Lobatus gigas (Queen Conch)

Superfamily: Stromboidea (Conchs)
Class: Gastropoda (Snails and Slugs)
Phylum: Mollusca (Molluscs)

Fig. 1. Queen conch, *Lobatus gigas*.

[http://www.arkive.org/queen-conch/strombus-gigas/image-G115438.html, downloaded 29 March 2015]

TRAITS. *Lobatus gigas*, formerly known as *Strombus gigas*, is a large marine soft-bodied gastropod mollusc with a hard calcareous external spiral-shaped shell with a glossy finish of pale shades of pink and orange on the interior (Fig. 1). Adults can reach a maximum length of 30cm and weigh up to 3.3 kg. This species is gonochoristic, with separate males and females. Soft bodied features include snout-like proboscis; black-speckled foot; two eyestalks topped with distinctive, yellow eyes and a pair of tentacles (Randall, 1964).

DISTRIBUTION. *Lobatus gigas* is found in the tropical western Atlantic from Florida to Brazil (Martin, 1995) (Fig. 2). The species is present throughout the Caribbean. Percharde (1968) noted that *Lobatus gigas* were commonly seen along the northwest coast of Trinidad and around the Bocas Islands, and were also found in most bays in Tobago.

HABITAT AND ACTIVITY. Found in marine habitats such as coral reef and rocky shore environments (Fig. 3), seagrass beds and alternating sand flats (Fig. 4) (Randall 1964, 255).

Ranging from as deep as 60m to along the shore during low tide but generally found between 5-20m (Sterrer, 1986). The limitation in depth is based on that of their plant food. Conch distribution and density is also influenced by fishing pressure. Adult queen conch living in shallow water is more vulnerable to harvest compared to those in deeper water because of fishery accessibility. Differences in the mean speed of the conch are observed seasonally. An increase in speed during the summer is evident among both male and female conches and are said to be linked with factors including temperature change, reproductive season, expanding available food source, predation and other necessary resources. During winter, conchs were few and relatively dormant.

FOOD AND FEEDING. The queen conch is a primary consumer, feeding primarily on algal plant material in *Thalassia* (a genus of seagrass) beds and epiphytes from the blades of the turtle grass by moving the proboscis over the surface of the blades and removing epiphytes. Off the coast of St. John, a sub-adult conch was observed to be removing a thin film of algae from small pebbles by picking them up in the proboscis (a tube extension), and rotating them for several seconds before dropping them. They may also feed on the algae from the upper surface of the shells of other conchs (Randall 1964). The home range for an individual queen conch is variable and has been found to be between 0.15-1.2 ha in Caribbean islands.

POPULATION ECOLOGY. Adults are solitary and territorial. Densities of adults vary largely depending on location and habitat. Densities of juvenile conch can be as high as 200-2000/ha which serves as predator protection (Stoner and Lally, 1994). On average, female queen conch grow at a faster rate than males, to a larger size, and have a greater tissue weight. Local environmental conditions can promote or slow growth which causes the sizes at maturity to vary. Shell length ceases to grow when the conch reaches sexual maturity, at around 3.5-4 years, and is depicted by the outward flaring of the edge of the shell lip. The conch can live up to approximately 30 years (McCarthy, 2008). Two locations were studied for the presence of wild juvenile conch in the Bahamas. Juveniles 1 year old and older were abundant at both sites, ranging up to 0.38 conch/m^2 at one site and from 0.18-0.51 /m^2 at the other, with highest densities in medium seagrass.

REPRODUCTION. This species has internal fertilization. Each individual is distinctively male or female. During copulation the muscular foot of the male attaches to the posterior portion of the female's flared lip. The male extends its end under the shell and into the females' vaginal groove. At this point, the male is positioned behind the female. Copulation occurs both diurnally and nocturnally and correlates with water temperature (Randall, 1964). Upon fertilization, female conches lay eggs in the form of gelatinous strings, which measure up to 23m. The sticky external substance of the egg strings enables them to form a compact egg mass with the surrounding sand (McCarthy, 2008). On average 8-9 egg masses of 180,000-460,000 eggs each can be produced per season. Reproductive season lasts from March to October peaking from July to September. Females spawn multiple times during this season (Davis, 2005). Embryos hatch 3-4 days after spawning producing a two-lobed larval form of mollusc known as veliger. Embryonic shell develops to about 1.3 mm high 16-40 days post hatching. The rest of its life is spent in the benthic zone (Medley, 2008).

