Reproductive Characteristics of Queen Conch, *Strombus gigas*, in Barbados

Características Reproductivas del Caracol Rosa *Strombus gigas*

Caractéristiques de la Reproduction du Lambi, *Strombus gigas*

CAROLINE E. BISSADA-GOODING[1]*, HAZEL A. OXENFORD[1], and DALILA ALDANA ARANDA[2]
[1]*Centre far Resource Management and Environmental Studies, University of the West Indies, Cave Hill Campus, Barbados, West Indies. *caroline.gooding@gmail.com. hazel.oxenford@cavehill.uwi.edu.* [2]*CINVESTAV-MERIDA, A.P. 73, Cordemex,C.P. 97310 Merida, Yucatan, Mexico. daldana@mda.cinvestav.mx.*

EXTENDED ABSTRACT

Barbados has a small, unmanaged, artisanal conch fishery with a high proportion of immature animals in the catch, and a very low overall abundance of adult conch. As such, protection of the remaining spawning stock is critical to ensure the maintenance of the populations' reproductive capacity. However, nothing is known of the reproductive characteristics of queen conch in Barbados. To address this knowledge gap, we investigated reproductive seasonality and size at sexual maturity of the local conch population. Conch were sampled every month for a full year (September 2009 - August 2010) from the catch of a commercial fisher. The shell lip thickness was measured, and the entire visceral mass was removed and taken to the laboratory for further sectioning. A 1 cm^2 cross section of tissue was cut from the mid-length of the gonad and digestive gland and placed in 10% buffered formaldehyde and sea water for a maximum of two weeks. The gonad tissue was processed using histological methods of dehydration, clearing, and embedding adapted from the techniques used by Avila-Poveda et al. (2005, 2006) and L. Frenkiel, Laboratoire de Biologie Animale, Universite Antille-Guyane, Guadeloupe (Personal communication). A 6 µm thick ribbon of the embedded tissue was then cut using a rotary microtome, floated in a water bath onto a slide, and dried in an oven overnight. Mounted sections were stained using the Hematoxylin and Esosin regressive stain method. The stained tissue slides were examined under 10 x 4, 10 x 10 and 10 x 20 magnifications using a light transmission microscope. The sex and development stage of each gonad was determined microscopically and classified into one of four stages (undifferentiated, gametogenesis, mature and spent) according to the percentage of gonadal tissue versus connective tissue and the presence or absence of reproductive cellular organelles. The reproductive seasonality was determined by examining the proportion of adults in each development stage each month. Conch became reproductively active (gonads in gametogenesis, mature and spent phases) in April and remained active through December. All sampled adults were undifferentiated from January through March, indicating that there was no reproductive activity during these three months. Onset of sexual maturity or first sexual maturity was taken as the smallest size at which the mature/ripe stage was reached. Some conch were found to be reproductively active at a shell lip thickness of 3 mm; although the population L_{80} was not reached until a lip thickness of 19.5 mm. This study has provided the first conclusive estimates of the size at sexual maturity and spawning seasonality for queen conch in Barbados. Defining these parameters is important for informing management decisions and support management regulations regarding closed seasons and minimum legal sizes to protect spawning stock.

KEY WORDS: Spawning seasonality, queen conch, size at sexual maturity, Barbados

LITERATURE CITED

Avila-Poveda, A. and E. Baqueiro-Cárdenas. 2006. Size at maturity of queen conch *Strombus gigas*, from Colombia. *Boletin de Investigaciones Marinas y Costeras* **35**:223-233.

Avila-Poveda, O.M., D. Aldana-Aranda, and E.R. Baqueiro Cárdenas. 2005. *Histological structure of Strombus gigas* (Gastropoda: Caenogastropoda: Strombidae). *Proceedings of the Gulf and Caribbean Fisheries Institute* **56**:735-740.

Oxenford, H.A., C. Gooding, J. Walcott, T. Staskiewicz, H. Valles. 2010. Assessment of the queen conch, *Strombus gigas*, in Barbados. Report prepared for the Natural Heritage Department and the Environmental Unit, Ministry of Environment, Water Resources and Drainage, Government of Barbados. 49 pp.