

NOTES ON THE COWRIES OF MINDANAO, PHILIPPINES

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Shells are a group of interesting creatures which evoke a strange kind of magic to many people. It is not surprising that there is a noticeable increase in the number of shell enthusiasts who spend considerable time, effort and money in expanding their shell collections. Many have gone to distant and remote islands purposely to collect them, and in this part of the world the Philippines leads as a shell-collecting country and exporter.

The largest and most diverse of the classes of mollusks are the Gastropoda or the Univalves and there are about 30,000 species of them. All snails and snail-like mollusks belong to this class and can be found almost everywhere, from the deep oceans to the lakes, rivers, forests and mountains. These mollusks vary greatly in size, form and color and possess but one shell which is often coiled and contains the vital organs.

Easily one of the most popular gastropods belong to the Superfamily Cypraeacea and are collectively known as Cowries. They include some of the most beautiful and rare shells known. In most cases, cowries have globular, glossy and colorful shells with narrow ventral apertures bordered by denticulate lips. They have a nocturnal habit and are easily collected within the vicinity of coral reefs. This shell group has been used as ornaments, money and symbols.

Of the literature available on the systematics and biology of Philippine mollusks, not one mentions any species of cowries from the explored localities. A great deal of information, therefore, remains to be published concerning the local cypraeal fauna. Knowledge of the country's

mollusks is partly discussed in several publications including those of Abbot (1971, 1976); Dance (1971, 1976); Lucifora (1977); Oliver (1975); Tinker (1958); Alcasid (1936, 1947); Sotto and Von Cosel (1982); and Cabrera (1984).

The Department of Natural Resources reported that there are about 7,161 species of mollusks in the country and the number would possibly double if a complete survey were made. Several mollusks of commercial value including the cowrie group are found in the Philippines. The same Department sadly reported that except for some species most of the shells found in the country have never been specifically mentioned in any book on shells. It also cited that 3 of the 13 most valuable shells in the world are in the Philippines, including *Cypraea aurantium* and *Cypraea leucodon* (MNR, The Blue Machine).

Abbot (1976) estimated some 200 species of cowries, while Dance (1976) reported about 355 species under the Superfamily. Oliver (1975) added that most of the shells in his guidebook are found in the Indo-Pacific Province in which the country is situated and mentioned several cowrie species whose restricted area of distribution included the Philippines. Rosewater (1975) remarked that *Cypraea tigris* is widespread in distribution and a very good collector's item.

The list of cowries in this paper is not complete and does not represent the general cypraeal composition of the different areas. Certainly some species have been missed due in part to the author's short collecting trips and inadequate diving gear.

Collection Sites

Collection of marine mollusks were made in 13 separate localities all over Mindanao from 1981 to 1986: Loreto, Dinagat Island, April 27-June 7, 1981; Camiguin Island, July 13-20, 1981; Jampason, Misamis Oriental, April 3-10, 1982; Baliangao, Misamis Occidental, May 20-June 4, 1982; Laguindingan, Misamis Oriental, April 5-17, 1983; Lanuza Bay, Surigao del Sur, August 9-15, 1983; Olanivan Island, Davao del Sur, January

24-February 13, 1984; Kapayas Island, Misamis Occidental, November 13-16, 1984; Murcielagos Island, Zamboanga del Norte, April 23-30, 1985; Sinipay Island, Zamboanga del Norte, November 7-18, 1985; Silinog Island, Zamboanga del Norte, February 15-24, 1986; Aligoay Island, Zamboanga del Norte, June 3-16, 1986; Banga Island, Surigao del Norte, October 28-November 6, 1986.

Materials and Methods

In the collection of marine mollusks, six divers sampled day and night shallow areas up to a depth of four fathoms by snorkeling, wading and overturning boulders of rocks, corals and rubbles. Bare hands were used for scooping sand dwellers. Mollusks that were attached to hard substrates were removed by the use of the diving knife. Burrowing species, on the other hand, were removed by carefully breaking or cracking the hard substrate with a knife or stone.

