



Characteristics and Fishing Practices of Common Spider Conch (*Lambis lambis*) in Mantatao Island Calape, Bohol: Its Implication to Management of Small-scale Fishers

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Abstract. The amount and formation of habitat can influence the faunal communities that encompass increasing habitat protection through good fisheries and conservation management. This study determines the characteristics and fishing practices of common spider conch as they relate to small-scale fisheries management. This study uses a mixed-methods research design that includes both qualitative and quantitative research. Specifically, the exploratory sequential design and data are enhanced by focused group discussion (FGD) and interviews. Results have shown that the daily catch ranges from 0.9–15.7 kg with an approximate number of 17–120 conchs per day, regardless of size. The conch sizes vary from small to large, including their length and width, which are mostly female. Some of the practices are gleaning, tangled nets, push nets, compressor diving, and scuba diving. The flow of the market originates from the gatherer, who either utilizes as food or sells it to middlemen, direct buyers, or even directly to the wet market. In general, there is a good potential for production; the island has a very rich and diverse ecosystem, considering that the catch is increasing as more females are recorded.

Keywords: characteristics, collection, practices, small scale fishers, spider conch

Rationale

Fishing is a subsistence activity that faces risks such as the uncertainty of catches and the dangers of the sea (Takahashi 2018). For maritime hunters and collectors, marine foods form the largest portion of their calorie or protein intake in their diet (Yesner 1980). Humans may adapt to tidal flats to secure physical safety and food, which are safe spaces compared to the offing or part of the sea visible from the shore. Humans, especially women, children, and older people, can harvest various foods on the tidal flats using simple tools and techniques during the ebb and tide. Tidal flats have

been an important factor in securing food (Takeda et al. 1998: 80) and have contributed to human evolution and adaptation to the environment.

The Philippines according to Anonuevo and Zaragoza (1986) is extremely very rich in coral reefs, shallow waterways, deep oceans, sandy beaches, and coastlines that are home to thousands of different types of seashells. It is likely having the most diversity of mollusk species of any country, with a conservative estimate of 5,000 species. There are around 1,500 of these species are used in the shell trade industry.

This astounding diversity of mollusks may be partly attributable to the 7,100 islands' abundance of complex habitats, which may have contributed to the isolation of creatures and subsequent diversification, as well as their location in the Indo-Pacific, one of the planet's most diversified ecosystems. The number of species that being found and recorded in the Philippines is still increasing each year.

In addition, one of the shellfish products that is promising nowadays is the common spider conch *Lambis lambis*, which is locally known as *Saang*, and these can be harvested by small-scale fishers. This species is usually found throughout the Indo-Pacific, from Tonga to the east coast of Africa. In his study, Abbott (1985) reported that the distribution of *L. lambis*, including the basic biology and ecology of the species, were largely unstudied. This species is highly considered a delicacy among the residents of the islands where it is extensively fished using artisanal techniques.

On the other hand, Filipinos' use of shellfish extends back over 7,000 years (Fox 1970), and people in the Philippines have relied on shellfish use habitually and economically (Tsuji 2013). People rely on shellfish as a significant resource to sustain their way of life, and many people who live close to tidal flats are shell collectors who go in search of shellfish every day at low tide for their daily diet and livelihood.

Shellfish are commonly collected for food, as commodities for tourist restaurants, and for the ornamental shell trade (Wood and Wells 1995). Fishers collect shellfish from the outlying coral reefs during low tide; however, there are gender differences as

men collect shellfish in the water while women collect shellfish on the tidal flats (Yano 2000). The conch is abundant in the Indo-Pacific shallow waters and is mainly found on sand, among rocks, or on coral reefs from the intertidal zone to 20 m depth (Hamel and Merciel 2006). The conch is locally classified as *sa'ang lalaki* (male) and *sa'ang babaye* (female). The latter has no projections at the immature stage, but the projections of the mature female are longer than the male's (Abbott and Dance 1985). The conch is collected by spearfishers who use non-motorized boats in shallow reefs. Although spears (*pana*) are used secondarily, the conch is mainly collected by hand.

Strombidae shellfish, including spider conches, are sold in public markets, while finfish are mostly consumed at home. Spear-fishing is practiced to a considerable degree in Central Visayas, including the Cebu Strait (Green et al. 2004), although there are reports that spearfishing has been decreasing worldwide because of innovations in fishing technology.

