

MARINE MOLLUSKS OF MURCIELAGOS BAY, NORTHERN MINDANAO, PHILIPPINES

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The members of the expeditionary team from the Natural Science Museum of Mindanao State University in Marawi City organized two separate trips to Murcielagos Bay in Northern Mindanao primarily to collect mollusk specimens for instructional, scientific and display purpose. The first trip, conducted on May 20, 1982, covered the eastern section of the bay, including Kabgan Island and the waters close to the vicinity of Baliangao, Misamis Occidental, while the second trip, made on November 7, 1985, was conducted in the western part including the island of Dako and the islets of Diyot and Pinyahon. The team was composed of two researchers, the author and Mr. Sherwin Nacua, and five other field assistants/divers: Apolonio Kintao, Felomino Duron, Bonifacio Cane, Alipio Makasukit and Danilo Paiso.

Previous record of mollusks from the bay is wanting but information has been gathered that scientists from Silliman University, Dumaguete City, visited the area sometime in 1984. Other than this isolated account nothing about the marine resources of the bay has come out in the literature. Several works, however, dealing with biology, systematics and distribution of the country's marine fauna are available and among these are the studies of Alcasid (1936, 1947); Bartsch (1913); Blanco (1956); Burkholder (1933); Cate (1976); Buenaflor (1977); Haven (1977); Seale (1912); Sotto and von Cosel (1982); Cabrera (1984); Abbot (1962, 1976); Dance (1971, 1976); Oliver (1975) and Tinker (1958).

Materials and Methods

The materials included in this paper are the results of the two expeditions conducted by the museum researchers. Shallow areas up to a depth of four fathoms were sampled by snorkeling, wading and turning over rocks and coral rubbles. Day and night dives were made daily. Diving knives were used to remove species that bore into or attached to hard substrate.

The methods used in cleaning and preparing mollusk specimens were those of S. P. Dance (1971, 1976).

The scientific names are those of Abbot (1962, 1976), Dance (1971, 1976), Cabrera (1984) and Sotto and von Cosel (1982).

The specimens are now deposited in the museum in Marawi City.

Collection Sites

Based on the maps P.C.G.S. 2838 and P.C.G.S. 2839, edition 3, published by the Philippine Coast and Geodetic Survey, Murcielagos Bay is the most northwestern body of water in Mindanao. It lies between $8^{\circ} 37'$ and $8^{\circ} 42'$ North latitude and between $123^{\circ} 29'$ and $123^{\circ} 36'$ East longitude. The bay is situated between the provinces of Misamis Occidental in the east and Zamboanga del Norte in the west. It has an area of approximately 77 sq. km. and its mouth entrance from Punta Miray in the east to Sawang Point in the west is about 8 km. wide (See Figure 1.)

Several islands and islets are found in the bay. Kabgan Island with some satellite islets nearby are located a few hundred meters from Punta Miray close to the eastern corner of the bay entrance. Another big island is Naburos which is situated on the southeastern corner of the bay. The last of the big islands is Sinipay Dako located on the western side about one kilometer east of the nearest point in the mainland. The small islets are situated close to the eastern and western sides of the bay. Sinipay Diyot which has been converted into a private resort lies about 150 meters south of Sinipay Dako while north of this island is Pinyahon which is also privately owned.

Results and Discussion

A list of species and sites of collection are presented in Appendix 1. Only the specimens that have been identified up to species level are included. The list, however, is not complete in many aspects, although most of the species are represented.

A total of 695 and 2,148 specimens were collected from Baliangao and Sinipay expeditions, respectively. From Baliangao, 95 species have been identified representing 39 genera and 31 families. Of the 95 species, 88 (92.60%) are gastropods and the remaining 7 (7.40%) are bivalves.

The Sinipay expedition yielded 182 species from 75 genera and 50 families. Of the 182 species identified, 140 (76.92%) are gastropods and 41 (22.52%) are bivalves. Only one species of scaphopod was identified.

The total number of species then identified from the bay is 210, representing 82 genera and 52 families from 3 classes.