BEHAVIOUR. During the first year of life, juvenile conchs remain buried in the sediment. Their shell length measures 50-70mm when they emerge from the sand, typically during the summer months. Shallow seagrass beds are common nursery areas that support an average density of 1000 – 2000 juvenile conchs per hectare (Appeldoorn, 2013). Predation is very high for juveniles as they do not have a hard shell like adults. Juveniles use the structure of the seagrass beds to reduce the risk of predation. Juveniles exist in depths less than 15m (Appeldoorn, 2013). This is in contrast to adults, who are more concerned with nutrition and less about predation so therefore have different habitat preferences and are found in deeper waters. The most important defence from predators is the conch's hard shell as they are unable to escape most predators due to slow movement. Juvenile conch differs in this mechanism by having a flight response as they do not possess a hard shell. Adults potentially avoid predators by extending their foot forward, grabbing onto substrate and hop forward. This leaves an unbroken chemical trail for predators to follow (Appeldoorn, 2013). Nocturnal activities may also be a strategy to avoid attention from visual predators (Randall, 1964).

APPLIED ECOLOGY. Queen conchs are prized for both their edible meat and attractive shell. It is used as a food source throughout its range. In the Bahamas, the conch is second in importance as a fishery product to the spiny lobster. The meat is also used as a source of bait for fish traps in American Virgin Islands (Berg, 1976). This conch has been reviewed under the significant trade process. The meat as well as the artisanal fishery and trade of this large snail are of particular importance to the Caribbean region. In accordance with this the International Trade requires CITES documents which can only be issued if these conditions are met; the conch were legally obtained in the state and export will not be detrimental to the persistance of *Lobatus gigas* as an attempt to protect the species from overexploitation. Many if not all states that participated in taking remedial measures made considerable progress in addressing complex fishery and conservation issues and greatly improved their queen conch management, thus this should ensure sustainable, transparent queen conch trade and fishery in full compliance with CITES provisions (United Nations Environment Program, 2006).

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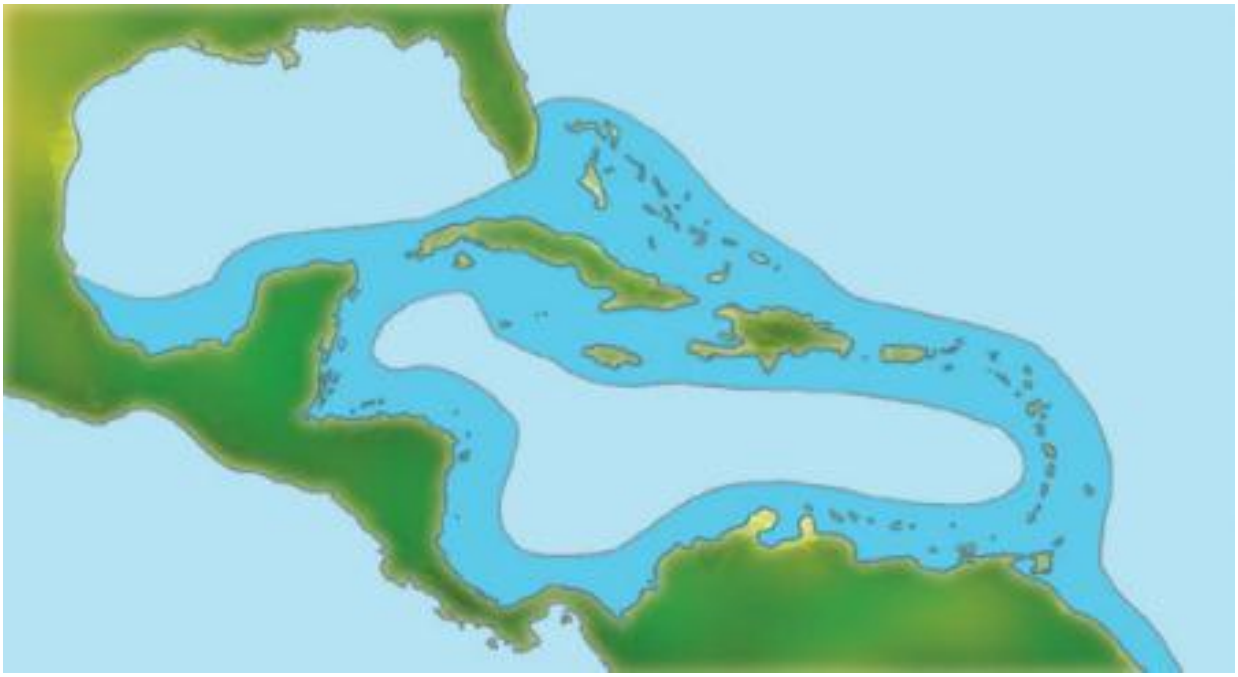

Fig. 2. Queen conch geographic distribution.

[http://community.oceana.org/en/explore/marine-wildlife/queen-conch, downloaded 29 March 2015]

Fig. 3. Queen conch on coral substrate.

[http://dr1.com/forums/living/111414-how-cook-lambi-4.html, downloaded 29 March 2015]

Fig. 4. Queen conch in a seagrass bed.

[http://oncfs-outremer.pagesperso-orange.fr/images/photos/martinique/strombus-gd.jpg, downloaded 29 March 2015]