The island of Mantatao is known to have a diverse ecosystem. The presence of a very good ecosystem displayed an enticing sea activity. One of the major sea activities is gleaning, which creates an opportunity for some local fishers to establish good fisheries management practices, especially in dealing with shellfish.

Objectives

Generally, this study aims to determine the common spider conch characteristics, practices and their implication for the management of small-scale fishers in Mantatao Calape, Bohol.

Specifically, it aims to identify the following:

1. fisher's profile, fishing methods and practices adopted by the common spider conch fishers;
2. volume of catch and other catch aggregates of the common spider conch fishery;
3. market flow of the common spider conch fishery;
4. problems and challenges faced by the common players in the spider conch industry in Mantatao Island, Calape, and Bohol.

Methodology

This study uses a mixed-methods research design that includes both qualitative and quantitative research. Specifically, this study uses the exploratory sequential design (QUAL-QUAN). In this design, the research first begins with a qualitative research phase that explores the views of the participants, then the data is analyzed and the information is used to build the second phase, which is the quantitative phase (Creswell, 2013). For the quantitative survey method, descriptive survey method was used with the aid of self-made questionnaires. For the qualitative, it involves the collection of data from the participants through the use of focused group discussion as the main data gathering procedure. Supplementary information was obtained during formal interviews.

This study was conducted on Mantatao Island, which has a vast intertidal zone. This is one of the 33 barangays in the municipality of Calape, Bohol. The island barangay is located in the northwestern part of the municipality and is 7.8 kilometers from the town hall. It is bounded to the east, north, and south by the Bohol Strait, and to

the west by the Calape Seawater. The place could be reached by any marine transportation, with almost 250 households and more or less 2 thousand residents. The respondents of the study are the small-scale fishers who have known about the gathering of common spider conch for a longer period of time. Purposive sampling was done in the focused group discussion, while simple random sampling was used for the identification of the respondents for the self-made questionnaires.

The grouping of the results was done. These was coded according to inductive categories (open-ended questions) and deductive categories (such as fishermen). Simple statistical techniques such as the arithmetic mean, frequency, and percentage were used.

Results and Discussion

Profile of the Small-scale Fishers

The island barangay is located in the northwestern part of the municipality and is 7.8 kilometers from the town hall. It is bounded to the east, north, and south by the Bohol Strait, and to the west by the Calape Sea. The place could be reached by any marine transportation. The results showed that the majority of the respondents are male (85% from the total respondents), 70% are married, and the majority are aged between 31 and 45 years old with a monthly income of less than 10,000 pesos. The data implied that they only belong to small-scale fishers. Although their main livelihood activity is fishing, there seems to be an indication that the shell industry in Mantatao Island has improved a lot from a mere backyard industry in the early 1970s to a more labor-intensive production unit, and production has shifted towards

exporting raw or ornamental shells in recent years, as evident when one of the traders said he is transporting shells to Cebu and other nearby towns. According to Turgo, N., (2016) the income from fishing has become even more low in recent years among the different fishing grounds due to overexploitation and uncontrolled illegal fishing. This is the reasons why some fishers opted to shift and concentrate on shell fish collection particularly the spider conch.

The fishing methods, fishing practices and fishing grounds

"Perhaps nowhere in the world one would find as efficient as the Filipinos in gathering shells," observations from a small-scale fisherman. Fishing practices are the most encouraged activities among the island residents and a very unique characteristics among the island resident. In the Philippines, particularly in Mantatao Island, Calape, and Bohol, there are five (5) major fishing methods used by the small-scale fishers that gleaning, tangled nets, push nets, compressor diving, and scuba diving. But they are also on board with using bamboo traps for catching other fish, while hook and line and traps are used for catching a wide range of fish species. The fishing grounds and area are presented in the form of maps (Fig. 1) that include the terrestrial area, mangrove area, seagrass/coral reefs, sandy beach/shoreline, and marine protected area/seaweed farm.

Gleaning. Gleaning ranks first as one of the fishing practices used by the fishers. These involve the collection of marine species (Shoppe et al., 1998), particularly invertebrates found on the reef flat at low tide. Fishers on the island are

mostly women, who walk through the shallow tidal flats and seagrass beds.

Tangle Net. The tangle net ranks second in the island's fishing practices. The net that was used measured 1.5 by 50 m in dimensions and was dropped by the fishers at 80–100 meters early in the morning or late in the afternoon.