Live specimens were killed by putting them in boiling water for at least ten minutes. The soft parts were then removed, using hard pins, and in some specimens the remaining parts of the internal organs were allowed to rot. After 3 to 4 days the specimens were thoroughly flushed with water to remove the rotten meat. In the laboratory each specimen was then assigned a catalogue number and then stored.

The scientific names are those of Abbot (1962, 1976), Tinker (1958), Dance (1971, 1976), and Oliver (1975).

This paper is the first of the series that will report on the shell collection of the Natural Science Museum of Mindanao State University, Marawi City. The other families of mollusks will be treated in separate articles.

Results and Discussion

Thirty-seven species belonging to the Family Cypraeidae and two species belonging to the Family Ovulidae are listed in Appendix I. Not all 39 species, however, are equally represented in the collection, although some are well represented while others are not. Species with less than four representative specimens are considered as poorly represented and 10 (25.6%) such species are listed in Table 3. Some species which are represented by one specimen each include *Cypraea argus* and *Cypraea felina* from Murcielagos Island; *Cypraea mauritiana* from Lanuza Bay;

Cypraea granulata from Sinipay Island and *Cypraea reticulata* from Banga Island. Two other species are represented each by two specimens and include *Cypraea cribraria* from Loreto, Dinagat Island, and *Cypraea lutea* from Silinog Island. *Cypraea walkeri* is represented by one specimen from Olanivan Island and another two specimens collected from Silinog Island.

In Table 2, the ten most common species are listed. Their status is based on S. P. Dance (1976). Of the ten species listed, 9 are considered common and only one is considered frequent. *Cypraea arabica* is truly very common for having the most number of specimens and for having been recorded from all the 13 collection sites. *Cypraea tigris*, although represented by 77 specimens, is also a common species and is reported from 12 collection sites. *Cypraea annulus*, *Cypraea moneta*, *Cypraea lynx* and *Cypraea isabella* are the other common species very well represented and have been collected from 11 different sites. Other species also considered common include *Cypraea carneola*, *Cypraea erronea*, *Cypraea caputserpentis* and *Cypraea vitellus* and they have been reported from 10 localities. *Cypraea nebrites* and *Cypraea asellus* were each collected from 8 different sites and are represented by 135 (7.3%) and 84 (4.5%) specimens, respectively. *Cypraea talpa*, although represented by only 21 (1.13%) specimens, has been reported from 9 sites.

Looking at the total number of species collected from each locality, Silinog Island has the most number with 28 (71.7%) species recorded (See Table 1). From Murcielagos Island, Zamboanga del Norte, 20 (51.2%) species have been listed while only 19 (48.7%) species each have been identified from Olanivan and Silinog Islands. Aligoay Island has 18 (46.1%) species recorded and from Banga Island only 17 (41.0%) species. Of the 13 localities, Laguindingan, with only 7 (17.9%) species recorded, has the least number of species.

Acknowledgments

The author and the members of the Natural Science Museum expeditionary team are grateful to Dr. Mamitua Saber for his encouragement and to the Finance Department, the Office of the VP for Academic Affairs and the Office of the President, all of MSU, for the financial support.

In Placer, while on the way to Banga Island, the Honorable Mayor Chito Patagan issued a permit in favor of the party to conduct the expedition on the island; Mr. and Mrs. Manolo Mondaya were the kind hosts to the team; Mr. Suhar Mondaya helped arrange for the boat and looked after the museum vehicle while the team was on the island. In Banga, the Sitio

President, Mr. Solano Mantua, extended every kind of assistance from boat to foodstuffs; Mr. Arsenio Mantua offered his hut for the team's use; Mr. Carlos Libante entertained the team with his songs; Mr. Abnir Mantua reinforced the collection effort; Mr. Isagani Cabana operated the boat to and from Banga.

Barangay Captain and Mrs. Reynaldo Jumalon of Sinipay Island extended their hospitality and kindness; Mr. Oscar Senahon and Rico Alingal were the boat operators during the Sinipay Expedition.

During the Baliangao Expedition the Barangay Captain of Punta Miray, Mrs. Glicería Añana, permitted the team to explore the waters within her jurisdiction; Mr. Leonardo Marimon provided camping space and served as field guide; the Local Fisheries Officer of the Bureau of Fisheries and Aquatic Resources offered a research vessel for the use of the team.

