

the Pacific coast of Costa Rica. Snorkel and scuba diving have been used for biological observations, and the mark-recapture method for biometric and population biology studies in each of the visited sites. Descriptions for its ecologic biology and population structure by size and sexes have been obtained from each one of the areas. At the same time, some attempts for larval culture in the laboratory have been made. From the observations taken in public and protected coastal zones and after the most common invasion in protected ones, the maintenance and increase of marine protected areas is very important, because of the existence of relatively healthful and reproductive populations for this and other species. Besides, the development of new research to improve larval culture technologies and repopulation methodologies for this species is indispensable to mitigate social pressures under protected areas.

KEY WORDS: *Strombus galeatus*, biological discription

Histología del Manto de *Strombus gigas* (Mesogastropoda: Strombidae) Linnaeus, 1758

OMAR HERNANDO AVILA-POVEDA ^{1,2}, DALILA ALDANA-ARANDA ² y ERICK R. BAQUEIRO-CÁRDENAS ³

¹ CEINER Centro de Investigación, Educación y Recreación
Isla San Martín de Pajarales, Islas del Rosario.
Cartagena, Colombia, Sur América. A.A. 7877

² Laboratorio de Biología Marina, CINVESTAV-IPN, Unidad Mérida
Km 6 antigua carretera a Progreso.
Mérida, Yucatán, México. C.P. 97310.

³ Recursos Naturales Costeros CICATA-IPN, Unidad Altamira.
Km 14.5 carretera Tampico Puerto Industrial Altamira
Tampico, Tamaulipas, México. C.P. 89600

RESUMEN

El Caracol Pala *Strombus gigas* ha sido estudiado desde los 60 en su biología básica por ser un recurso marino de importancia económica en todo el Mar Caribe, sin embargo, se ha detecto la ausencia de conocimiento en su histología básica. El manto es una importante estructura de la anatomía de los gasterópodos, responsable de fabricar la concha, de interactuar química y físicamente con el ambiente, de secretar mucus, entre otras. Además, el desarrollo de la acuicultura y la protección de las poblaciones naturales de *Strombus gigas* es cada día más vulnerables a enfermedades y contaminación por la disminución de su diversidad genética requiriendo el conocimiento de las características histológicas, que permitan el diagnóstico de daños causados por enfermedades, parásitos, contaminación y

depredación.

En esta investigación se analizan tres machos y tres hembras del Arrecife Alacranes, Yucatán, México, con una longitud de la concha de 228 mm (± 20) y un grosor del labio de 16 mm ($\pm 1,8$). Cada animal fue removido de su concha y muestras de 1 cm³ del manto fueron fijadas en Solución Davidson A.F.A. por cuatro días, lavados en alcohol al 70 %, deshidratadas en alcoholes del 70 %, 96 % y 100%, clarificadas en Benceno y embebidas en Parafina Paraplast. Secciones de 6 μ m fueron hechas con un microtomo rotatorio y fueron montadas sobre placas con albúmina de Meyer. Para la tinción se usó Hematoxilina de Harris - Eosina Amarillenta "HHE₂", método regresivo. Se describe a magnificaciones de 100x, 400x y 1000x la anatomía microscópica de cinco zonas que forman el manto desde su parte externa (adyacente a la concha) hasta su parte interna (próxima a la cavidad del manto) y está constituido de la siguiente forma:

- i) Franja constituida por epitelio escamoso;
- ii) Franja de fibras colágeno;
- iii) Zona intermedia de tejido conectivo;
- iv) Zona de tejido muscular; 5) epitelio transicional. Como característica particular se observa que el citoplasma de las cinco zonas que estructuran el manto es de colágeno.

PALABRAS CLAVES: *Strombus gigas*, histología del manto

Histology of the Mantle of *Strombus gigas* (Mesogastropoda: Strombidae) Linnaeus, 1758

The basic biology of the Queen Conch has been studied from the 1960s because is an economical importance marine resource in all Caribbean Sea; however, an absence on the knowledge of basic histology has been detected. The mantle is a very important structure of gastropod anatomy, it is responsible of shell formation, to interacting both chemically and physically with the environment, to secrete mucus, and so on. Moreover, the Aquaculture development and the conservation of the natural stock the Queen Conch everyday are more vulnerable a maladies and contamination by lessening of its genetic diversity, requiring the knowledge of its histological characteristic that is necessary to establish diagnostics of damage caused by diseases, parasites, contamination and depredation.

In this investigations three males and three females were sampled from Alacranes reef, 22°22'96"N 89°41'3"W, North of Yucatan Peninsula, Mexico. They had a shell length of 228 mm (± 20) and a lip thickness of 16 mm (± 1.8 mm). Each individual were remove from the shell and a 1-cm³ section of the mantle were fixed in Davidson's A. F. A. solution for four days, rinsed in alcohol at 70 %, dehydrated in alcohol at 70 %, 96 %, 100 %, clarified in Benzene, and inclusion in Aparaplast@ synthetic paraffin. Six microns sections were made with rotary microtome and were mounted on glass slides with Meyer's albumin. For staining was used Harris Hematoxiline B Yellow Eosine (HHE₂), regressive method. Under 100x, 400x and

1000x magnifications the microscopy anatomy of five layer that form the mantle from outside (shell adjacent) until inside (cavity of mantle) were described as follow:

- i) A squamous epithelium layer;
- ii) A collagen fibers layer;
- iii) A middle layer of connective tissue;
- iv) Layer of muscular tissue; and
- v) Transitional epithelium.

As particular characteristic, it was observed that collagen form the cytoplasm of all the five layers that structure the mantle.

KEY WORDS: *Strombus gigas*, histology of the mantle

Microscopic Anatomy of Tegument of the Foot the Queen Conch *Strombus gigas* (Mesogastropoda: Strombidae) Linnaeus, 1758

OMAR HERNANDO AVILA-POVEDA ^{1,2}, DALILA ALDANA-ARANDA ² y
ERICK R. BAQUEIRO-CÁRDENAS ³

¹ CEINER Centro de Investigación, Educación y Recreación
Isla San Martín de Pajarales, Islas del Rosario.
Cartagena, Colombia, Sur América. A.A. 7877

² Laboratorio de Biología Marina, CINVESTAV-IPN, Unidad Mérida
Km 6 antigua carretera a Progreso.
Mérida, Yucatán, México. C.P. 97310.

³ Recursos Naturales Costeros CICATA-IPN, Unidad Altamira.
Km 14.5 carretera Tampico Puerto Industrial Altamira
Tampico, Tamaulipas, México. C.P. 89600

ABSTRACT

The histology of healthy tissues has to be known in detail if the damage caused by diseases, pollution and maladies is to be identified. *Strombus gigas* Linnaeus, 1758 (Prosobranchia, Mesogastropoda, Strombacea, Strombidae) is a species under severe stress, caused by the reduction of its populations and pollution of coastal waters where it inhabits. Epithelia are important structures of gastropod anatomy, aiding in locomotion, physical and chemical interaction with the environment, respiration among others. In this investigations three males and three females were sampled from Alacranes reef, 22°22'96"N 89°41'03"W, North of Yucatan Peninsula, Mexico. They had a shell length of 228 mm (\pm 20) and a lip thickness of 16 mm (\pm 1.8 mm). Each individual were remove from the shell and a 1 cm³ section of the mantle were fixed in Davidson's A. F. A. solution for four days, rinsed in alcohol at 70 %, dehydrated in alcohol at 70 %, 96%, 100%, clarified in Benzene, and