Among the gastropod families listed in Table 1, Family Canidae is represented best by having 26 (15.66%) species. Family Cypraeidae and Family Strombidae are also well represented by 20 (12.05%) species and 18 (10.84%) species, respectively, while only 13 (7.83%) species have been identified, for Family Mitridae. Under Family Trochidae, 9 (5.42%) species have been identified, while only 8 (4.82%) species each, have been listed under Families Cymatiidae, Muricidae and Terebridae. Family Bursidae has with it 7 (4.21%) species identified whereas there are only 6 (3.61%) species listed under Family Naticidae. Two other families, Cerithiidae and Olividae, have 5 (3.01%) species each, while Families Cassididae and Tonnidae have 4 (2.41%) each. Three species each have been identified under Families Turbinidae, Buccinidae and Fascioliidae. Except for Family Harpidae which has 2 (1.20%) species, the remaining families have only 1 (0.60%) species each.

Of the bivalve families listed in Table 2, Family Veneriidae has the most number of species in having 7 (16.28%), while only 5 (11.62%) species have been listed under Family Pectinidae. Four (9.30%) species have been

identified under Family Cardiidae while 3 (6.97%) species each have been identified for Families Arcidae, Spondylidae and Tellinidae. Five other families have 2 (4.65%) species each and include Mytilidae, Pteridae, Tridacnidae, Mactridae and Psamobidae. The remaining families are represented by only one species each.

Of the species listed, eleven are represented by one or two specimens and this may suggest restricted occurrence in the bay. These species are *Dentalium elephantinum*, *Solen roseomaculatus*, *Architectonica perspectiva*, *Conus glaucus*, *Lambis millepeda*, *Mitra praestantissima*, *Colubraria maculosa*, *Apollon gyrinus*, *Cypraea quadrimaculata*, *Atys naucum*, *Turris babylonia*.

Ten other species are new record for the museum and include *Lioconcha ornata*, *Lima lima*, *Architectonica perspectiva*, *Solen roseomaculatus*, *Dentalium elephantinum*, *Conus glaucus*, *Turris babylonia*, *Mitra praestantissima*, *Cypraea quadrimaculata* and *Terebra robusta*.

One very interesting find is the lone specimen of *Dentalium elephantinum*. The specimen was collected during one of the dives off the western coast of Sinipay Dako on a white sandy substratum just a few feet from the outer edge of the eel grass bed, *Thalassia.sp.*, at a depth of about two fathoms. Another species, *Solen roseomaculatus*, was collected in the same area. Specimens of both species were already empty at the time of collection.

Acknowledgments

The members of the expeditionary team are sincerely grateful to the Offices of the Finance Director, Accounting Division, Cashier's Division, Vice President for Administration and Finance, Vice President for Academic Affairs, and the Office of the President, all of MSU, for funding the expeditions; Dr. Mamitua Saber for the encouragement; Barangay Captain and Mrs. Reynaldo Jumalon for the hospitality and kindness extended; Mr. Leonardo Marimon for providing camping area and for acting as the field guide; Mrs. Gliceria Añana, Barangay Captain of Punta Miray gave

permission to collect in the waters within her jurisdiction; Oscar Senahon and Rico Alingal operated the boat.

Prof. Jim Cabrera, conchologist, National Museum of the Philippines, identified some of the gastropod specimens. Prof. Filipinas Sotto did the identification of the bivalves with the facilities of the University of San Carlos, Cebu City. To their unselfish efforts, our sincere appreciation is due.