The members of the Silinog Barrio Council through Mr. Teofilo Bantilante issued the permission to collect in the waters around the island; Mr. and Mrs. Teodulo Taruc accommodated the team in their own residence; Sergio Taruc and Dodong Taruc assisted in the collection; Mr. and Mrs. Reynaldo Jumalon arranged for the boat to and from Silinog; Ms. Vanessa Dickinson, U.S. Peace Corps Volunteer, was an inspiration to the divers; Mr. Frank Bontilao served as the quartermaster.

On the way to Aligoay Island the team spent one night in Dipolog City where Mr. and Mrs. Paul Briones were the friendly hosts; Councilman Pedro Engcol of Aligoay provided security, boat service and camping space; Mr. Alfredo Bacana had his boat at the team's disposal; Mr. Bibet Duron served as the expert cook; Miss Luciana Sumagang and Miss Juanita Icalina made the trip satisfying and enjoyable; Mr. Rene Sardane operated the boat during the sidetrip to the Challenger Reef.

The local officials of Cantilan, Surigao del Sur headed by Mayor Fabio Altrecha and Barrio Captain Alberto dela Peña issued a permit and clearance to collect in the waters of Lanuza Bay; Mr. Reuben Liwagon assisted in selecting a suitable camping area; Dr. and Mrs. Valentin Olan of Madrid, Surigao del Sur, were the kind hosts during a brief stopover in their town.

Mayor Jose Salcedo and Vice Mayor Obing Paurom of Jasaan, Misamis Oriental, permitted the team to collect within the vicinity of the town; Mr. Vicente Rojas of Jampason, Misamis Oriental provided camping area and boat service; Mr. Ruben Rojas operated the boat during most of the dives; and to all the countless folks from all the expedition sites who in many ways contributed to the success of the trip, the team's gratitude and appreciation are due.

Table 1. Number of Species collected from each locality.

Collection Site	No. of Species	O/O
Silinog Island	28	71.7
Murciolagos Island	20	51.2
Olanivan Island	19	48.7
Sinipay Island	19	48.7
Aligoay Island	18	46.1
Banga Island	17	43.5
Kapayyas Island	16	41.0
Loreto	15	38.4
Camiguin Island	13	33.3
Lanuza Bay	12	30.7
Jampason	11	28.2
Baliangao	10	25.6
Laguindingan	7	17.9

Table 2. Ten most common species based on specimens collected.

Species	Status*	No. of Specimens	O/O
<i>C. arabica</i>	Common	263	14.2
<i>C. annulus</i>	Common	220	11.9
<i>C. moneta</i>	Common	205	11.0
<i>C. caputserpentis</i>	Common	163	8.8
<i>C. lynx</i>	Common	156	8.4
<i>C. nebrates</i>	Frequent	135	7.3
<i>C. isabella</i>	Common	90	4.8
<i>C. erroneus</i>	Common	87	4.7
<i>C. asellus</i>	Common	84	4.5
<i>C. tigris</i>	Common	77	4.1

* Based on S.P. Dance (1976)

Table 3. Ten most uncommon species based on number of collected specimens.

Specimens	Status*	No. of Specimens
<i>C. argus</i>	Frequent	1
<i>C. cribraria</i>	Frequent	2
<i>C. cicercula</i>	Frequent	1
<i>C. felina</i>	Frequent	1
<i>C. lutea</i>	Frequent	2
<i>C. mauritiana</i>	Common	1
<i>C. quadrimaculata</i>	Frequent	1
<i>C. reticulata</i>	Frequent	1
<i>C. walkeri</i>	Frequent	3
<i>C. caputraconis</i>	Frequent	4

* Based on S.P. Dance (1976)

