

Incidence of Stromboids Species Dispersal: The Case of Mantatao Island Calape, Bohol

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Abstract

This study was conducted to determine the abundance of sea snails from family strombidae in Mantatao Island, Calape, Bohol. Quantitative research design was used in the study particularly the descriptive method using the transect line method with 2x2m per quadrant with a five (5) point scale in determining the abundance of stromboids species. There are nine (9) commonly stromboids species found in every quadrant in Mantatao Island. The species are spider Conch Shell *Strombus erythrinus*, Silver Conch Shell *Strombus lentiginosus*, Spotted Conch Shell *Strombus maculatus*, Variable Conch Shell *Strombus variabilis*, Rooster-tail Conch *Strombus gallus*, Little Bear Conch *Strombus urceus*, Scorpion Shell *Lambis scorpius*, Common Spider Conch *Lambis lambis* and the Millipede Spider Conch *Lambis millepeda*. Conch shell *Strombus erythrinus* got the highest numbers of individuals while Millipede spider conch *Lambis millepeda*, got the lowest. Results implied that distribution of stromboids species in the island showed significant indicator that the island has a diverse ecosystem.

Keywords: population distribution, sea snails, stromboids species, quadrat sampling

INTRODUCTION

Stromboids are sea snails that belong to the family Strombidae. These are one of the most important marine species in coastal areas. It is a good source of food for humans. Some of these species are being exported to other countries and are served in five-star hotels as one of their specialties and command a high price. Because of this increasing demand both domestically and abroad and due to the rapid increase of our population, the stromboid species populations are now rapidly declining.

Sea snails, commonly known as true conchs, are the taxonomic family of medium- to very large sea snails in the superfamily stromboidea. The Strombidae family includes the genera *Lambis*, *Strombus*,

Terebellum, *Tibia*, and *Variscopira*. These are one of the more familiar of the muluscan groups. In the study conducted by Abbot, R.T. (2011), there are around 60 species that belong to the Strombidae family compared to other molluscan families. There is an indicator of a smaller size difference between strombus species. But the majority of the marine mollusks are grown less like *Eustrombus Goliath*. The largest recorded shell is *Strombus helli*, which is 380 millimeters, while the other end of the size spectrum rarely reaches 25 millimeters in length.

In addition, strombus species are widely distributed in the Indo-Pacific; some are from the West Indies and from the Mediterranean down through West Africa.

In the tropics, strombs' live mostly in sand and seagrass environments from intertidal to subtidal depths. The strong fort and sickle-shape operculum of the animal allow both small and large strombs to dig quickly and deeply into sandy substrates for protection and during periods of shell growth. Another known shell is the adult *Eustrombus gigas*, the Queen conch, which feeds mainly on minute algae, as do most other species of strombs; in the larval stage, these may feed on plankton. The larger species of 'strombs, *Eustrombus gigas*, are harvested as a popular and exploited food source in most shallow waters found in the tropics. Robertson, R. (2009) stated that there was an overharvesting of this shell documented in Florida, and with these efforts, the aquaculture community has lengthened efforts in raising this species to avert the extinction of dwindling populations of the species.

It is understood that there is a great challenge nowadays because fish and other sea foods are humans most important foods after cereals. There are about 15 percent of the world's protein eaters. It comprises nearly 70 million tons of the world's edible animal protein. Nevertheless, to meet this demand, previously vast stocks have often been exhausted to the point of near extinction. There is a study conducted by FAO in 2022 that shows that freshwater and marine biodiversity work expanded the reviews on the present status of genetic resource management, the needs and constraints, identifying factors of intervention like population and overfishing,

and problems caused by different species and lifestyles.

On the other hand, shells are noticeable and are widely collected, traded, or even bought and sold because of their beauty, attractiveness, and rarity. Some are used as raw material for decorative and household items, which they find in both local and foreign markets. But of course, the supply is dependent on the wild stock population.

Having the intertidal flats and fringes of the drop-off of Cebu Province, including that of Mactan Island, abound with shells showed a greater potential. The abundance of gastropod species in these places seems to be favored by the type of substrata, which is made up of coralline rubbles, coral heads, and reefs. Likewise, the sandy, rocky, sandy-muddy substratum and the crystal-clear water provide an excellent haven to marine molluscs, particularly the gastropod group.

This favorable condition is also evident from the number of species found in the vicinity of Cebu City and the eastern side of Mactan Island. The latter is surrounded by coral reefs and is richly endowed with flourishing marine organisms, aside from mollusks. But excessive and indiscriminate collection of the genera *Cypraea*, *Strombus*, *Murex*, *Oliva*, and *Conus* poses serious danger. Some of the species mentioned above are now difficult to find. *Strombus*, or stromboids, is one of the species considered food by people in the Visayan Island and Mindanao. Also, one of the species is afraid it may be difficult to find in the market later

on if its collection stays unregulated. What fate lies ahead for these gastropod species may be the same as that of other overexploited victims among economically important species of Philippine Fauna (Garcia, R. 2011).