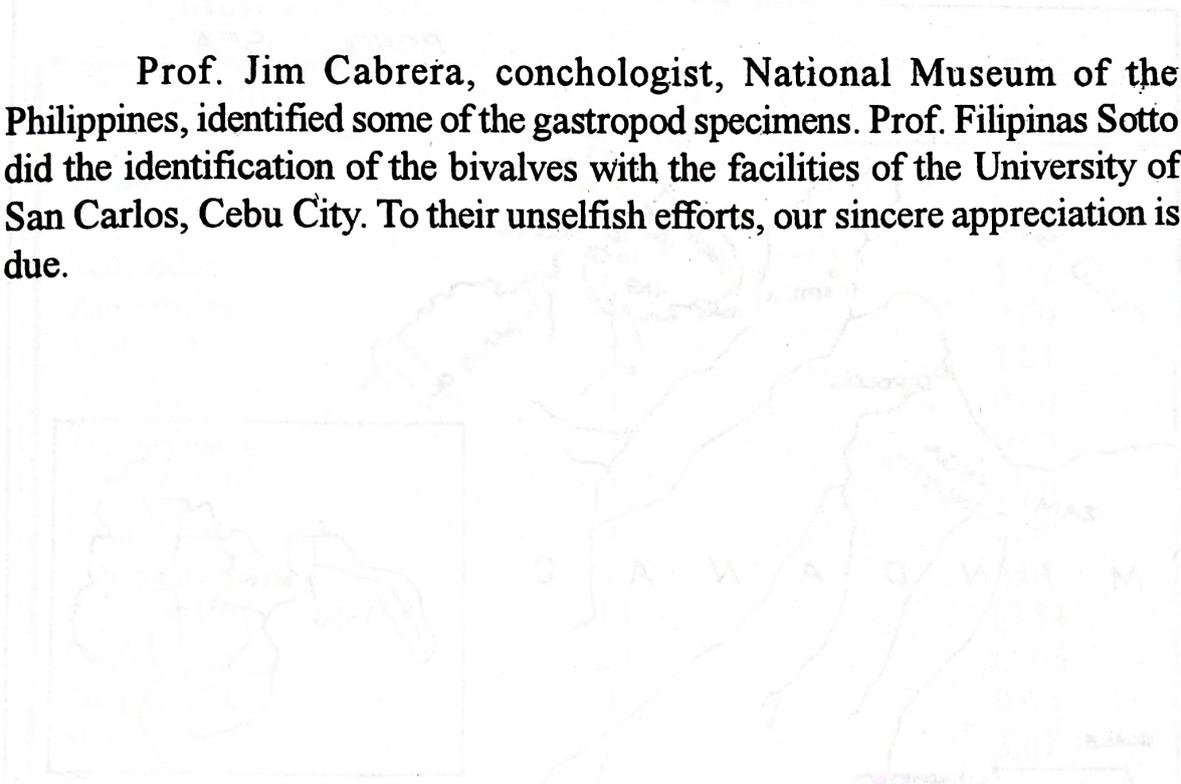


Fig. 1. Map of the Philippines showing the location of the study area.