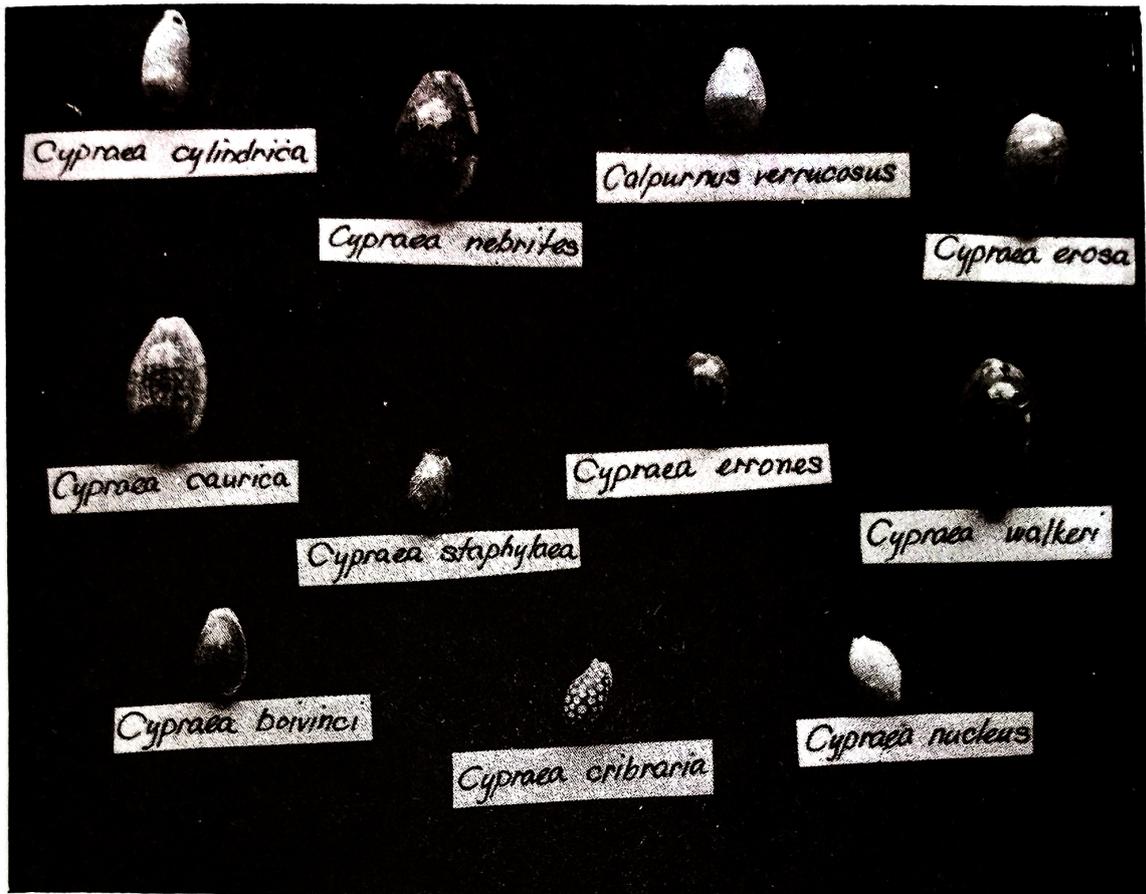


Fig. 1. Some of the small Cowries of Mindanao

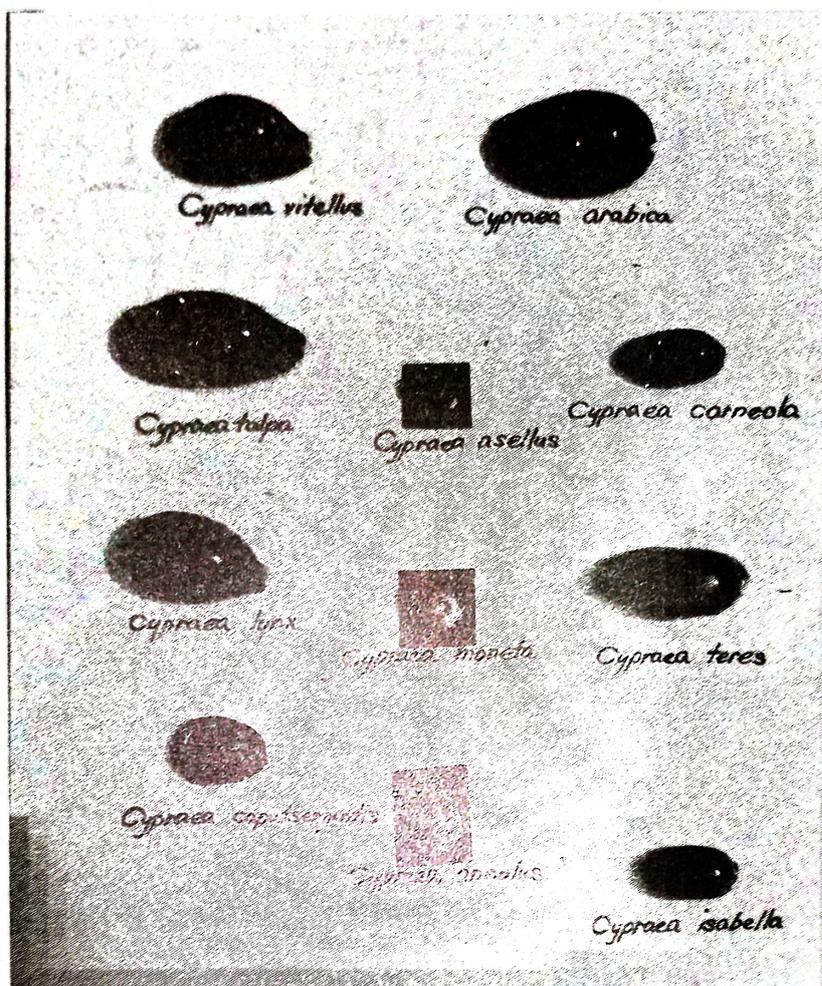


Fig. 2. More Cowries of Mindanao

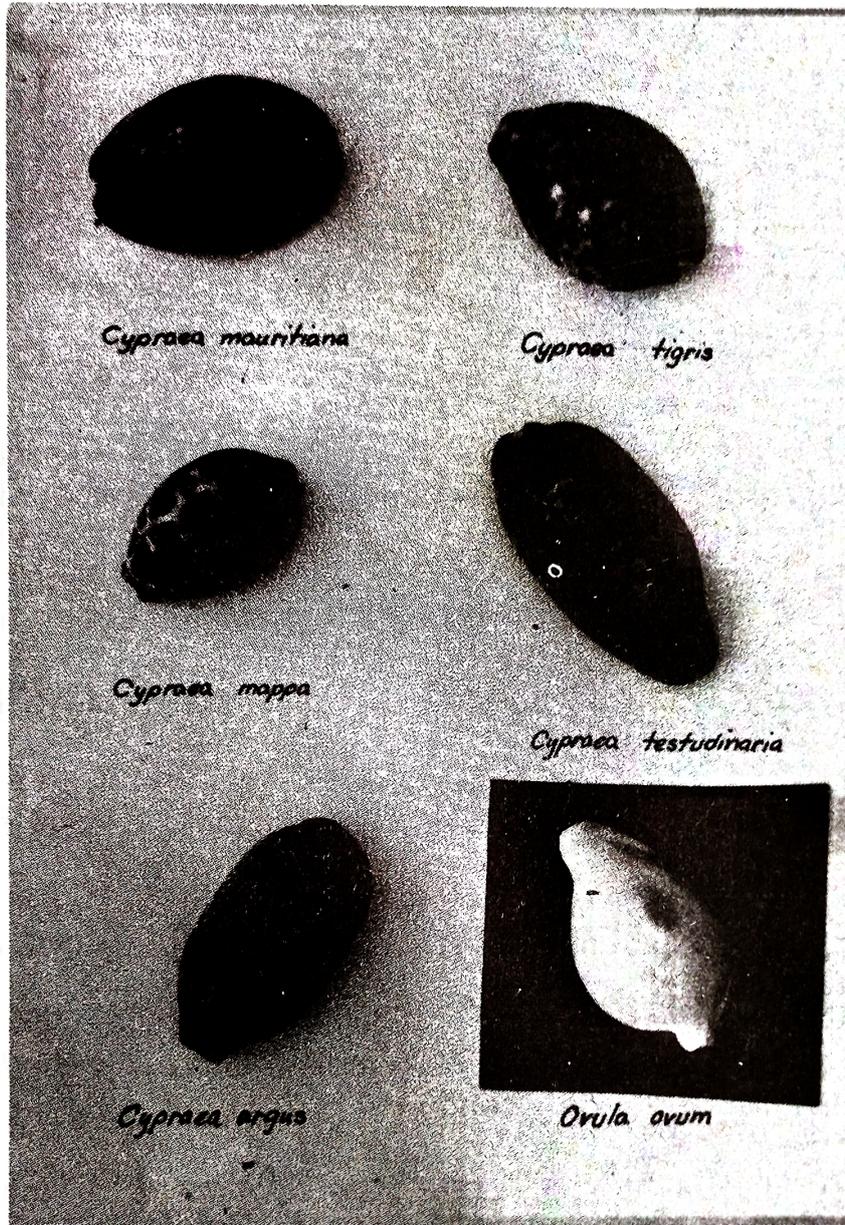


Fig. 3. The bigger Cowries of Mindanao

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APPENDIX 1

List of Cowry species from the different collection sites.

Figures are numbers of specimens collected.

Species	Loreto	Camiguin	Jampason	Baliangao	Laguindingan	Lanuza Bay	Olanivan I.	Kapayas I.	Murcielagos I.	Silinog I.	Sinipay I.	Aligoay I.	Banga I.
Family Cypraeidae													
<u>Cypraea annulus</u> (Linne)	18		9	3	3	45	30	12	30	50		19	1
<u>C. aselus</u> (Linee)						1	1	2	2	7	67	2	2
<u>C. argus</u> (Linee)									1				
<u>C. annulata</u> (Gray)											6		1
<u>C. arabica</u> (Linne)	11	17	19	19	6	50	26	18	27	31	6	24	9
<u>C. boivinii</u> (Linne)		4						1		42	6		
<u>C. carneola</u> (Linne)	1	1	2	2	1	1	7		3	26	12		
<u>C. caputserpentis</u> (Linne)	39	7				11	12	1	13	32	1	42	9
<u>C. cribraria</u> (Linne)	2												
<u>C. caurica</u> (Linne)			4	2									1
<u>C. cylindrica</u> (Born)	1										4		1
<u>C. caputdraconis</u> (Meville)										4			
<u>C. cicercula</u> (Linne)										1			
<u>C. erroneus</u> (Linne)	5			2		2	2	1	2	63	6	3	4
<u>C. erosa</u> (Linne)		3	7				19			5	4	2	
<u>C. felina</u> (Gmelin)							20		1				
<u>C. globulus</u> (Linne)										6			
<u>C. helvola</u> (Linne)									1	24	1		
<u>C. hirundo</u> (Linne)										4		4	
<u>C. isabella</u> (Linne)	1	1	3			1		1	16	29	9	17	3
<u>C. lynx</u> (Linne)	12	8		6		6		1	8	65	24	5	1
<u>C. lutea</u> (Gmelin)										2			
<u>C. mappa</u> (Linne)			4							2		1	
<u>C. mauritiana</u> (Linne)						1							
<u>C. moneta</u> (Linne)	12	2	10			31	77	2	6	41	14	5	5

APPENDIX 1
(Contd.)

<u>C. nebrates</u> (Meville)	5	1										
<u>C. nucleus</u> (Linne)												
<u>C. pallidula</u> (Gaskoin)												
<u>C. quadrimaculata</u> (Gray)										1		
<u>C. reticulata</u> (Martyn)												
<u>C. staphylaea</u> (Linne)			1		1			1	3	1		
<u>C. talpa</u> (Linne)	2	3	2	1	3	3		4	2	3		
<u>C. tigris</u> (Linne)	6		10	11	3	2	1	1	17	7	7	9
<u>C. testudinaria</u> (Linne)	1						1		1			2
<u>C. Teres</u> (Gmelin)	2						1		15	1		3
<u>C. vitellus</u> (Linne)	3		1	24			1	5	1	9	9	2
<u>C. walkeri</u> (Sowerby)							1	2				

Family Ovulidae

<u>Ovula ovum</u> (Linne)	7	2	2			1	1				2
<u>Calpurnus verrucosus</u> (Linne)	31						1	4			1