Knowing the existing condition, this may be considered a threat that needs conservation for these species that are fast declining and urgently need action. The meaning of conservation, particularly of the living resources of the sea, was discussed during the International Conference on the Law of the Sea held in Geneva in 1958. The law focused on the measures for achieving an optimum sustainable yield for the maximum supply of food and other marine products. Hence, a conservation program is recommended in securing the continuous food production for human consumption because it is very evident that some marine resources, particularly these stromboids, are being depleted due to indiscriminate harvesting and destruction of their natural habitat.

With these, there is a need to manage the marine species and ecosystem to prevent their decline and extinction. Strengthen terrestrial conservation, which is to preserve and protect biodiversity and ecosystem function through species population enhancement and habitat rehabilitation. Some of these actions, like overfishing and intensification of global climate change, which alter oceanic circulation and disrupt existing tropical relationships, are detrimental to our marine ecosystem if no one is responsible for managing marine

conservation programs. If these programs are not functioning properly, they may lead to the decline of some species and even their extinction in the sea.

OBJECTIVES

This study determines the incidence of dispersal of sea snails from family Strombidae in Mantatao Island, Calape, Bohol with the following indices; characteristics such as weight, size and length and degree of abundance per quadrat.

METHODOLOGY

The study uses the quantitative research design particularly descriptive survey method using quadrat sampling in assessing the abundance of sea snails from family. There are three (3) transect line laid out with distance of fifty meters away from the shoreline, every transect line had three (3) quadrats with 2x2 meters, the interval of each quadrat in a given transect line measures 10 meters and its interval to other transect line measures fifty (50) meters. Each transect line were monitored and the species found in every quadrant were collected.

Mantatao Island has a wide coastal area, is one of the island barangays found in the municipality of Calape, Bohol. It is situated 3.9 kilometers from the Bohol Island State University (BISU) Calape Campus. The coastal area is approximately 12.56 hectares, and the total coastal area of Calape, Bohol is approximately 403.46 hectares. The total coastal area of Mantatao Island is 1/32 of the total coastal area of Calape, Bohol.



Figure. 1. Coastal Area of Mantatao at lowest low tide

Thirty-five (35) meters plastic rope used for the transect line plotting, two by two (2x2) meters quadrat, 50 meters for the horizontal distance in each quadrant, field guide, book for the identification of the local, English and Scientific Names of some Stromboids in the Philippines, data sheets and ballpen for the recording of all information, tape measure in getting the length and width of the Stromboids and weighing scale for obtaining its weight.

Preliminary survey in the island was conducted to identify the possible stromboids with the assistance of the gatherers and the residents of the island. Species identified and listed according to the key with proper taxonomic classifications.

Stromboids species that are found in the quadrats was counted and identified according to its English name, Local name and Scientific Name. The characteristics such as length, weight and size gathered were tabulated and analyzed. After counting

and identifying Stromboids species was returned on the place where they are gathered. A book was used as reference or key and information from the people living in the barangay. This study was conducted during the lowest low tide.

To determine the significance of the stromboids characteristics such as the weight, length, width gathered among sampling sites, one way ANOVA was used in the study. Mean, percentage and simple frequency was used for the distribution and relative abundance for the population density identification.

RESULTS AND DISCUSSION

Economically Important Stromboids Species

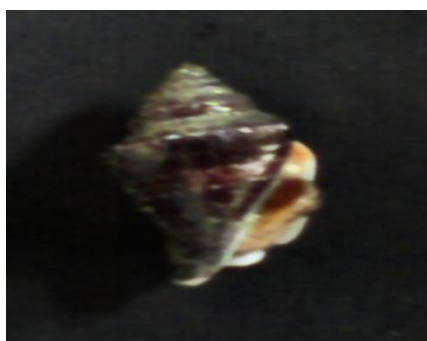
There are nine (9) commonly stromboids species found in every quadrant in Mantatao Island. The species they got were Conch Shell *Strombus erythrinus*, Silver Conch

Shell *Strombus lentiginosus*, Spotted Conch Shell *Strombus maculatus*, Variable Conch Shell *Strombus variabilis*, Rooster-tail Conch *Strombus gallus*, Little Bear Conch *Strombus urceus*, Scorpion Shell *Lambis scorpius*, Common Spider Conch *Lambis lambis* and the Millipede Spider Conch *Lambis millepeda*.