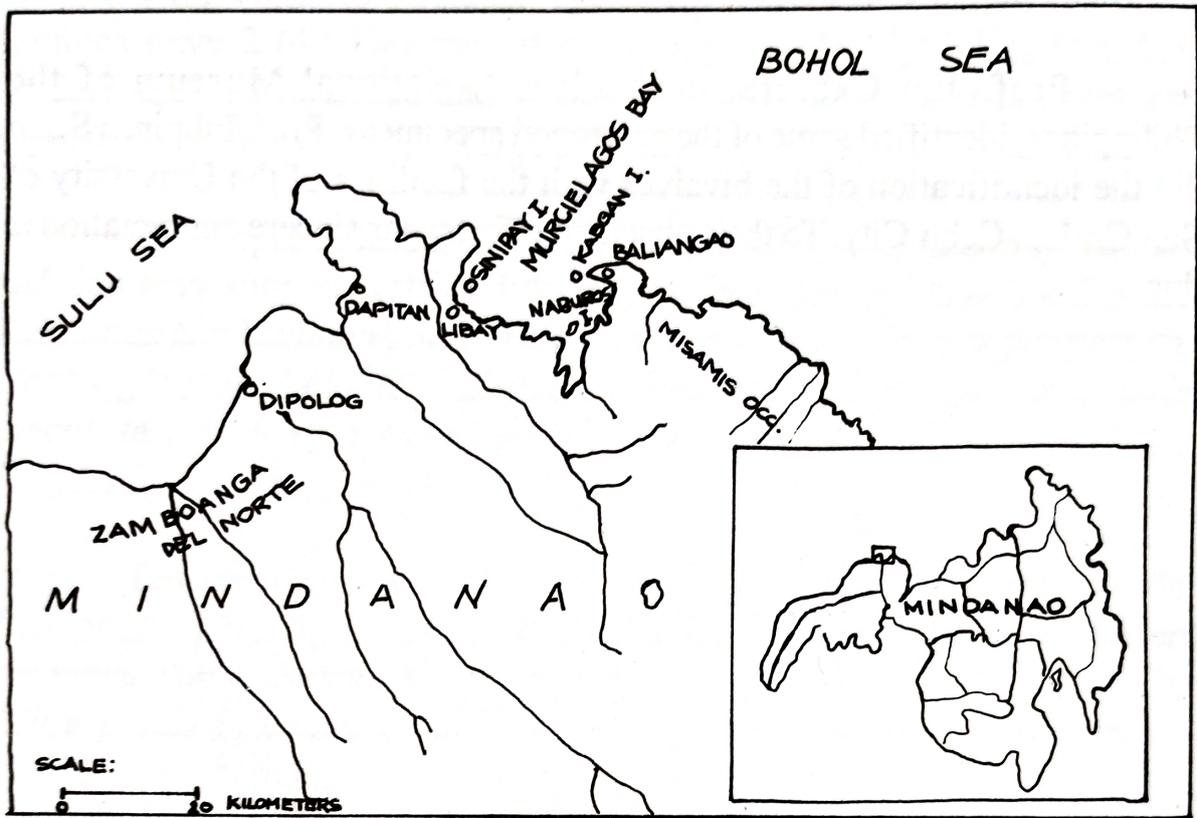


Fig. 1. Murcielagos Bay, Northern Mindanao.

Table 1. Number of species from each Gastropod family recorded from Murcielagos Bay.

Family	Number of Species	O/O
Haliotidae	1	0.60
Acmaeidae	1	0.60
Trochidae	9	5.42
Angariidae	1	0.60
Turbinidae	3	1.81
Neritidae	1	0.60
Turritellidae	1	0.60
Architectonicidae	1	0.60
Modulidae	1	0.60
Cerithiidae	5	3.01
Strombidae	18	10.84
Cypraeidae	20	12.05
Ovulidae	1	0.60
Naticidae	6	3.61
Cassidae	4	2.41
Cymatiidae	8	4.82
Bursidae	7	4.21
Tonnidae	4	2.41
Muricidae	8	4.82
Buccinidae	3	1.81
Nassariidae	1	0.60
Fasciolaridae	3	1.81
Olividae	5	3.01
Mitridae	13	7.83
Vasidae	1	0.60
Harpidae	2	1.20
Volutidae	1	0.60
Turridae	1	0.60
Canidae	26	15.66
Terebridae	8	4.82
Atyidae	1	0.60
Bullidae	1	0.60

Table 2. Number of Species from each Pelecypod family.

Family	Number of Species	O\O
Arcidae	3	6.97
Glycemeridae	1	2.32
Mytilidae	2	4.65
Pteridae	2	4.65
Malleidae	1	2.32
Pectinidae	5	11.62
Spondylidae	3	6.97
Limidae	1	2.32
Fimbriidae	1	2.32
Cardiidae	4	9.30
Tridachnididae	2	4.65
Mactridae	2	4.65
Solenidae	1	2.32
Tellinidae	3	6.97
Psammobiidae	2	4.65
Veneriidae	7	16.28
Anomiidae	1	2.32
Grypaeidae	1	2.32
Isognomonidae	1	2.32

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APPENDIX 1

List of shelled mollusks from Murcielagos Bay.

Mollusks	Expedition Sites	
	Baliangao	Sinipay Island
I. Class Gastropoda		
Family Haliotidae		
<i>Haliotis asinina</i> (Linne)		x
Family Acmaeidae		
<i>Acmaea saccharina</i> (Linne)		x
Family Trochidae		
<i>Monodonta canalifera</i> (Lamarck)		x
<i>Trochus conus</i> (Gmelin)		x
<i>Trochus incrassatus</i> (Lamarck)		x
<i>Trochus niloticus</i> (Linne)		x
<i>Trochus tubiferus</i> (Kiener)	x	x
<i>Tectus fenestratus</i> (Gmelin)		x
<i>Tectus pyramis</i> (Born)	x	x
<i>Chrysostoma paradoxum</i> (Born)		x
Family Angariidae		
<i>Angaria delphinus</i> (Linne)	x	x
Family Turbinidae		
<i>Astraea calcar</i> (Linne)	x	x
<i>Astraea rodostoma</i> (Lamarck)	x	x
<i>Turbo chrysostomus</i> (Linne)	x	x
Family Neritidae		
<i>Nerita plicata</i> (Linne)	x	

