# Comparing historical and recently harvested Queen Conch *(Lobatus gigas*) populations using discarded empty shells as a proxy measure of age in Southern Grenada, West Indies.

# Comparación de poblaciones históricas y recientemente cosechadas de caracol rosado (*Lobatus gigas*) utilizando conchas vacías desechadas como medida indirecta de la edad en el sur de Grenada, West Indies.

# Comparaison des populations historiques et récemment récoltées de lambis (*Lobatus gigas*) en utilisant des coquilles vides jetées comme mesure indirecte de l'âge dans le sud de Grenada, West Indies.

STEPHEN NIMROD, MAKEDA MATTHEW-BERNARD, QUIANNA WATSON, and SHANELLE GILKES
St. George's University
Grenada, West Indies
Email: snimrod@sgu.edu

**EXTENDED ABSTRACT**

The queen conch (*Lobatus gigas*, formally *Strombus gigas*) is an edible soft-bodied gastropod mollusc or shellfish found in seagrass beds and sand flats. The high demand for this delicacy in the Caribbean can cause queen conch populations to decline due to increased fishing pressure, hindering the queen conch stock's ability to recover if. Grenada, akin to numerous Caribbean Islands, supports a bustling queen conch fishery. Despite the prolonged fishery activity, due to the informal nature of landing sites, a certain extent of inconsistency is displayed in data entry and data is observed to be very deficient. Primarily, the available data solely encompasses aggregated processed queen conch weights in pounds, lacking detailed insights into the population's structure, age, and sexual maturity. It is difficult to determine the sustainability and viability of the stock in Grenada without knowing the population structure, age, and sexual maturity of the queen conchs being removed. Therefore, this research shed light on the extraction patterns of queen conch being harvested over time in the nearshore area in Southern Grenada (< 2 miles or 3.2 kilometers from shore), aiming to evaluate and compare the shifting population structure of harvested queen conch at the two popular landing sites.

The objective was to assess changes in the harvested queen conch population over time by analyzing mean shell length, weight, and lip thickness of discarded shells, comparing differences between the two sites. More specifically, this research estimated the age of queen conchs harvested in recent years in comparison to those harvested historically in the same area in Southern Grenada using empty shell measurements as a proxy indicator of age. Random sampling from stockpiles of discarded shells was conducted at both sites, namely Woburn landing site (historical site) and the Hog Island landing site (recent site) during April 2021, using 15-meter transects and 50 cm x 50 cm quadrats placed at 1-meter intervals ($n$ =100). The weight of each sample was recorded using the Taylor Glass Platform Digital Kitchen Scale, while a measuring board and vernier caliper were used to record shell length and shell lip thickness, respectively. Shell weight, length, and lip thickness of the empty queen conch shells for both sites were separated into classes inclusive of juveniles and adults, for further comparison.

The results revealed that the older site (Woburn Bay site) had significantly greater shell weight (Mann-Whitney $U$ test; P = <0.001), length (Mann-Whitney $U$ test; P = <0.001), and lip thickness (Mann-Whitney $U$ test, P = <0.001) than the recent site (Hog Island site). Results also indicated that the Hog Island site which was the more recent site had a lower or smaller mean shell lip thickness of 4.30 mm ± 0.45 (SE) compared to Woburn Bay which was the older site that had a mean shell lip thickness of 18.04 mm ± 0.89 (SE). The mean weight of queen conch shells at the historical site was 1613.29 g ± 51.32 (SE) which was also greater than the mean weight of queen conch shells at the recent site which was 880.21 g ± 23.57 (SE). The mean shell length at the recent site was lower at 206.24 mm ± 1.58 (SE) while the historical site measured a greater mean length of 226.05 mm ± 2.42 (SE). Additionally, a greater proportion of mature queen conch was observed at the historical site (93%) compared to the recent site (66%). This was also consistent with the results displaying proportion of conch with flared lips whereby 72% of individuals were observed with flared lips at the historical site compared to 15% of conch observed with flared lips at the recent site.

The shell measurements indicate that queen conch harvesting patterns have changed in this nearshore area over time. Historically, larger, older queen conch were harvested, however, in recent years, smaller, younger queen conch are being harvested. Moreover, the vast majority of queen conch harvested recently in the same nearshore area in southern Grenada have not reached sexual maturity. Further research should be conducted to assess whether the observed changes in harvesting patterns may be due to overfishing or a change in market preference for younger queen conch. In the absence of landing data collection, queen conch shells can serve as important fossil records. The shells can provide valuable information on the population structure of harvested queen conch. Data gathered from this research can aid resource managers in making

informed management decisions and interventions to sustainably manage the queen conch fisheries in Grenada to prevent its collapse.

KEYWORDS: Caribbean, fisheries management, mollusk, queen conch, sexual maturity

## LITERATURE CITED

Harvey, O. (2018). *Overview of Fisheries Data Collection and management in Grenada - Gró*. United Nations University. https://www.grocentre.is/static/gro/publication/679/document/Olando18prf.pdf

Mitchell, M. (2021). *The Conch Industry in Grenada*. https://unctad.org/system/files/non-official-document/ditc-ted-23032021-BlueBioTrade-moran.pdf

Seepersad, K. (2015). *The online guide to the animals of Trinidad and Tobago-Lobatus gigas (Queen Conch)*. UWI St. Augustine. https://sta.uwi.edu/fst/lifesciences/sites/default/files/lifesciences/documents/ogatt/Lobatus_gigas%20-%20Queen%20Conch.pdf

Stoner et al. (2012*). Maturation and age in Queen conch (Strombus gigas): Urgent need for changes in harvest criteria*. *Fisheries Research*, *131-133*, 76-84. https://doi.org/10.1016/j.fishres.2012.07.017

United Nations Conference on Trade and Development. (2022). *Blue BioTrade in Saint Vincent and the Grenadines: Developing value for the sustainable trade and production of queen conch in the Eastern Caribbean*. https://unctad.org/system/files/official-document/tcsditcinf2022d8_en.pdf