

GASTROPODS ON REEF FLATS AT PENJALIRAN BARAT ISLAND, JAKARTA BAY

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ABSTRACT

Forty-five species of gastropods in 27 genera were collected along transect lines and identified. A total of 35 species were associated with hard substrata and 10 species with soft sediment. Four species have commercial value: *Halotis varia*, *Trochus niloticus*, *Lambis lambis*, and *Pleuroploca trapezium*. *Trochus niloticus* has been declared endangered species by The Indonesian Minister of Forestry.

INTRODUCTION

Molluscs from North Java waters, including the Seribu Islands, have been listed by Martosewojo *et al.* 1980, Kastoro *et al.* 1980, Aswandy *et al.* 1991, and Roberts *et al.* 1982. In this study we collected gastropods from the reef flats along the coast of Penjaliran Barat Island, which is protected from all human activities, except for research (Departemen Kehutanan 1994). The island is part of the larger national park area (Taman Nasional Laut Kepulauan Seribu (TNLKS)) established by Minister of Forestry's decree No. 527/Kpts/Um/7/1982 (PPTNLPS 1989) to protect marine natural resources in that area.

MATERIAL AND METHODS

Reef flats in four directions of the compass were studied on Penjaliran Barat Island (Fig. 1) from 2-9 March 1996 (transition period between west monsoon and east monsoon) and 31 July to 3 August 1996 (east monsoon).

Using manta tow as suggested by AIMS (1994), a preliminary survey was conducted in October 1995 (transition period between west monsoon and east monsoon). Based on that survey, 5 stations were determined: one in the east (StE, 300 m transect), west (StW,

140 m transect), and north (StN, 10 m transect) respectively, and 2 stations in the south, to the west (StS1, 100 m transect) and

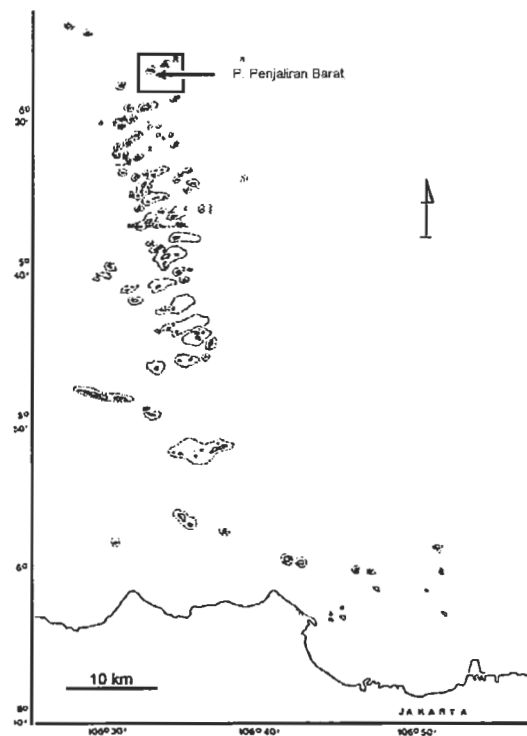


Figure 1. Penjaliran Barat Island in Seribu Islands National Park, Jakarta Bay. (Puslitbang Oseanologi 1989)

Table 1. Presence (+) or absence (0) of gastropods at 5 sites on reef flats of Penjaliran Barat Island. Number of samples in brackets.

Taxa	Stations (samples)				
	S1 (5)	S2 (5)	W (7)	E (15)	N (1)
Prosobranchia					
Haliotidae					
<i>Haliotis varia</i>	0	0	0	+	0
Fissurellidae					
<i>Diodora lineata</i>	+	+	0	0	0
Trochidae					
<i>Tectus pyramis</i>	0	+	0	0	0
<i>Trochus sp.</i>	0	+	0	0	0
<i>Trochus niloticus</i>	0	+	+	+	0
Turbinidae					
<i>Astraea calcar</i>	+	+	0	0	0
<i>Turbo brunneus</i>	0	0	+	0	0
Neritidae					
<i>Nerita albicilla</i>	0	0	0	0	+
<i>Nerita chameleon</i>	0	0	0	0	+
<i>Nerita planospira</i>	0	0	0	0	+
<i>Nerita polita</i>	0	0	0	0	+
<i>Nerita undata</i>	0	0	+	0	+
Planaxidae					
<i>Planaxis sulcatus</i>	0	0	0	0	+
Cerithiidae					
<i>Cerithium columna</i>	0	0	0	+	+
<i>Clypeomorus moniliferus</i>	0	0	+	0	+
Strombidae					
<i>Lambis lambis</i>	+	0	0	+	0
<i>Strombus mutabilis</i>	0	+	0	0	0
<i>Strombus urceus</i>	0	0	+	+	0
Cypraeidae					
<i>Cypraea annulus</i>	+	+	0	+	+
<i>Cypraea arabica</i>	+	+	+	+	0
<i>Cypraea caputserpentis</i>	0	0	+	0	0
<i>Cypraea cylindrica</i>	0	0	+	+	0
<i>Cypraea lynx</i>	0	+	+	0	0
<i>Cypraea moneta</i>	0	+	+	+	0
<i>Cypraea vitellus</i>	+	0	0	0	0

east of the pier (StS2, 100 m transect) respectively.