Family Turritellidae

<i>Turritela terebra</i> (Linne)	x		
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Family Architectonicidae

<i>Architectonica perspectiva</i> (Linne)		x	x
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Family Modulidae

<i>Modulus tectus</i> (Bmelin)			x
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Family Cerithiidae

<i>Cerithium aluco</i> (Linne)	x		x
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<i>Cerithium nodulosum</i>	x		x
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<i>Cerithium asper</i> (Linne)	x		x
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<i>Cerithium sinensis</i> (Gmelin)	x		x
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<i>Cerithium vertagus</i> (Linne)	x		x
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Family Strombidae

<i>Terebellum terebellum</i> (Linne)			x
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<i>Lambis chiragra</i> (Linne)			x
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<i>Lambis lambis</i> (Linne)			x
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<i>Lambis millepeda</i> (Linne)			x
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<i>Lambis scorpios</i> (Linne)	x		
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<i>Strombus aurisdiane</i> (Linne)	x		x
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<i>Strombus bulla</i> (Roding)			x
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<i>Strombus canarium</i> (Linne)	x		x
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<i>Strombus erythrinus</i> (Dillwyn)			x
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<i>Strombus gibberulus</i> (Linne)	x		x
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<i>Strombus urceus incissus</i> (Wood)			x
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<i>Strombus lentiginosus</i> (Linne)	x		x
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<i>Strombus luhuanus</i> (Linne)	x		x
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<i>Strombus mutabilis</i> (Swainson)	x		x
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<i>Strombus plicatus</i> (Roding)			x
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<i>Strombus urceus</i> (Linne)	x		x
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<i>Strombus sinuatus</i> (Lightfoot)	x		
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<i>Strombus vittatus</i> (Linne)		x	
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Family Cypraeidae

<i>Cypraea annulus</i> (Linne)	x	x
<i>Cypraea arabica</i> (Linne)	x	x
<i>Cypraea asellus</i> (Linne)		x
<i>Cypraea boivinii</i> (Kiener)		x
<i>Cypraea caputserpentis</i> (Linne)		x
<i>Cypraea carneola</i> (Linne)	x	x
<i>Cypraea cylindrica</i> (Born)		x
<i>Cypraea erosa</i> (Linne)		x
<i>Cypraea erronea</i> (Linne)	x	x
<i>Cypraea helvola</i> (Linne)		x
<i>Cypraea isabella</i> (Linne)		x
<i>Cypraea lynx</i> (Linne)	x	x
<i>Cypraea moneta</i> (Linne)		x
<i>Cypraea nebrites</i> (Melville)		x
<i>Cypraea quadrimaculata</i> (Gray)	.	x
<i>Cypraea talpa</i> (Linne)	x	x
<i>Cyp[raea] teres</i> (Gmelin)		x
<i>Cypraea tigris</i> (Linne)	x	x
<i>Cypraea vitellus</i> (Linne)	x	x
<i>Cypraea caurica</i> (Linne)	x	

Family Ovulidae

<i>Ovula ovum</i> (Linne)	x	x
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Family Naticidae

<i>Natica fasciata</i> (Roding)		x
<i>Natica onca</i> (Roding)		x
<i>Natica stellata</i> (Heddey)		x
<i>Polinices flemingiana</i> (Necluz)x		x
<i>Polinices maurus</i> (Lamarck)		x
<i>Polinices tumidus</i> (Swainson)		x