Push et or "sud-sud". Push nets are triangular-shaped structures supported by two bamboo poles and pushed forward by a fisherman over the surface of a muddy substrate. This fishing practice ranks third because it is used to gather small shells in the shallow waters.

Compressor Diving. Compressor diving ranks 4th, and the majority of the fishers used the compressor, which is attached to a tube that feeds oxygen to the diver, enabling them to stay underwater for a few minutes to several hours. Most of the fishermen can stay up to five hours. Shells are collected with other fish by browsing the coral heads and other substrates.

Scuba Diving. Although this fishing practice ranks fifth and is very rare on the island, it is still included as one of the practices that were used to collect shells and other invertebrates. There are reports of people saying that divers are collecting shells inside marine sanctuaries and hiding the shells in their pockets. Scuba diving uses a special kind of underwater breathing apparatus.

Other practices used. A large proportion of the respondents use their own motorized boats. But, one physically gifted individual who was known as a spider conch gatherer for almost 3 decades only borrowed the fishing vessels from a friend. As an outcome of the study, he receives one (1) used, but in good condition, non-motorized fishing vessel. Even if gleaning is the most popular practice among small-

scale fishers, other fishers have opted to engage in seaweed farming, mariculture, and other aquaculture practices to augment their income. Their catching involvement with spider conch ranges from 10 to more than 20 years, with an average trip of 2 to 8



hours depending on the type of catching practices, a maximum trip of 5 trips per week, 16-30 trips per month, and 2–9 months per year because they are also very dependent on the environmental conditions.



Figure 1. The fishing grounds and area in the Mantatao Island Calape, Bohol.

Volume of catch common spider conch

Below is the figure for the monthly trend of the small-scale fishers catch activities per kilogram of their daily catch. Data shows that there are days when no catch is recorded due to poor weather conditions. The catch per day is ranging from 0.9 to 15.7 kg. Generally, shells are bought and sold per kilo. Each month has different trends on catches. During the first month, which started in November, the gathered data fluctuated and was confirmed again during the second month of the study. Based on the interviews, a regular trader is selling shells twice a month, although some of them sell them as frequently as 1-3 times a week, as small-scale fishers usually do during peak season. The choice of this month is a result of the qualitative approach, as this month was known to have more spider conch gathered considering that is the peak season (November and December). This result is supported by the study of Floren, 2003, which found that certain months or peak seasons on the year are from December to March.

The daily changes of the number of spider conch catch

The importance of monitoring the daily catch provides an avenue for catch sharing among fishing sectors in order to have credible data for decision-making, allocation, and management. Fishers may have experienced and understood behavioral changes and increased fishing power, which may have obscured declines from landings data. There are 17 to 120 pieces per day (Figure 2) as the total number of catches, regardless of the size of the spider conch gathered by the small-scale fishers. Data showed a remarkable indicator that the island is very rich and has a diverse ecosystem. Even though some fishers experience no catch because of bad weather conditions, they still manage to go on collecting the spider conch because of orders and for additional income.

