 2008). Southern Gulf of Mexico: Laguna Carpintero, Laguna de Sontecomapan and Campeche Bay (Henry and McLaughlin 1975, Celis 2004, 2009, Celis et al. 2007, Barrios-Quiroz et al. 2013).

Examined material

One organism in Boca Negra and 32 in La Bocana between 13 and 20 psu. LC average 5.97 mm, 2.44-13.88 mm; AC average 4.96 mm, 1.99-12.53 mm and HC average 2.74 mm, 1.2-9 mm. Epizoics on *M. corona*, *M. melongena*, *B. exustus* and *A. improvisus*.

DISCUSSION

Of the 10 species of barnacles registered for the Southern Gulf of Mexico (Celis 2009), *A. eburneus* and *A. improvisus* were included among the dominant crustaceans in the oyster banks of the Carmen-Machona and Mecoaacán coastal lagoons (Tepetlan and Aldana-Aranda 2008). Moreover, the second species was abundant on coarse woody debris in the zone with tidal influence in Pantanos de Centla (Montalvo et al. 2010). *Megabalanus tintinnabulum* was reported in the Puerto de Sánchez Magallanes (Celis and Álvarez 2008), at the Santa Ana Inlet in the Laguna del Carmen. The *A. venustus* record is the first for an estuarine ecosystem in the southern Gulf of Mexico.

A. improvisus was dominant between 1 and 10 psu in the Chesapeake Bay (Lippson and Lippson 1984) and it was register in meso-polyhaline environments between 10.8 and 36.1 psu in the Paripe River, Brazil and Laguna Mecoaacán (Farrapeira 2008, Tepetlan and Aldana-Aranda 2008). In addition, this barnacle was record between 0.69-2.76 psu in Pantanos de Centla (Montalvo et al. 2010). In this study, *A. improvisus* was capture between 22-31 psu in the two sites most influenced by tidal currents.

Alike, *A. eburneus* was capture in the above-cited two sites, between 20 and 22 psu. As *A. improvisus*, it was report in the Laguna Mecoaacán between 23 and 32 psu (Tepetlan and Aldana-Aranda 2008). This barnacle was dominant in polyhaline

Epizoic barnacles in Gulf of Mexico.

González G, Sánchez AJ*, Florido R, Hernández C, Álvarez-Pliego N and Salcedo, MA.

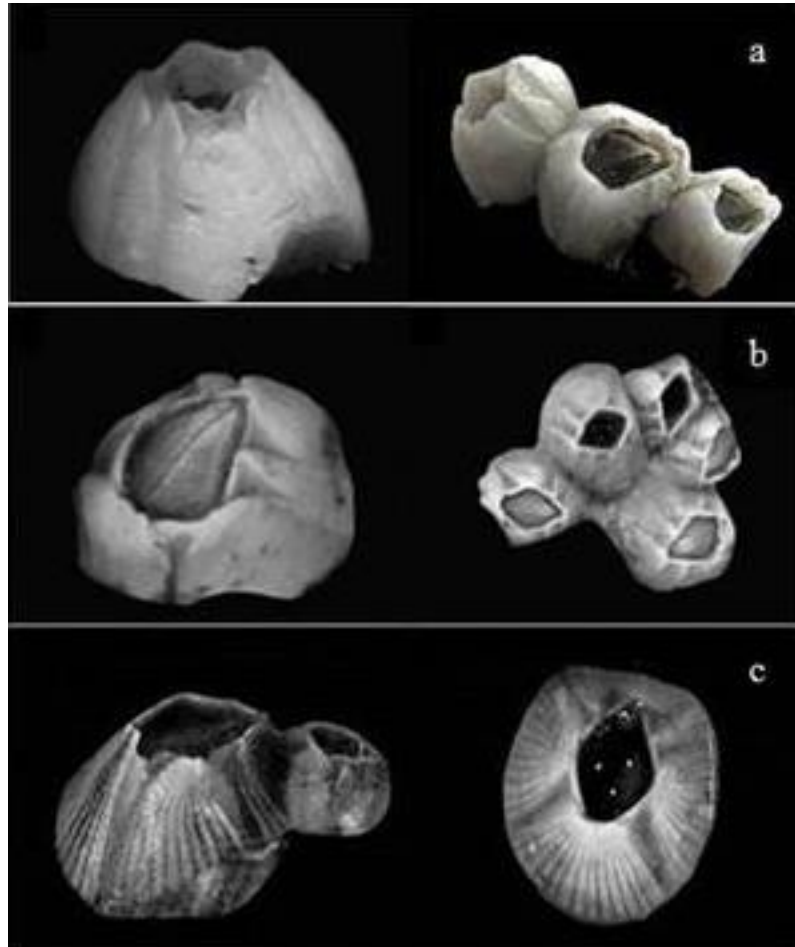


Fig. 1: Epizoic barnacles recorded in Laguna Mecoaacán: a) *Amphibalanus eburneus*, b) *A. improvisus* and c) *A. venustus*.

environments in the Chesapeake Bay (Lippson and Lippson 1984). *A. venustus* was characterized as a polyhaline species in salinities higher than 28.7 psu in the Paripe River, as well as in the Panama coast and Campeche Bay (Gittings et al. 1986, Farrapeira 2008). These results partially coincided with this study, since it was captured between 13 and 20 psu in the inlet.

The distribution of epibiont barnacles' has relation to salinity tolerance of their hosts (Farrapeira 2008). *A. improvisus* had registered on bryozoans, mollusks, other barnacles, and decapods (Giri and Wicksten 2002, Tepetlan and Aldana-Aranda 2008, Farrapeira et al. 2009, Farrapeira and Calado 2010), as well non-obligate commensals in turtles (ERC 2007). Meanwhile, *A. eburneus* is epizoic on mollusks (Celis and Álvarez 2008, Tepetlan and

Epizoic barnacles in Gulf of Mexico.

González G, Sánchez AJ*, Florido R, Hernández C, Álvarez-Pliego N and Salcedo, MA.

Aldana-Aranda 2008). In addition, *A. venustus* and *A. eburneus* were non-obligate commensals and epibionts on shell turtles (ERC 2007, Barrios-Quiroz et al. 2013). In Laguna Mecoacán, the three species of barnacles were only epibionts of bivalves, gastropods, and barnacles, although there are high abundance and diversity of decapods in this lagoon (Domínguez et al. 2013).

CONCLUSIONS

In this century, the increase of barnacles' records has been notorious in the Southern Gulf of Mexico. However, they are still limited in estuarine systems in the Grijalva-Usumacinta basin. With this review of epizoic barnacles, *A. eburneus* was added to the list and the presence of *A. venustus* and *A. improvisus* confirmed. The absence of epizoic barnacles in oligohaline environments close to the direct river drain, to open up the possibility of increasing the sampling effort to verify, if the lack is due to sampling effort or physiological limitations.

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Epizoic barnacles in Gulf of Mexico.

González G, Sánchez AJ*, Florido R, Hernández C, Álvarez-Pliego N and Salcedo, MA.

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Epizoic barnacles in Gulf of Mexico.

González G, Sánchez AJ*, Florido R, Hernández C, Álvarez-Pliego N and Salcedo, MA.