

THE FOOD OF SOME NERITID PROSOBRANCH MOLLUSCS FOUND AT MKOMANI MOMBASA, KENYA

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INTRODUCTION

The rocky shores of the Kenya coast at Mkomani, Mombasa support a wide variety of organisms. One of the common organisms is the gasteropod prosobranch mollusc *Nerita*. Three species of *Nerites* are found i.e *Nerita plicata*, *N. undata* and *N. textilis*, at different heights on the rocky shore.

Various studies have been carried out on the *Nerites* and their ecological, zonal and migrational patterns and discussed by several workers. Thus, many aspects of the life of the *Nerites* are known, however little has been done on the nature of the food of these organisms. It is known that they are herbivorous and browse upon the algae found on the rocks by utilizing the powerful radula to scrape the food off (Ruwa and Brakel 1981). Little other information is available on the food of these molluscs. Details of the algal species, quantities and qualities of the contents have not been revealed.

The study of the food could provide information that would be of use in the study of other aspects of the rocky shore ecosystem, their position in the ecosystem.

LITERATURE REVIEW

The rocky shore environment and its associated organisms have been studied by several workers who have contributed much useful information on these shores. A comprehensive introduction to the ecology of rocky shores has been provided by Lewis (1964). Hartnoll (1975) worked on the rocky shores of Dar-es-salaam and found *Nerita* spp. among the other rocky shore organisms. Taylor (1971) found *Nerita* spp. on the rocky shores at Aldabra.

Other studies on the *Nerita* spp. have been carried out by Vannini and Chelazzi (1978, 1981), Hughes (1971), Maxwell (1970), Warburton (1973). The local *Nerite* species have been studied by Ruwa and Brakel (1981) with regard to zonation and tidal periodicity while anatomy of some *Nerites* is described by Fretter (1965).

Little information is available on the food of the *Nerita* spp. Although it is known that they are herbivorous and feed upon algae, the exact nature of the food is unknown. Studies on the algae found on the Kenyan Coast have been carried out by a few workers. Species lists have been drawn up by Isaac (1967, 1968, 1971) Knutzen and Jaasund (1979), Kind (1956), Gerloff (1960), Moorjani (1980).

METHOD

In order to carry out the study of the food of the *Nerita* spp. the specimens had to be dissected, and the gut contents analysed microscopically. Three samples, one of each species, were collected daily as far as possible. The Nerites were then washed and the outer shell carefully cracked and removed. The mantle skirt and body cavity were cut away and the gut was uncoiled and gently pulled out onto a microscope slide. The gut material was pressed out into distilled water and macerated thoroughly. Drops of this solution were examined microscopically, and the algae identified as far as possible.

For comparisons, fresh algal samples were collected from the rocky cliffs and examined microscopically. This helped in identification of the algae found in the gut. The relevant types of material found in the gut were identified and recorded.

TABLE I: Food Items found in stomachs of *Nerita* spp.

RESULTS

Food Item Algal Genus	<i>Nerita textilis</i>	<i>Nerita undata</i>	<i>N. Plicata</i>
BACILLAROPHYCEA			
<i>Navicula</i>	+	+	+
<i>Meridion</i>	+	+	+
<i>Licmophora</i>	+	+	-
<i>Nitzchia</i>	+	-	-
<i>Cymbella</i>	+	+	+
<i>Cocconeis</i>	+	-	-
<i>Melosira</i>	+	+	+
<i>Achnanthes</i>	+	+	+
<i>Synedra</i>	+		
CHLOROPHYCEA			
<i>Chaetomorpha</i>	+	+	+
<i>Rhizoclonium</i>	+	+	-
<i>Enteromorpha</i>	+	+	+
<i>Scenedesmus</i>	-	+	-
RHODOPHYCEA			
<i>Bostrychia</i>	-	-	+
CYANOPHYCEA			
<i>Lyngbya</i>	+	+	+

(+ indicates presence)

RESULTS

The results summarized in Table I show the types of algae consumed by each of the species. The algae was found macerated in small clumps and fragments due to digestion. This led to difficulties in identification, however, some algae remained intact and could be identified.