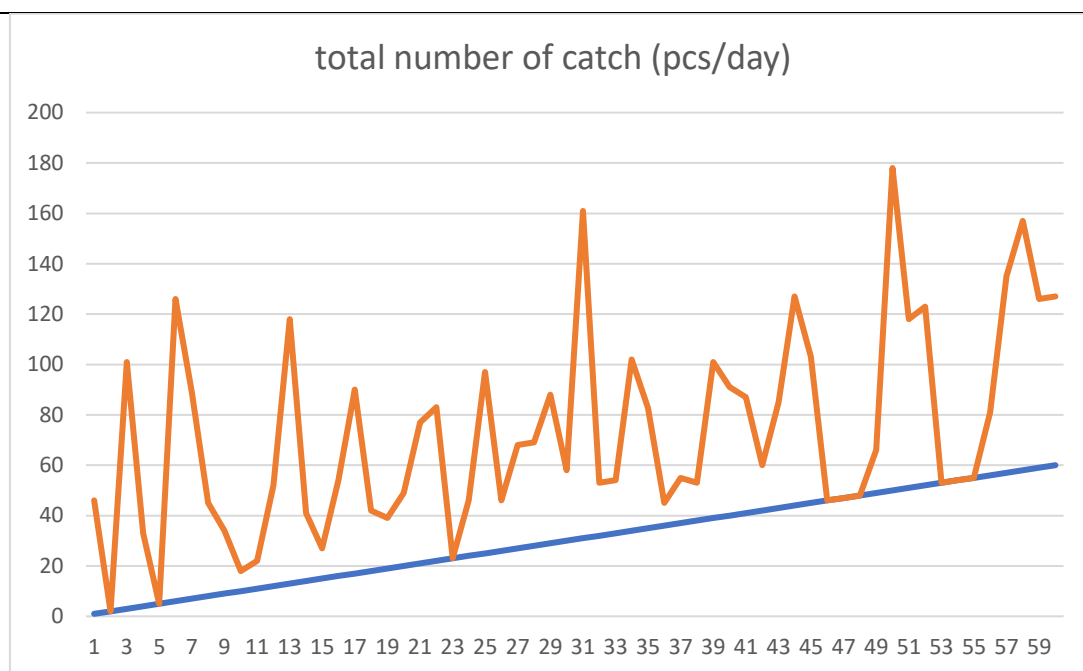


Figure 2. The daily changes on the number of pieces catch of the common spider conch gathered by the small-scale fishers of Mantatao Island Calape, Bohol.

The ranges of spider conch sizes (length and width)

A fundamentally interesting issue that has a significant impact on community structure and biodiversity preservation is the evolution of shell body size. It is crucial to understand that when examining size as an adaptation to the deep-sea environment, investigations within species should make use of size measurements that are calibrated to typical growth stages (BFAR, 2020, FAO, 2021). In the study, the conch sizes vary from small to large, including their length and width (Table 1). During the 2-month study, the length was classified into small, medium, and large, with the smaller one ranging from 17.40 to 110.73 mm, which has a clear picture in relation to the other sizes, which are 21.60 to 127.4 mm, and the large one having 27 to 141.66 mm. But when it comes to the width or diameter size, more or less, daily size monitoring

does not affect the daily diameter of the catch considering that the sizes range from 9.60 mm to 111.08 mm.

Results are supported in the study of FAO (2020) that the body size of shells is inversely related to the abundance and biodiversity of the species in certain environment. There was also an observation that having a good nutrient input can contribute the larger size because of its metabolic or competitive advantages. In addition, the adaptation of certain shells in the island is the driving force of biological diversity, and geographic patterns of body size that could led to unify ecological of deep-sea biodiversity. Same with the gender ratio that majority of the gathered spider conch are female and potential for production.

Table 1. Ranges of spider conch sizes (length and width) gathered by the small-scale fishers of Mantatao Island Calape, Bohol.

