# High density of *Tridacna crocea* in Rita Island, Puerto Princesa City, Palawan, Philippines

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**ABSTRACT**

In spite of being a protected species in the Philippines, the *Tridacna crocea* or crocus clam, the smallest among eight known giant clam species in the country, is getting rare in most reef areas of Palawan. However, a high density of this species has recently been noted in Rita Island, Ulugan Bay. A total of 44 photos with known dimensions having a total area of 13.26 $m^2$ suitable habitats with clams were analyzed for size structure and density of *T. crocea*. In total, 215 *T. crocea* were noted with 84.91 (±25.6) mm average shell length (±sd). The average density (±sd) was 16.22 (±15.75) individual (ind)·$m^{-2}$ but the clams had occurred up to 17 individuals in 0.28 $m^2$ or 59.91 ind·$m^{-2}$. This high density of *T. crocea* could be due to suitable environment and the absence of exploitation within the vicinity of the island resort. The importance of other resorts in biodiversity conservation may be investigated.

**Keywords:** abundance, bivalves, giant clams, resort, shell length

Giant clams (Cardiidae: Tridacninae) are closely associated with the coral reefs and widely distributed throughout the Indo-Pacific region (bin Othman et al. 2010). These iconic invertebrates perform various important ecological roles such as food, shelter and capacity to promote a balanced reef ecosystem (Soo and Todd 2014; Neo et al. 2015). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Union for Conservation for Nature (IUCN) and several Philippine policies call for the protection of the giant clam species (DA 2001). However, several factors including intense anthropogenic pressure (Neo and Todd 2012), exploitation for human consumption, and illegal fishing (bin Othman et al. 2010) remained prevalent and had caused the depletion of giant clam populations (Neo et al 2017; Ramah et al. 2018).

*Tridacna crocea* or crocus clam, which could attain a maximum shell length of 15 cm, is the smallest among the eight known species of giant clams in the Philippines (Dolorosa et al. 2015c; Neo et al. 2015; 2017; Ecube et al. 2019;). It is highly polymorphic and cryptic in habit to avoid its mantle from being attacked by predators (Todd et al. 2009). Although, this species is the most abundant giant clam species (Juinio-Meñez et al. 2003) they are now seldom encountered in many reefs of Palawan (Dolorosa et al. 2015a,b). This

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notes provide information on the size structure and density of *T. crocea* in Rita Island, Puerto Princesa City, Palawan.

Rita Island (10 °4'27.42"N; 118 °46'49.32"E) in Ulugan Bay, Puerto Princesa City is one of the emerging tourist destinations in the western coast of Palawan. The island is surrounded by sloping sandy, rocky substrate with some patches of corals. It is also known as sea turtles nesting site (PCSDS 2006). During a visit on the island on 4 May 2019 to confirm the presence of the largest giant clam *Tridacna gigas*, photos of suitable habitats with *T. crocea* were taken while SCUBA diving. As a size reference, a polyvinyl chloride (PVC) rod was placed beside the clams before each photo was taken. The area of the habitat covered by the photo and the sizes of the clams present were determined using Coral Point Count with Excel extension ver. 4.1 (Kohler and Gill 2006; Figure 1). The density was determined by dividing the number of clams with the area covered in each photo.