The *Nerita* spp. feed upon various types of algae, the different classes being the Cyanophyceae, Chlorophyceae, Rhodophyceae and Basillariophyceae. The exact quantities of each of these consumed was difficult to ascertain due to the mentioned identification problems. However, it was possible to identify the various classes consumed.

The diatoms were easily distinguished and were found in all the three species in individual, chain or colonial forms. They were identified by differences in frustule shape as well as pigmentation differences. The fresh algal material was observed to have large numbers of epiphytic diatoms, some of them motile.

Some zooplanktonic organisms were also found ingested by the *Nerita*. These were thought to have some type of Nemertine worms, but identification was not certain.

CONCLUSION AND DISCUSSION

The *Nerites* were found to be herbivorous gastropods feeding upon the algae off the rocky shores. The radula collected and rasped the material into fine particles that were digested in the gut. Any undigested algal material was eliminated in the fecal material which was found to contain large amounts of algae. The algae in the gut of the *Nerites* corresponded closely to that found on the rocky cliffs, indicating that the *Nerites* derived their food primarily from the rocky cliffs. However, it was possible that some of the algae were phytoplanktonic. All the three *Nerite* species had similar algal material in their guts, this indicated that they fed upon the same algae from the rocky cliffs.

The amounts and types of algae found in the *Nerites* did not seem to differ greatly with each spring or neap tide cycle. This, however, is subject to quantitative confirmation. Each *Nerite* had to have some means of reaching the algae found at particular heights on the rocky cliffs. The migratory patterns observed could be a method of obtaining the food.

Most of the algae found in the gut of the *Nerites* were thought to be part of the food of these organisms due to the numbers and frequency of occurrence of the various types of algae. However, the zooplanktonic Nemertines were not thought to be part of the food due to their low numbers and infrequency of occurrence. They were thought to have been accidentally ingested with the algal food material, and remained undigested in the gut.

REFERENCES

1. Chelazzi G. & M. Vannini (1976) Coastward orientation after displacement in *N. textilis* (Dillwyn) (Gasteropoda prosobranchia). *Mon. Zool. Ital. n.s. suppl.* 8: 161 - 171.
2. Fretter V. (1965) Functional studies of the anatomy of some Neritid prosobranchs. *J. Zool.* 147: 46-74.
3. Hartnoll R.G. (1975). The ecology of some rocky shores in tropical East Africa. Est. Coast. *Mar. Sci.* 4: 1 - 21.
4. Hughes R.N. (1971). Notes on the Nerita (Archaegastropoda) population of Aldabra Atoll Indian Ocean. *Mar. Biol.* 9: 290 - 299
5. Isaac W.E. (1967). marine Botany of the Kenya coast I A. First list of Kenya Marine Algae. *J.E. Afr. Nat. Hist. Soc.* 26: 75 - 81.
6. Isaac W.E. (1968 a). Marine botany of the Kenya coast 2A second list of Kenya Marine Algae. *J.E. Afr. Nat. Hist. Soc.* 27: 1 - 6.
7. Isaack W.E. (1971). Marine botany of the Kenya Coast 5 A. Third list of Kenya Marine Algae. *J.E. Afr. Nat. Hist. Soc.* 28 (122): 1 - 23.
8. Knutzen & J.E. Jaasund (1979). Note on littoral algae from Mombasa Kenya. *J.E. Afr. Nat. Hist.* 168: 1 - 4
9. Lewis J.R. (1964). The ecology of rocky shores.
10. Maxwell W.L. (1970). An ecological study of *Nerita plicata* (Gasteropoda) on the coast at Shimoni Kenya. Final part University of Bristol: Internal Publ. p. 81 - 120.
11. Moorjani S.A. (1980). Rocky shore zonation in Kenya Horizontal and vertical distribution patterns in the Marine flora. Proceedings symposium on the marine environment of the red sea: Gulf of Aden and Tropical West Indian Ocean, