

## COEXISTING SPECIES OF *ANADARA* IN COASTAL WATERS OF SANGIHE ISLAND, NORTH SULAWESI.

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### ABSTRACT

Six species of the bivalve genus *Anadara* were found in various combinations of coexistence in coastal waters of Sangihe Island, North Sulawesi, Indonesia. All six species, viz. *A. granosa*, *A. cornea*, *A. nodifera*, *A. antiquata*, *A. inflata*, & *A. pilula* could be found in mud, muddy sand, and sand. In addition, the latter three species were also found among corals, while *A. antiquata* was the only species encountered in algal beds, in addition to the other habitats.

### INTRODUCTION

The taxodont bivalve genus *Anadara* is in the family Arcidae, subfamily Anadarinae (Barnes, 1974; Soemodihardjo & Kastoro, 1982). *Anadara* are often referred to by the trivial name cockle, although ark shells are not true cockles. Ark shells are commercially important. The bivalve-meat has good nutritional value, the shells can be used for handicraft as well as a traditional mix for mouth wash. The purpose of this study was to quantify the number of species living in specific habitats, and to estimate the abundance of ark shells. Such basic information is needed in order to be able to recommend wise utilization of ark shell resources without the risk of habitat destruction or over-exploitation of individual species.

### MATERIALS AND METHODS

90 quadrats, each 1 x 1 m, were sampled in the study area on Sangihe Island, North Sulawesi. The quadrats were divided into 16 grids, each 25 x 25 cm. All bivalves within the 0.0625 m<sup>2</sup> grids were collected by shovelling the sediment into labelled plastic bags which were brought to the laboratory and sorted. The quadrates were placed at random according to depth in five habitats classified as sand, mud, muddy sand, coral, and algae bed. The ark shells were identified according to descriptions in

Feinberg & Sabeli (1978) and Soemodihardjo & Kastoro (1982).

### RESULTS AND DISCUSSION

Table 1 shows the 6 species of *Anadara* encountered in 5 habitats. *A. granosa* and *A. cornea* were the most abundant ark shells, occurring in mud, muddy sand, and sand. However, *A. granosa* was most abundant in mud while *A. cornea* was most abundant in muddy sand and sand. *A. nodifera* was also most abundant in muddy sand but the abundance was skew symmetric towards the muddy substratum. In comparison, *A. cornea* was skew symmetric towards the sandy substratum.

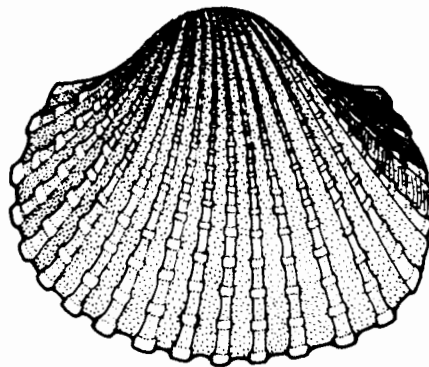
Three species were also found in coral areas. *A. antiquata* was apparently favoured by coarse substrata. It was most abundant in sand but abundance was skew symmetric towards sandy mud and corals. It had the lowest density in pure mud and among algae. *A. antiquata* was the only ark shell found in algal beds, though at low density. *A. inflata* and *A. pilula* were both abundant in sand. They had quite similar distributions although the density of *A. inflata* decreased much when mud occurred in the habitat, while the densities of *A. inflata* were identical in sand and in muddy sand.

**Table 1.** Density of *Anadara* species (ind/m<sup>2</sup>) in specified habitats of coastal water at Sangihe Island.

Species	Mud	Sand	Muddy sand	Coral	Algae	Total
<i>A. granosa</i>	31	3	14	-	-	48
<i>A. cornea</i>	7	18	23	-	-	48
<i>A. nodifera</i>	14	5	21	-	-	40
<i>A. antiquata</i>	2	14	10	6	3	35
<i>A. inflata</i>	6	20	9	2	-	37
<i>A. pilula</i>	3	17	16	1	-	37
<b>In Total</b>	63	77	93	9	3	245

### REFERENCES

- Barnes, R.D. ,1974. *Invertebrate Zoology*. W.B Saunders Co.Philadelphia  
 Feinberg, H.S. & Sabelli, 1979. *Guide to shells*. Simon and Schuster's New York. 512 p.  
 Soemodihardjo, R.D.S. & W. Kastoro, 1982. *Shallow water marine molluscs of North Java*. LON-LIPI. Jakarta. 143 p.



*Anadara granosa* L., 1758. PMBC 532. 2x.  
 Drawing by Patairat Singdam.