Family Cassidae

<i>Phalium bancatum</i> (Perry)		x
<i>Casmaria erinaceous</i> (Linne)	x	x

<i>Casmaria ponderosa</i> (Gmelin)	x	x
<i>Cassis cornuta</i> (Linne)	x	x
Family Cymatiidae		
<i>Apollon gyrinus</i> (Linne)		x
<i>Cymatium muricinum</i> (Roding)		x
<i>Cymatium nicobaricum</i> (Roding)		x
<i>Cymatium pileari</i> (Linne)		x
<i>Cymatium pyrum</i> (Linne)		x
<i>Cymatium tabulatum</i> (Menke)		x
<i>Colubraria maculosa</i> (Gmelin)		x
<i>Distorsio anus</i> (Linne)	x	x
Family Bursidae		
<i>Bursa bubo</i> (Linne)	x	x
<i>Bursa bufonia</i> (Gmelin)		x
<i>Bursa cruentata</i> (Sowerby)		x
<i>Bursa granularis</i> (Roding)	x	x
<i>Bursa rosa</i> (Perry)		x
<i>Bursa rubeta</i> (Linne)	x	x
<i>Bursa nobilis</i> (Reeve)	x	
Family Tonnidae		
<i>Tonna canaliculata</i> (Linne)	x	x
<i>Tonna perdix</i> (Linne)		x
<i>Tonna tessellata</i> (Lamarck)		x
<i>Malea pomum</i> (Linne)		x
Family Muricidae		
<i>Chicoreus brunneus</i> (Link)	x	x
<i>Chicoreus sauliae</i> (Reeve)		x
<i>Drupa grossularia</i> (Roding)	x	x
<i>Drupa rubisidaeus</i> (Roding)	x	
<i>Drupa ricinus</i> (Linne)	x	
<i>Morula margariticola</i> (Broderip)		x
<i>Drupella cornus</i> (Linne)		x
<i>Murex tribulus</i> (Linne)	x	

Family Buccinidae

<i>Cantharus fumosus</i>			x
<i>Cantharus undosus</i> (Linne)	x		x
<i>Cantharus rubiginosus</i> (Reeve)	x		

Family Nassariidae

<i>Nassarius coronatus</i> (Bruguire)			x
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Family Fasciolaridae

<i>Latirus turritus</i> (Gmelin)			x
<i>Latirus polygonus</i> (Gmelin)	x		
<i>Fusinus colus</i> (Linne)	x		

Family Olividae

<i>Oliva annulata</i> (Gmelin)			x
<i>Oliva miniacea</i> (Roding)		x	x
<i>Oliva oliva</i> (Linne)	x		x
<i>Oliva reticulata</i> (Roding)		x	x
<i>Oliva vidua</i> (Roding)			x

Family Mitridae

<i>Vexillum rugosum</i> (Gmelin)	x		x
<i>Vexillum plicarium</i> (Linne)	x		x
<i>Vexillum vulpecula</i> (Linne)	x		
<i>Mitra cardinalis</i> (Gmelin)			x
<i>Mitra coronata</i> (Lamarck)			x
<i>Mitra eremitarium</i> (Roding)	x		x
<i>Mitra incompta</i> (Lightfoot)	x		
<i>Mitra mitra</i> (Linne)			x
<i>Mitra papalis</i> (Linne)	x		
<i>Mitra praestantissima</i> (Roding)			x
<i>Mitra puncticulata</i> (Lamarck)			x
<i>Mitra stictica</i> (Link)	x		
<i>Strigatella paupercula</i> (Linne)			x

Family Vasidae		
<i>Vasum turbinellum</i>	x	x
Family Harpidae		
<i>Harpa major</i> (Roding)		x
<i>Harpa articularis</i> (Lamarck)	x	
Family Volutidae		
<i>Cymbiola vesperilio</i>	x	x
Family Turridae		
<i>Turris babylonia</i> (Linne)		x
Family Canidae		
<i>Conus arenatus</i> (Hwass)		x
<i>Conus carinatus</i> (Swainson)	x	
<i>Conus coronatus</i> (Gmelin)	x	
<i>Conus capitaneus</i> (Linne)		x
<i>Conus flavidus</i> (Lamarck)		x
<i>Conus generalis</i> (Linne)	x	x
<i>Conus glans</i> (Linne)		x
<i>Conus imperialis</i> (Linne)		x
<i>Conus literatus</i> (Linne)	x	
<i>Conus magus</i> (Linne)		x
<i>Conus marmoreus</i> (Linne)		x
<i>Conus miles</i> (Linne)		x
<i>Conus miliaris</i> (Hwass)		x
<i>Conus moreleti</i> (Crosse)		x
<i>Conus mustelinus</i> (Hwass)		x
<i>Conus nigropunctatus</i> (Sowerby)		x
<i>Conus nussatela</i> (Linne)		x
<i>Conus omaria</i> (Hwass)		x
<i>Conus planorbis</i> (Born)	x	x
<i>Conus rattus</i> (Hwass)	x	x
<i>Conus stercomuscarum</i> (Linne)		x
<i>Conus striatus</i> (Linne)	x	x
<i>Conus textile</i> (Linne)	x	x
<i>Conus varius</i> (Linne)		x
<i>Conus vexillum</i> (Gmelin)		x
<i>Conus virgo</i> (Linne)	x	x