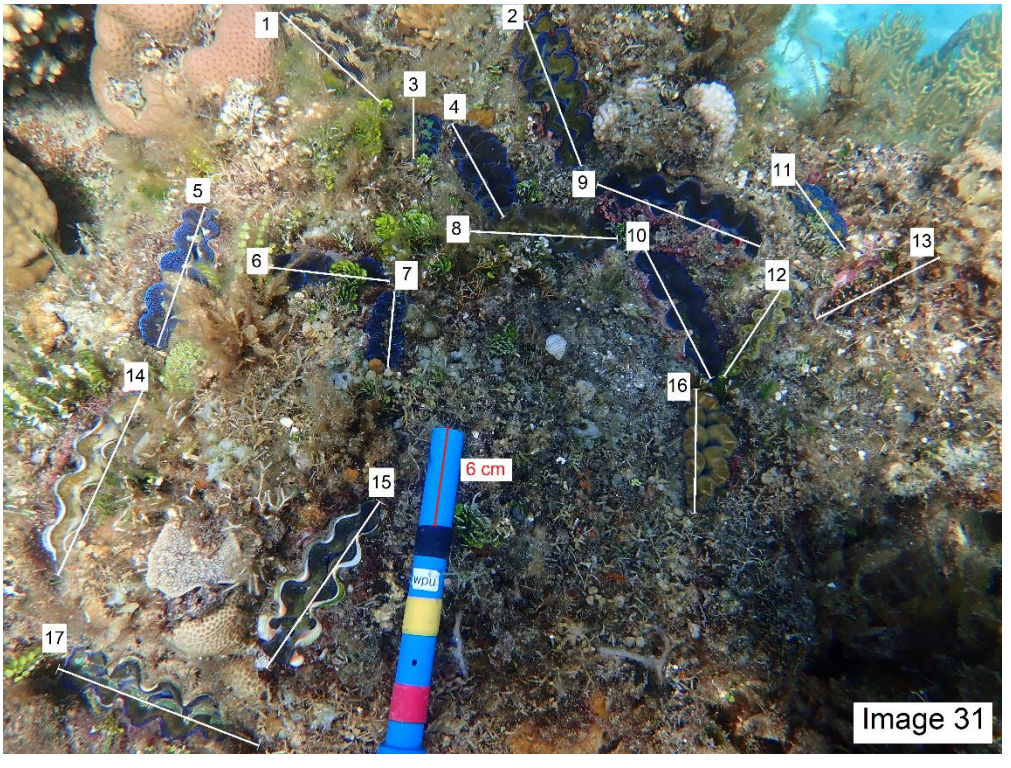


Figure 1. A photo containing 17 individuals of *Tridacna crocea* within 0.28 m², and a polyvinyl chloride (PVC) tubing used as size reference.

Out of 48 photos, 44 were selected based on the presence of *T. crocea*. In total, 215 individuals were recorded. The population is normally distributed as reflected in Figure 2. The size range (21.4 mm to 147.6 mm) and average

shell length (±sd) of 84.91 (±25.6) mm in Rita Island was larger compared to Tubbataha Reefs Natural Park where *T. crocea* measured between 10 mm and 135 mm with an average shell length (±sd) of 67.67 (±32.26) mm (see Conales et al. 2015).

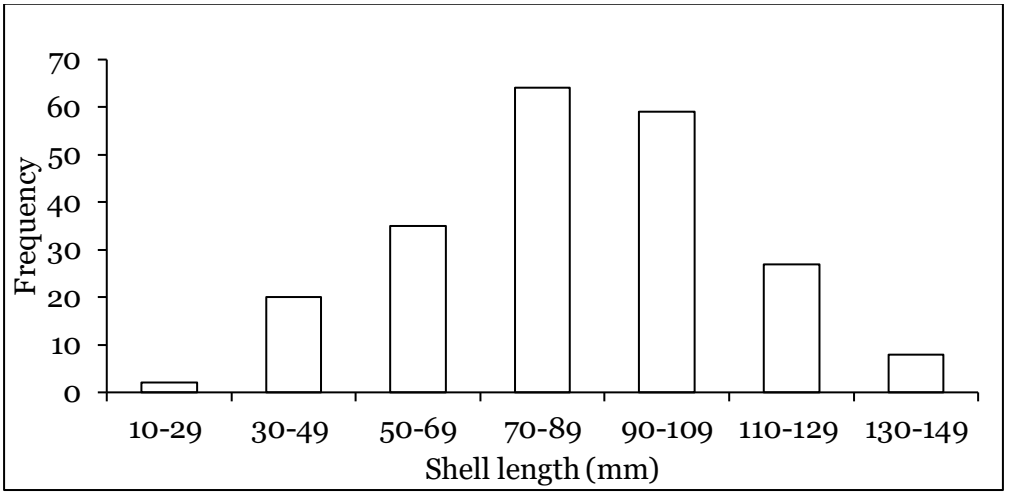


Figure 2. Size structure of *T. crocea* (n=215) in Rita Island, Puerto Princesa City, Palawan, Philippines.

The evaluated photos had a total area of 13.26 $m^2$, thus representing an average density (±sd) of 16.22 (±15.75) ind·$m^{-2}$. Highest density was recorded in image 31 with 17 individuals in 0.28 $m^2$ or 59.91 ind·$m^{-2}$ while lowest density was recorded in image 21 with only 1 individual in 0.37 $m^2$ or 2.69 ind·$m^{-2}$.

*Tridacna crocea* are known to occur at high densities as also been reported in Tubbataha Reefs Natural Park where the clams near the ranger station had an average (±sd) density of 7.67 (±5.59) ind·$m^{-2}$ (Conales et al. 2015). In the coastal area of Bay Canh Island and Cau Island, South China Sea, the highest densities of *T. crocea* could occur up to 23 ind·$m^{-2}$ and 25 ind·$m^{-2}$ respectively (Selin and Latypov 2011).

The high density of *T. crocea* in Rita Island could be due to the suitability of environmental factors and the absence of harvesting within the vicinity of the resort. In the past, the adjacent oyster inlet was observed to host substantially high densities of various species of giant clams (BJ Gonzales pers. comm.). Continued protection of the area is recommended to ensure the safety of these marine bivalves, and for them to serve as natural sources of recruits for nearby areas. Studies on genetic structures of *T. crocea* population and the potential of other resorts in protecting these vanishing species may be investigated.

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