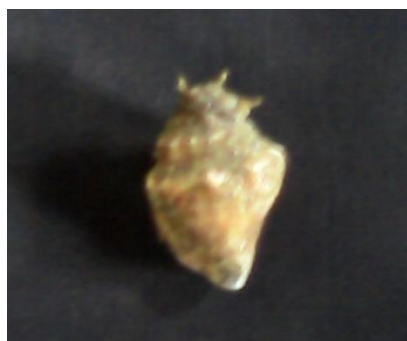
Conch Shell has an angular ribbed and with varices. Spiral chords become bigger anteriorly and near lip ribs becomes six and blunt knobs on dorsal half of the body whorl. Silver Conch Shell is solid and heavy with short pointed spire and spiral striae. Axial ribs nodulose or shoulder of cater whorls. Spotted Conch Shell has moderate spire with former varices and rounded faintly knobbed shoulders. Variable Conch Shell has high-spired; spirally ridge on early whorls and base of body whorl; axially ribbed and angular. Rooster-tail Conch is a fairly high spire and small, blunt knobs above the deep suture. Spiral chords on the early whorl become low. Its color is white with orange-tan mottling. Little Bear Conch has a narrow with high spire angular whorls. It is brown orange-mouth, white, cream or brown, with spots, flecks, bands or axial

streaks. Scorpion Shell is having short spire; spirally corded including lip; angular shoulder with small knobs. It is color white and pale gray. Common Spider Conch is a pointed spire having eight whorls, spirally and axially striate and with sharp angular shoulder. It is creamy white, heavily mottled with brown or purple brown spines retain the periostracum even when dried. And the Millipede spider conch that has short spire with about eight whorls, spirally ribbed and angulated with blunt spire in shoulder. It is cream with brown maculation.

The study is supported by Cob, Z.C., et al. (2009), who found that there are 230 individuals of *Strombus* along Johor Straits, Malaysia. Among these species are four: *Strombus canarium* Linnaeus, 1758; *Strombus urceus* Linnaeus, 1758; *Strombus marginatus* subspecies *succinctus* Linnaeus, 1767; *Strombus marginatus* subspecies *robustus* Sowerby, 1874; and *Strombus vittatus*, subspecies *vittatus* Linnaeus, 1758. Whereas *Strombus canarium* was the most common, that is, the most widely distributed and abundant, followed by *S. urceus*, and others are rarely found.



Local name: Aninikad



Local name: Aninikad

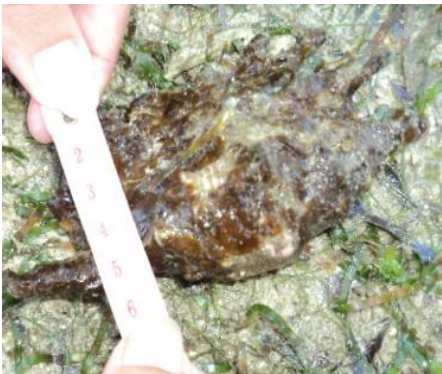
English name: Conch shell
Sc. Name: *Strombus erythrinus*



Local name: Aninikad
English name: Spotted conch shell
Sc. Name: *Strombus maculatus*



Local name: Aninikad
English name: Rooster- tail conch
Sc. Name: *Stombus gallus*



Local name: Saang five fingers
English name: Scorpion shell
Sc. Name: *Lambis scorpius*

English name: Silver conch shell
Sc. Name: *Strombus lentiginosus*



Local name: Aninikad
English name: Variable conch shell
Sc. Name: *Strombus variabilis*



Local name: Aninikad
English name: Little bear conch
Sc. Name: *Stombus urceus*



Local name: Saang
English name: Common spider conch
Sc. Name: *Lambis lambis*



Local name: Saang

English name: Millipede spider conch

Sc. Name: *Lambis millepeda*

Figure 2. List of Stromboids Species Identified in Mantatao Island, Calape, Bohol

Abundance of Stromboids species

Conch-shell *Strombus erythrinus* had the greatest number of individuals being gathered, counting 15 individuals, representing 21.73 percent of the total stromboids identified. Variable conch *Strombus variabilis* ranked second, with 14 individuals being gathered, representing 20.28 percent of the total stromboids identified. Third in rank was the silver conch, *Strombus lentiginosus*, with 12 individuals representing 17.39%. Fourth was the Rooster-tail conch, *Strombus gallus*, with seven individuals representing 10.14%. The common spider conch, *Lambis lambis*, ranked fifth, having 6 individuals and representing 8.69%. Spotted conch *Strombus maculatus* and little bear conch *Strombus urceus* grabbed the sixth rank, with 5 individuals representing 7.24%. Seventh in rank was the Scorpion Shell *Lambis scorpius*, having 3 individuals representing 4.34 percent, and the last is the Millipede

Spider Conch *Lambis millepeda*, having only 2 individuals representing 2.89%.

