

NOTES ON THE MOLLUSCAN FAUNA
OF PULAU PARI

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Introduction

Among the scores of islands that make up "Pulau Seribu", Pulau Pari is ecologically interesting. It is composed of five small islands united by a common, distantly located, outer reef. Collectively they offer a long beach line easily within our reach. The vast intertidal area, the uneven bottom topography and the nature of the bottom, give rise to different kind of habitats from which we may expect different biotic populations.

This paper deals with the molluscan fauna of The island with special reference to the local distribution of gastropods and pelecypods. It is based on observation made in 1966 and on, the work of Gooding (1969). who gives a preliminary report on the topography, hydrography and general biology of the island.

About the island

The five islands constituting Pulau Pari are: Pulau Burung, Pulau Tengah, Pulau Kongsu, Pulau Kampung and Pulau Pari sensu striato. They were closely packed and connected

to one another by shallow sand flat or lagoon. As regard to the size, Pulau Pari s.s. far exceeded the other four islands. for the most part, the vast intertidal area was of sandy bottom. All islands showed quite similar ecological condition, therefore they were treated here as a single ecological unit. Three main types of habitats were noted: sand flat, mud flat and lagoon.

The sand flat formed the greentoot portion of the ~~intertidal~~ area, extending from the island proper to the edge of the outer reef. The sea floor near the land was dried off at low tide: toward the open sea it gradually sloped down, reaching a depth of 1.5 meter or so, then, immediately behind the outer reef, it arised suddenly to form a reef rampart. This reef rampart was made up of shingles and broken corals heaped up at the edge of the outer reef by wave action, forming a continuous tract that reflected the actual outline of the outer reef itself. It was exposed off above sea surface at low tide.

Nine lagoons occurred in the complex (Gooding, 1969), two were large and the rest were small. The greatest depth of the lagoon measured by Gooding was 16 meters. He further stated that the floor of ell the lagoons was slit overlaying sand.

The mud flat formed only small portion of the complex, occurring near the land mass east of Pulau Burung and Pulau Tengah, and at the north-western side of Pulau Pari Fazi ,

associated usually with mangrove patches. The mud flat ~~was~~
-black and soft with typical odour of decomposing organic
debris. Away from, the land the thick mud gradually gave
~~way~~ to the sand.

Molluscs population

More than 80 species of molluscs were collected from, the island, occupying the different habitats. Pelecypoda and gastropods were the most important as considered, from the number of species representing them. Other classes of Molusca were represented only by very few/ species. To date only two species of Chitonida. and two species of Seaphopoda had "been collected. The cephalopods, except for a small species of octopus. lived mostly in the open water, hence could not be considered as inhabiting the island, though they may sometimes be collected in the lagoon during night fishing operations. For the above reasons, our discussion will be confined to the class Pelecypoda and Gastropoda.

The sandflat was inhabited by various species of gastropoda and pelecypods; some were found in a considerable number. Walking across the sand flat I noticed, a definite pattern of distribution of the gastropods. In other words, same sorts of zonation seemed to exist, though clear-cut boundary between two successive zones was difficult to make, since overlapping ~~occurred between them.~~

The first zone would be referred to as nerite zone,

named after the most populous genus in the area, the Nerita. Several species shared the place, e.g. Nerita polita. N. albicilla. H., undata. ffp, chameleon and N. plicata. Other gastropods lived here were Littorina - scarba and Planaxis sulcatus. creeping on the root of mangroves or pandanus trees that grew at the water edge. A species of pelecypod, Mesodesma, glabrata. infested the beach sand.

The next zone was cerithid zone; the dominant species here was Cerithium vertagus,. This zone stretched out from the mean sea level to several decades meters seaward. The sandy sea floor might be completely dried off or partly covered by thin layer of water at low tide. Other gastropods that also lived here/several species of. Nassa, Polynces and Hatica Though numerically insignificant compared to C. vertagus. they were not/all rare. The bivalves consistedL mainly of Modiolus sp., Pinna muricata Malleus regula and Isognoiaon isognonon.

The third Zonne would be strombid zone; Strombus gibberulus was the dominant- species. Overlappingg, with the proceeding zone was evident where, over a wide border line, Strombus, gibberulus was nixed up with Cerithium vertagus, which were still found in great number. The sea floor maintained a layer of water at low tide, hence species of algae, like. Padina sp. f Caulerpa raceaosa and a few others were able to survive. Patches of eelgrass (Enhalus sp.)

were also to be found. Several species of polycypods, namely Venus purpurea rary, Atrina vexillum. Cardiina, unedo. cardium FlaviumI began to) thrive.

The fourth or the last zone might be termed the xired zone the name-implied that no species: could boast itself being dominant though, some of them were found, rather abundant. This zone bordered the open sea, separated from the latter by the reef rampart. It retained enough water even at the lowest low tide so as to make coral growth possible.