At each station, a transect line was drawn perpendicular to the coast line from the beach to the reef edge. Sampling was carried out for every 20 m along the line. Molluscs were collected within quadrates of 1x1 m. Soft bottom substrata were dug to a depth of 5 cm and sieved through 0.8 mm mesh size. On hard bottom substrate, molluscs were collected upon encounter. Specimens were preserved in 10% formalin.

Taxa (continued)	Stations (samples)				
	S1 (5)	S2 (5)	W (7)	E (15)	N (1)
Naticidae					
<i>Natica sp.</i>	+	0	0	0	0
Muricidae					
<i>Chicoreus torrefactus</i>	0	+	0	0	0
<i>Cronia margariticola</i>	+	+	+	+	+
<i>Morula biconica</i>	0	0	0	+	0
<i>Thais aculeata</i>	0	0	+	+	0
Buccinidae					
<i>Cantharus fumosus</i>	0	0	+	0	0
<i>Cantharus undosus</i>	0	0	+	+	0
<i>Engina alveolata</i>	+	0	+	+	+
<i>Engina zonalis</i>	0	0	+	+	0
Columbellidae					
<i>Pyrene ocellata</i>	0	0	0	+	+
<i>Pyrene testudinaria</i>	0	0	+	+	+
Melongenidae					
<i>Melongena galeodes</i>	0	+	0	+	+
Fascioliariidae					
<i>Pleuroploca filamentosa</i>	0	+	+	+	0
<i>Pleuroploca trapezium</i>	0	0	0	+	0
Vasidae					
<i>Vasum ceramicum</i>	0	+	0	0	0
Mitridae					
<i>Mitra aurantia</i>	0	0	+	0	0
<i>Mitra eremitarum</i>	0	0	0	+	0
Conidae					
<i>Conus marmoreus</i>	0	0	+	0	+
<i>Conus textile</i>	0	0	0	+	0
PULMONATA					
I. Bassomatophora					
Siphonariidae					
<i>Siphonaria atra</i>	0	0	0	+	0

At StS1 and S2, two samplings were done on sandy coral substratum, 2 from dead coral, and 1 from living coral. At StW, two samples were from muddy sand, 4 from sandy dead coral, and 1 from living coral. At StE, two samplings were from muddy sand, 6 from sandy sea grass bed, 4 from sandy dead coral, 2 from dead coral, and 1 from living coral. St N was sampled at random.

RESULTS

The distance from the beach to the reef edge varied considerably along the coast. The substrata were clearly zoned. At StS, a sandy zone extended 40 m seaward, from the beach, followed by 40 m sandy dead coral, and 20 m living corals. At StE, a 40 m zone of muddy sand was followed by 120 m sandy

sea grass bed, 120 m dead coral, and 20 m living coral. At StW, a zone of 40 m muddy sand was followed by 80 m dead coral, and 20 m living coral. At StN the substratum was fragments of dead coral and only about 10 m from a mangrove.

A total of 45 species of gastropods in 2 subclasses, 4 orders, 19 families, and 27 genera were collected in these habitats. The species are listed in Table 1.

DISCUSSION

One species of the Subclass Pulmonata was collected: *Siphonaria atra*. This species is adapted to live in the upper intertidal (Purchon 1977 & Roberts *et al.* 1982).

The reef flats at Penjaliran Barat Island consist mainly of stones, dead corals, and living coral. Therefore, 35 of the collected species were associated with hard bottom. Only 10 burrowing species were found: *Lambis* (1 species), *Strombus* (2 species), *Natica* (1 species), *Melongena* (1 species), *Mitra* (2 species), and *Conus* (2 species). *Lambis* and *Strombus* were found in sand among algal covered dead coral. *Melongena* lived in muddy sand near a mangrove at a sheltered beach. *Mitra* and *Conus* were found on sand under boulders. These findings are in accordance with previous records (Abbott 1961; Boneka *et al.* 1994; Roberts *et al.* 1982; Cernohorsky 1976; Wilson (1993b). According to Mudjiono (1989), *Conus* spp. are nocturnal. They hide under boulders or burrow in the sand during day time.

Natica sp. was only encountered in the upper zone of StS1-1. The water was calmer than at other stations and the sand was thicker enabling *Natica* to burrow and search for prey (Kabat 1990; Wilson 1993a).

Only 4 of the encountered species have commercial value: *Haliotis varia*, (Kaligis 1994) *Trochus niloticus* (Nessa *et al.* 1995), *Lambis lambis* (Boneka *et al.* 1994), and *Pleuroploca trapezium* (Edward & Ayyakkannu 1992).

