

Abundance and Distribution of Queen Conch (*Strombus gigas*) Veligers of Quintana Roo, Peninsula of Yucatan Mexico

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ABSTRACT

In order to study the distribution and abundance of *Strombus gigas* (Linné 1758) larvae were collected every month from January to December 2005 in twelve sites of Quintana Roo. Plankton tows were made with a conical net of 500 µm mesh-size. During the sample period, 417 veliger were identify. Larvae were more abundant during August, with 179 larvae (42.9%) and they were lest abundant in April, with 16 larvae (3.83 %). Small larvae (200 to 320 µm) were more abundant in August. Analysis of Correspondence GLM was different significantly between months ($p = 0.005388$). High abundance of small sizes of larvae suggests that Quintana Roo North area could be a possible site of production of *Strombus gigas* larvae. It could be related to presence of a adult stock at Puerto Morelos, in the Quintana Roo North area in Yucatan Peninsula of Mexico.

KEY WORDS: Distribution, abundance, larvae, *Strombus gigas*, Mexico

Abundancia y Distribución de Larvas del Caracol Rosa (*Strombus gigas*) en la Península de Yucatán, Quintana Roo, México

En la zona norte de la Península de Yucatán, Estado de Quintana Roo, México se realizaron muestreos mensuales de enero a diciembre del 2005 para determinar la abundancia y la distribución de larvas del caracol rosa *Strombus gigas* (Lineé 1758). Las muestras de plancton se colectaron por medio de arrastres con una red Neuston 60 x 80 con luz de malla de 500 µm y con una duración de 15 minutos en superficie. Se identificaron un total de 2100 larvas de gasterópodos y 417 larvas de *Strombus gigas*. La mayor abundancia se presentó en el mes de agosto con 179 larvas (42.9 %) y la menor en abril con 16 larvas (3.83 %). Las larvas de mayor talla (≥ 500 µm) se encontraron en septiembre y diciembre y las de menor talla se observaron en los meses de julio y agosto (200-320 µm). Con un Análisis de Correspondencia ($p = 0.05388$) se encontró diferencia significativa entre el numero de larvas entre meses, siendo agosto diferente. Estos resultados muestran que el Norte de Quintana Roo en la Península de Yucatán, México presenta una población de larvas todo el año, con un pico en verano, lo que indica que esta zona es una área de producción *in situ* de *S. gigas*, posiblemente perteneciente a un stock de adultos presentes en Puerto Morelos. Sin embargo no existe monitoreos sobre la abundancia de la población adulta el la zona Norte de la Península de Yucatán desde los años 90.

PALABRAS CLAVES: Distribución, abundancia, larvas, *Strombus gigas*., México

L'abondance et la Distribution de Larves de Lambis (*Strombus gigas*) de Quintana Roo, Péninsule de Yucatan, Mexique

Pour étudier la distribution et l'abondance de *Strombus gigas* (Lineé 1758) des larves ont été ramassées chaque mois de janvier 2005 à décembre 2005 dans Quintana Roo. Les remorquages de plancton ont été faits à l'aide d'un filet conique avec une dimension de maille de 500 µm. Pendant la période de promotion, 417 larves (veliger) ont été identifiées. Les larves étaient plus abondantes en août, avec 179 larves (42.9 %) et étaient moins abondantes en avril, avec 16 larves (3.83 %). Les petites larves (200 à 320 µm) étaient plus abondantes en août. L'analyse de correspondance GLM était différente de façon significative entre les mois ($p = 0.005388$). La profusion de larves de petites tailles suggère que la région du nord de Quintana Roo pourrait être un site possible de production de larves *Strombus gigas*. Cela pourrait être relié à la présence d'un stock adulte à Puerto Morelos, dans la région du nord de Quintana Roo North dans la Péninsule Yucatan du Mexique.

MOTS CLÉS: Distribution, profusion, larve, *Strombus gigas*, Mexique

INTRODUCTION

The queen conch, *Strombus gigas* (Linné 1758), is a gastropod of commercial importance in the Caribbean, with a distribution range from Venezuela to Florida and the Bahamas, including the lesser and mayor Antilles. Queen conch stocks have declined throughout the region over the past 10, and various regulations have been implemented in most Caribbean countries (CITES 2003). The biology and

ecology of queen conch is relatively well studied, but larval distribution and abundance studies have been surveyed only recently (Stoner *et al.* 1996, Davis *et al.* 1993, Posada and Appeldoorn 1994, Stoner and Davis 1997, de Jesus Navarrete and Aldana-Aranda 2000, de Jesus Navarrete 2002).