Family Terebridae

<i>Terebra affinis</i> (Gray)			X
<i>Terebra areolata</i> (Link)	X		X
<i>Terebra crenulata</i> (Linne)		X	X
<i>Terebra dimidiata</i> (Linne)			X
<i>Terebra guttata</i> (Roding)			
<i>Terebra maculata</i> (Linne)		X	X
<i>Terebra robusta</i> (Hinds)			X
<i>Terebra subulata</i> (Linne)		X	X

Family Atyidae

<i>Atya naucum</i> (Linne)			X
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Family Bullidae

<i>Bulla ampulla</i> (Linne)	X		X
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II. Class Scaphopoda

Family Dentaliidae

<i>Dentalium elephantinum</i> (Linne)			X
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III. Class Pelecypoda

Family Arcidae

<i>Arca navicularis</i> (Bruguiere)	X		
<i>Barbatia bicolorata</i> (Dillwyn)			X
<i>Anadara maculosa</i> (Reeve)			X

Family Glycemeridae

<i>Glycemeris amboinensis</i> (Gmelin)			X
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Family Mytilidae

<i>Mytilus smaragdinus</i> (Talavera & Faustino)			X
<i>Modiolus philippinarum</i>			X

Family Pteridae

<i>Pinctada margaritifera</i> (Linne)			x
<i>Pinctada maculata</i> (Gould)			x

Family Malleidae

<i>Malleus malleus</i> Linne)			x
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Family Pectinidae

<i>Chlamys pallium</i> (Linne)			x
<i>Chlamys senatorius</i> (Gmelin)			x
<i>Chlamys squamosa</i> (Gmelin)		x	x
<i>Pecten tigris</i>			x
<i>Pecten radula</i> (Linne)			x

Family Spondylidae

<i>Spondylus ducalis</i> (Roding)		x	x
<i>Spondylus regrius</i> (Linne)	x		x
<i>Spondylus butleri</i>			x

Family Limidae

<i>Lima lima</i> (Linne)			x
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Family Fimbriidae

<i>Fimbria fimbriata</i> (Linne)			x
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Family Cardiidae

<i>Cardium haemicardium</i>			x
<i>Corculum cardissa</i> (Linne)			x
<i>Laevicardium flavum</i> (Linne)			x
<i>Laevicardium substratum</i>			x

Family Tridacnidae

<i>Tridacna crocea</i> (Lamarck)			x
<i>Tridacna maxima</i> (Roding)		x	x

Family Mactridae

<i>Mactra veneriformes</i> (Reeve)			x
<i>Mactra violacea</i> (Gmelin)			x

Family Solenidae

Solen roseomaculatus x

Family Tellinidae

Tellina linguafelis (Linne) x

Tellina perna (Spengler) x

Tellina remies (Linne) x

Family Psammobiidae

Asaphis dichotoma (Anton) x

Asaphis violascens (Forsk.) x

Family Veneridae

Venus puerpera (Linne) x

Venus clathrata x

Gafrarium pectinatum (Linne) x

Lioconcha castrensis (Linne) x

Lioconcha ornata (Dillwyn) x

Pitar pellucidus (Cernohorsky) x

Tapes literatus (Linne) x

Family Anomiidae

Placuna sella (Gmelin) x

Family Grypaeidae

Pycnodonte hyotis (Linne) x

Family Isognomonidae

Isognomon isognomum (Linne) x