The common gastropod species in this zone were ^{were:}
Cypraea annulus. C. moneta. C. arabica. C. tigris, Lambis
ohiragra. The -Cypracea. spp. were seen usually crawling on coral colonies, upon which polyyps they were supposed to subsist. Lambis lambis and Lambis ohiragra found their home among the algae which nourished them. Another common gastropod was the cone shells, consisting of from the smallest Conus glano to the big Conus marmoreus and Conus geoaraphus.

Among the bivalves living here were speadylus ducalis. Chama lazarus. Perna sp. Tridacna crocea. Hippopus-hippopus, hippopus, Pecten, sp. Lima sp., etc. Under coral fragment of the reef rampart could be found Arca fusca. Trochus niloticus. Turbo, Luvotus, aria ffilamentosa Vasum turbinellum and some others,

living condition in the lagoon would invariably be different from that is the sand flat.. Being a great deal deeper, the lagoons could support vast coral growth along

their slopes. Gooding stated that many of the invertebrates that lived on the slope of the outer reef were found on the slopes of the lagoons as well. Were it not for the silty floor of the lagoons, they were otherwise the same.

The molluscan fauna in the lagoons showed a distinctive difference either with that of the sand flat or the outer reef. Cerithium vertagus and Strombus gibberulus, the two species that dominated the sand flat, did not flourish in the lagoons. In their place came big venetid snails, probably of the genus Siphonium, that lived attached on stony coral.

The mud flat was inhabited by the typical potamid snails Terebralia palustris; and Telescopium telescopium, which are found all over the mud surface. The bivalve that could tolerate the stinking black mud was Gafrarium gibbia. As the mud became sandy, eel grass began to grow and between them lived Arca antiquata and, now and then, also a rare species of heart cockle, Cardium cardissa.

General remarks

As far as population density is concerned, Cerithium vertagus outranks all other species. They are so numerous that for a few moments after the water has receded at low tide, the sea floor is literally dotted with these ~~large~~ pointed snails. At the place where the sea floor is

~~ried~~ up, these snails evade direct sunlight by burrying themselves in the sand. However, their whereabouts can be easily detected as they always leave a clear tract in the sand where, At one of the tract's ends, the sand piles up slightly which betrays the hiding snail beneath.

An attempt was made to measure its population density by throwing randomly a square iron frame with an area of 0.25 m^2 . The sampling site was not haphazardly taken, "but was predetermined at a supposedly homogenous locality. An average of six and a maximum of 10 individuals per 0.25 a^2 were obtained.

It is interesting to note the presence of enormous number of starfish (Archaster typicus) in the oerithid zone. Gooding (personal communication) stated that this starfish, is a filter feeder, feeding on organic matter that is mixed up with the sand grains. That explains why they live peacefully with the molluscs.

Behind the reef rampart the water is relatively deep and not much affected by wave action. Water exchange with the open sea is maintained through shallow channels that traverse the reef rampart. It is a good place for snail coral colonies and algae to grow. The availability of coral colonies and algal growth in this protected body of water seems to make this section a suitable place for many species of Molluscs to live in. It is also a good home for many other invertebrates, such as species of holothuroids, echinoids, asteroids, sponges, annelids, aneans etc. The black long-spined sea urchin

(*diadema setosum*) aggregate on the sand bar between coral patches,

Terebralia palugtris, and *Telescopium telesoopium* are real mud dwellers, preferring in particular the one that is associated with mangroves. They were not found at the sandy sea floor.

In the lagoons, the sub-surface water is not, or only slightly disturbed by current or wave action, as such the water is relatively tranquil. In such a case, particulate matter suspended in water, can easily settle down to the bottom. That is why the floor of all the lagoons is silt overlaying sand (Gooding, 1969). Visibility is always poor in the lagoon due to the sinking suspended particles.

Condition in the lagoon seems to suit well the vermetid snail *Siphomium*. It is a sessile gastropod of the family *Vermatidae*, having a thumb-sized, loosely coiled shell cemented to coral rock. It belongs to one of the few filter feeding gastropods that filter suspended organic particles for food. A mucus net is spread over the water to trap particulate matter that flows with water current generated by ciliary action. From time to time this mucous net is swallowed together with its organic matter content. Under water this mucous net is clearly visible as a thin layer of mucus dangling from the aperture of the animal's shell.

it seems quite likely that moluscs, especially ~~polychaetes~~ and gastropods, play an important role in the cycle of organic matter within the intertidal region of the island. Some of them, namely *Siphonium*, *Spondylus* and *Ostrea*, take a significant part in reef forming process. Their distribution is determined by local variation of the environment in conformity with their mode of life.

Reference

I Gooding, R.U. (1969). Report on preliminary survey of the Pulau Pari group of islands, Java Sea. Unpublished report. Seamec Biotrop (Coral Reef Project).