This research was designed to determine the abun-

dance of *S. gigas* veligers and present temporal spatial variations in Quintana Roo North, in the Caribbean Mexico.

MATERIALS AND METHODS

Study area

In Quintana Roo' North coast (21° 35'- 17° 49° N, 86° 42'- 89° 25°W) were collected from Laguna Bojórquez to Puerto Morelos every month from January to December 2005 (Figure 1).

The dry season extends from March to June, while the rainy season is from July to October, and the cold season, characterized by strong northerly winds ("nortes"), is from

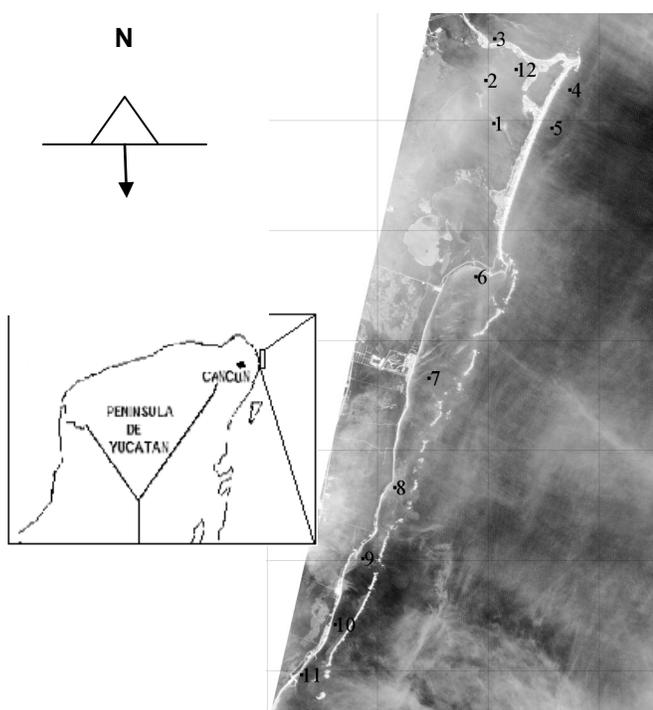


Figure 1. Map of Quintana Roo North, Mexico.

SAMPLING METHODS

Samples were collected from January to December 2005, in twelve sites: site 1(20°06'20" 86°47'07") cuenca sur Nichupté, site 2 (21°09'18" 86°46'30") cuenca norte Nichupté, site 3 (21°08'50" 86°47'05") boca Norte, site 4 (21°07'12" 86°44'89") hotel, site 5 (21°07'55" 86° 46'20") hotel Sheratan, site 6 (21°01'48" 86°47'21") boca sur, site 7 (20°58'48" 86°49'09") Hotel Moon Palace, site 8 (20°55'34" 86°50'13") Punta Tanchacté, site 9 (20° 53'28" 86°51'13") Punta Caracol, site 10 (20°51'31" 86° 52'05") Cerca del ojo de agua, site 11 (20°50'02" 86° 53'08") antes de los cubos, site 12 (21°07'26" 86°45'45") laguna Bojorquez (Figure 1).

Replicate surface plankton tows were made at each site using a conical net, 60 x 80 with a 500 µm mesh size. Plankton was fixed with a mixture of neutralized 4% sea

water-formalin.

Gastropod larvae were identify using dissecting microscope (X 20). Positive identifications for *S. gigas* larvae were made following the descriptions of Davis et al. (1993). Veligers were counted and shells were measured for total length with a calibrated ocular micrometer. Larvae divided for groups: 200 – 320-µm SL (group 1), 320 – 550- µm SL (group 2), and > 550- µm SL (group 3).

Larval abundance was compared using Analysis of Correspondence GLM, on Log function Poisson transformed data larvae. However, there were significantly between months (p = 0.005388).

RESULTS

Physical Measurements

Maximum mean Temperatures were recorded during August, September and December, 31°C and 31.5°C, respectively whereas lowest temperature occurred in April with 27°C .

Distribution of Larvae

A total of 417 veligers of *S. gigas* were identify from January 2005 to December 2005. Most were collected at three site with 71 larvae (17%), followed by twelve site with 66 larvae (15.8%) and 51 larvae at five site with 12.2%.

The highest number of conch larvae was collected in August and September (57.07%) significant increments in the abundance of veligers between months (Figure 2).