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REFERENCES

- AIMS (Australian Institute of Marine Science). 1994. Survey manual for tropical marine resources. AIMS, Townsville: xii + 368 hlm.
- Abbott, R.T. 1960. The Genus *Strombus* in the Indo-Pacific. - Indo-Pacific Mollusca 1 (2): 33-146.
- Abbott, R.T. 1961. The Genus *Lambis* in the Indo-Pacific. - Indo-Pacific Mollusca 1(3): 147-174.
- Aswandy, I., W.W. Kastoro, A. Azis, I.A. Hakim & Mudjiono. 1991. Distribution, abundance and species composition of macrobenthos in Seribu Islands, Indonesia. Dalam. - Proceeding of the Regional Symposium on Living Resources in Coastal Areas. Manila, 30 January - 1 February: 183-206.
- Boneka, F.B., M. Ompi & J.A.P. Andaki. 1994. Occurrence of the common spider shell, *Lambis lambis* (L.) (Gastropoda: Strombidae) in the intertidal zone of Karatung, Sangihe Island, Indonesia. - Phuket mar. biol. Cent. Spec. Publ. 13: 159-161.
- Cernohorsky, W.O. 1976. The Mitridae of the world. Part I. The Subfamily Mitrinae. - Indo-Pacific Mollusca 3(17): 237-528.
- Departemen Kehutanan. 1994. Rencana karya lima tahun: 1 April 1994 sampai 31 Maret 1999 TNLKS. Proyek Pembinaan TNLKS tahun 1992/1993, Jakarta: xii + 109 hlm.
- Edward, J.K. Patterson & K. Ayyakkannu. 1992. Economic importance of the gastropod *Fasciolaria trapezium*, an

- important seafood resource along the Southeast coast of India. - Phuket mar. biol. Cent. Spec. Publ. **10**:17-19.
- Kabat, A.R. 1990. Predatory ecology of naticid gastropods with a review of shell boring predation. - *Malacologia* **32**(1): 155-193.
- Kaligis, G.J.F. 1994. Intertidal abalones on the coast of North Sulawesi: A survey of the distribution and abundance of *Haliotis varia* and *H. asinina*. - Phuket mar. biol. Cent. Spec. Publ. **13**: 153-156.
- Kastoro, W., A. Djamali & B.S. Sudibyo. 1980. Penelaahan tentang komunitas moluska di perairan Teluk Jakarta. Dalam: Nontji, A. & A. Djamali (eds.). 1980. Teluk Jakarta: Pengkajian fisika, kimia, biologi, dan geologi tahun 1975-1979. LON-LIPI, Jakarta: 249-269.
- Martosewodjo, S., B.S. Sudibjo, V. Toro, & A. Djamali. 1980. Penyebaran bentos di perairan Teluk Jakarta. Dalam: Nontji, A. & A. Djamali (eds.). 1980. Teluk Jakarta: Pengkajian fisika, kimia, biologi, dan geologi tahun 1975-1979. LON-LIPI, Jakarta: 217-225.
- Mudjiono. 1989. Jenis-jenis keong laut berbisa dari Suku Conidae (Mollusca: Gastropoda) dan beberapa aspek biologinya. - *Oseana* **14**(3): 73-80.
- Nessa, M.N., A. Rahman & M. Hatta. 1995. Studi reproduksi, penyebaran, dan kepadatan *Trochus* spp. Dan *Tectus* spp. Di Taman Nasional Laut Taka Bonerate. - *Torani Buletin Ilmu Kelautan* **5**(5): 96-107.
- PPTNLPS (Proyek Pembinaan Taman Nasional Laut Pulau Seribu). 1989. Laporan inventarisasi fauna karang dan ikan hias di kawasan TNLKS. Departemen Kehutanan, Direktorat Jendral Perlindungan Hutan dan Pelestarian Alam, Jakarta: vii + 45 hlm.
- Puslitbang Oseanologi LIPI. 1989. Panduan wisata bahari Pulau Genteng dan sekitarnya. Proyek Penelitian Pengembangan Sumber Daya Laut LIPI, Jakarta: iv + 42 hlm.
- Purchon, R.D. 1977. The biology of the Mollusca. 2nd ed. Pergamon Press, Oxford: xi + 332 pp.
- Roberts, D., S. Soemodihardjo & W. Kastoro. 1982. Shallow water marine molluscs of the North-West Java. LON-LIPI, Jakarta: xvi + 143 hlm.
- Wilson, B. 1993a. Australian marine shells. Prosobranch gastropods. Part I. Odyssey Publishing, Kallaroo: 408 pp.
- Wilson, B. 1993b. Australian marine shells. Prosobranch gastropods. Part II. Odyssey Publishing, Kallaroo: 370 pp.