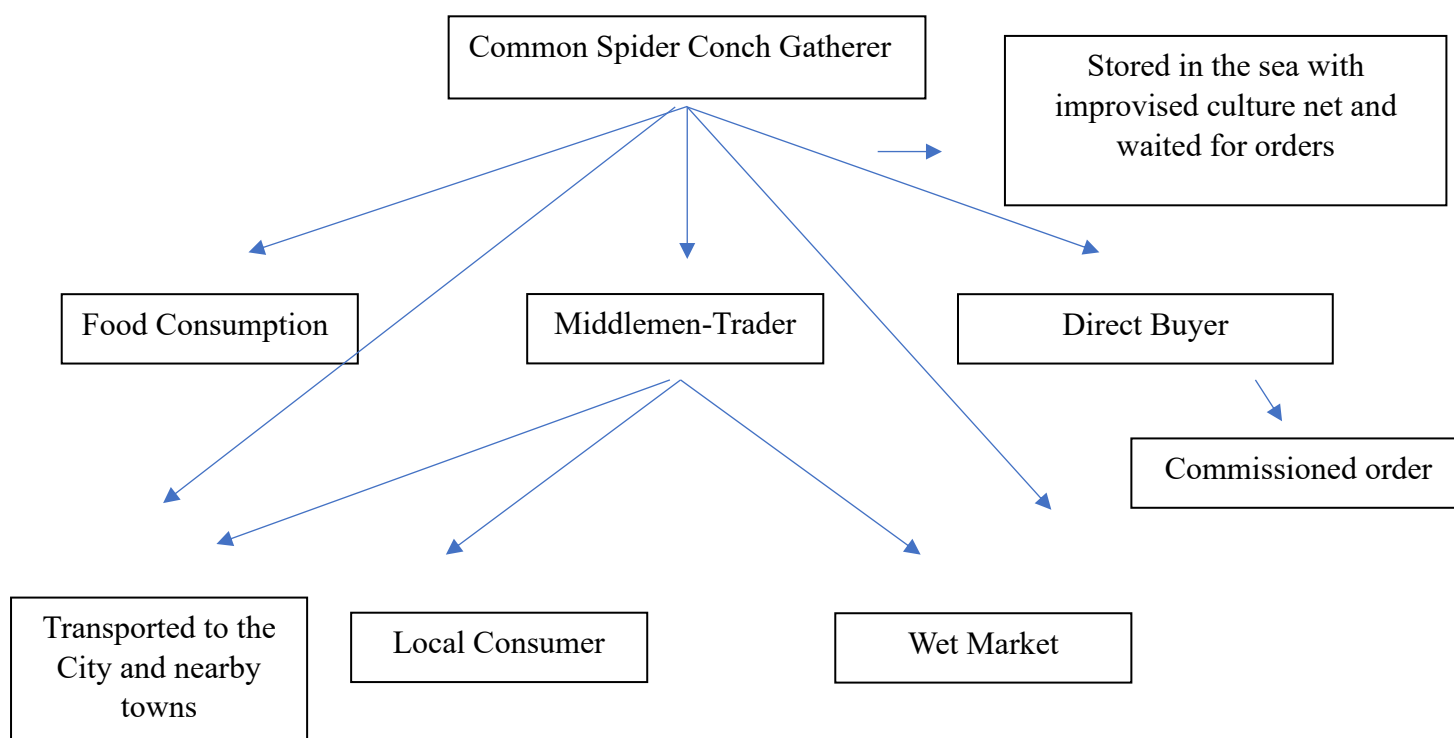
Ranges of the Size	Length (mm)			Width (mm)		
	Small	Medium	Large	Small	Medium	Large
1-15 days	17.40-83.34	21.60-99.0	27.35-111.08	15.60-83.43	21.60-99.30	27.35-111.08
16-30 days	19.70-90.33	25.30-102.29	27.60-115.42	9.60-31.75	13.80-51.13	14.60-69.67
31-45 days	19.90-110.73	24.20-125.36	27.00-141.66	9.90-58.05	14.20-68.60	18.60-85.28
46-60 days	23.20-109.56	25.80-127.4	27.60-111.75	11.00-46.13	12.60-64.48	15.60-79.72

Source: daily monitoring of catch sizes from key informants, 2023

Market flow of common spider conch fishery

In Figure 3, it shows the flow of the collected spider conch. The majority of the respondents indicated that the collected shells are still stored in the sea and that they are waiting for orders from direct buyers. Some also presented that they directly sell the shells to the wet market and others for food consumption. There were also cases where they opted to sell to the middlemen, and the middlemen sold it to the local consumer, to

the wet market, and even transported it to nearby towns. Results are supported in the study of Wang et al. (2019) that market flow recognizes a series of activities that include customer and consumer orientation, value creation, allocation, recognition, and protection; obtaining the right product each time; having effective and efficient logistics; having effective information and communications; shaping and sustaining effective relationships.



Problems and Challenges

Figure 3. The market flow of the common spider conch industry in the island of Mantatao (Key Informants, 2023)

The problems identified on the island are marine habitat degradation and mangrove overharvesting. It is also noted that there are minimal records of alternative livelihood projects. The high cost of fishing inputs and low prices of some fishery products, together with poor sanitation facilities and the declining fish catch, are also among the contributory problems on the island. Some small-scale fishers are also looking into overfishing and bycatch like catching or collecting shells that are smaller, and some have said that the government is very strong in its implementation of the rule that no illegal fishing has been recorded to this date.

Conclusion

The fishing practices like gleaning and the common characteristics of spider conch shells that varies on the number of catches, weight and its sizes from day 1 to day 60 provides a potential for small-scale fishers, especially in terms of managing resources.

Recommendation

The majority of the recommendations were derived from the survey results and the FGD.

1. The existence of the vast intertidal zone of the islands can facilitate the establishment of more Marine Protected Areas (MPAs) that will allow the breeding of stocks to replenish areas where the common spider conch is harvested.
2. Continue and carry out more basic research on the distribution, population studies, and breeding seasons of another mollusk and may focus on the common species of shells that are potential for

manufacture of shell crafts or as lime materials for fertilizers.

3. Using an appropriate management scheme, particularly for small-scale fishers, there could be many more shells obtained from our municipal waters because the local government is very supportive of the local implementations.

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