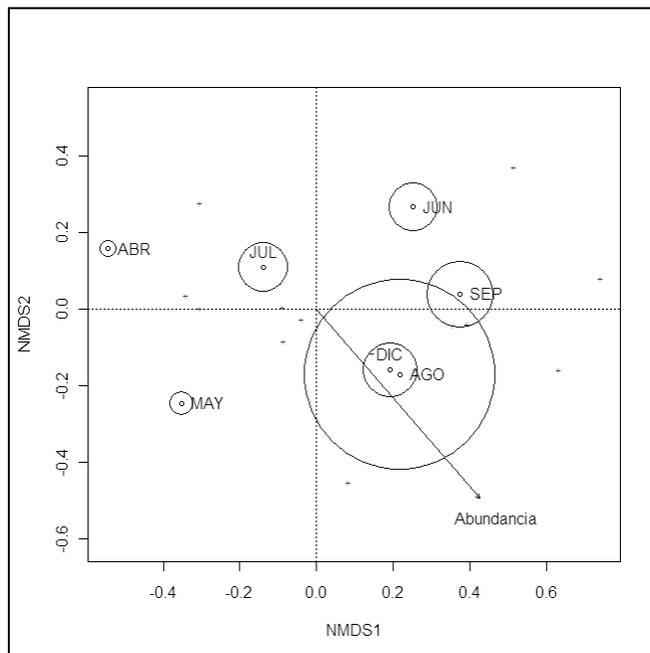


Figure 2. Results of NMDS2 for veligers distributions of *S. gigas* between months.

Larval Distribution by Size

Group 1 larvae (200 - 320 μm) were most abundant (51.7%, 216 larvae) than group 2 and 3. These sizes were distributed over all sample sites, but with greatest abundance at three site and twelve site. The size-frequency distribution varied from 200 - 620 μm SL. Larvae < 320 μm SL represented 51% (Figure 3).

DISCUSSION

Stoner *et al.* (1992) reported high *S. gigas* larvae abundance in the Bahamas during the warmer season (June to September), during the period of reproductive activity at Los Roques National Park, Venezuela. Aldana - Aranda and Perez Perez 2007 observed in Alacranes reef mature organism from June, July and August. Aldana - Aranda *et al.* (2003a) reported high *S. gigas* larvae in Chinchorro bank from May to September and spawner conchs from June to September. In this study of *S. gigas* larvae was observed the high abundance in August. Coinciding with Stoner *et al.* (1992) and Aldana Aranda (2007). The presence of a greater quantity of larvae size < 320 μm was attributed to this area.

In Chinchorro Bank, de Jesús-Navarrete and Aldana-Aranda (2000) found a high percentage (89%) of larvae of early stages I and II (244-780 μm) indicating that Chinchorro Bank is important source of *S. gigas* veligers. In a minor number, de Jesús Navarrete and Aldana - Aranda (2007) found 86% of larvae stage I.

The results obtained in this study suggest that Quintana Roo North is a local source of *S. gigas* veligers and a basin site for this species, which could be receiving a few larvae from other sites of the Mexican Caribbean (Cozumel).

ACKNOWLEDGMENTS

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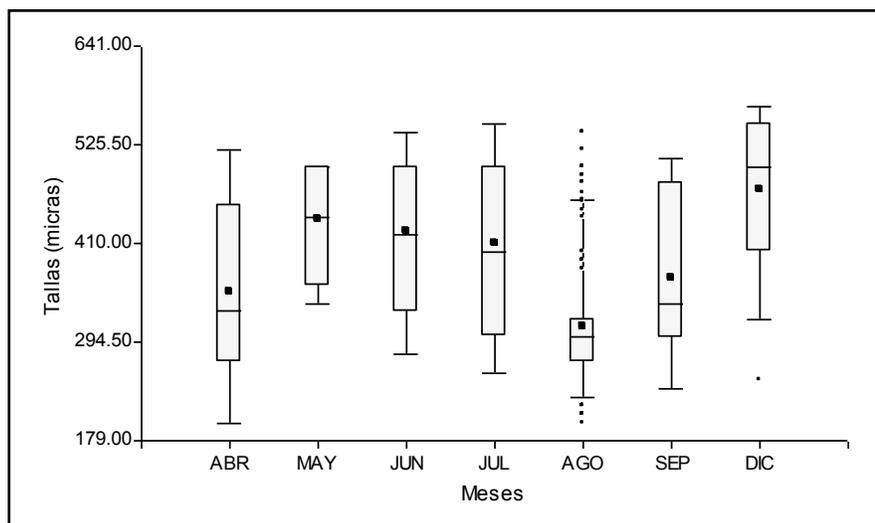


Figure 3. The size distribution varied from 200 - 620 μm SL identify in Quintana Roo, North, Mexico.