Cob, Z.C. et al. (2008) stated that, despite their economic importance, one of the species that is poorly understood is *Strombus canarium*, including the factors influencing their habitat preferences. The species was reported as being highly associated with seagrass bed ecosystems, but their distribution and specific preferences within the habitat remain unknown. In this study, habitat preference and usage of conch in their natural habitat were investigated. The population was patchily distributed and present in local colonies that comprised mixed age groups. There was high spatial variation in conch abundance, where multivariate analysis (PCA) showed high preferences for microhabitats with mixed seagrasses dominated by *Halophila* sp. Other important habitat characteristics preferred were high sediment organic

content (% LOI), high sediment sorting, and a low mean sediment particulate size.

Frequency Distribution of Stromboids Species

Conch shell, silver conch, and variable conch appeared in eight quadrants with a frequency of 88.89; rooster tail conch appeared in six quadrants with an equivalent frequency of 66.67; and spider conch occurred in five quadrants with an equivalent frequency of 55.56. Followed by the spotted conch and little bear conch, which appeared in four quadrants having the equivalent of 44.44; the scorpion conch appeared in three quadrants having the frequency of 33.33. The last, or the species that has the least number of occurrences and

frequency, is the millipede conch, which has appeared only in two quadrants and has an equivalent frequency of 22.22 (Table 1).

As a support study, a similar study had been conducted, particularly in documenting the geological survey and stratigraphic study of the Neogene of the Bocas del Toro region (Panama). In that study, gastropod assemblages were documented. This is the first paper dealing primarily with the Bocas Neogene gastropod assemblages (Strombidae) since the pioneering work of Olsson (1922). Six species of *Strombus* are described, three of them new: *S. acanthospira* n. sp., *S. pugiloides*, *S. gatunensis*, *S. elegantissimus* n. sp., *S. vermeiji* n. sp., and *S. cf. floridanus* (Landau, B. et al. 2011).

Table 1. Distribution of Stromboids Species

Stromboids species	Total no. of quadrant sample	Occurrence	(%)
Conch shell	9	8	88.89
Silver conch shell	9	8	88.89
Variable conch	9	8	88.89
Rooster tail conch	9	6	66.67
Common spider conch	9	5	55.56
Spotted conch shell	9	4	44.44
Little bear conch	9	4	44.44
Scorpion conch	9	3	33.33
Millipede shell	9	2	22.22

Average measurement and scale of the Stromboids species

As shown in Table 1, the Milleped spider conch is the largest, with measurements of 127.3mm in length, 56.6mm in width, and 117g in weight. Second was the common spider conch, with a length of 126.3mm, a width of 56.3mm, and a weight of 117g. The Scorpion conch came in third place, measuring 124.3mm in length, 56.3mm in width, and weighing 116.3g. The fourth was the small bear conch, which measured 86.4mm in length, 34.6mm in width, and weighed 25.6g. Fifth was the Rooster tail

conch, which measured 52.7mm in length, 26.8mm in width, and 12.7g in weight. Sixth was the variable conch, which measured 50.9mm in length, 24.6mm in width, and 11.1g in weight. The spotted conch grabbed the seventh spot and measured 50mm in length, 23.4 mm in width, and 10 g in weight. The silver conch was number eight, measuring 49.4 mm in length, 22.2 mm in width, and 10.4 g in weight. The last spot, or the smallest and lightest of all stromboids species, was the conch shell, with measurements of 49.3 mm in length, 18.6 mm in width, and 9.8g in weight.

Table 2. Average measurement and scale of the Stromboids species.

Stromboids species	Length (mm.)	Width (mm.)	Weight (g.)
Milleped spider conch	127.3	56.6	117
Common spider conch	126.3	56.3	117
Scorpion conch	124.3	56.3	116.3
Little bear conch	86.4	34.6	25.6
Rooster tail conch	52.7	26.8	12.7
Variable conch	50.9	24.6	11.1
Spotted conch	50	23.4	10
Silver conch	49.4	22.2	10.4
Conch shell	49.13	18.6	9.8

CONCLUSION

Out of nine identified stromboids species, Millipede spider conch *Lambis millepeda* has the greatest number of its characteristics in terms of length, width, and weight, but the least when it comes to abundance and frequency.

Conch shell *Strombus erythrinus* got the highest percentage when it comes to composition, population, and occurrence but got the lowest average numbers when it comes to characteristics in length, width, and weight.

RECOMMENDATION

1. A shell garden sanctuary might be established on the island.
2. Fisherfolk and residents living along the nearby coast should help in protecting and conserving the stromboids species in the barangay.
3. LGU may consider establishing a stromboid species sanctuary as the research site that will serve as a spawning ground for these species' breeders.

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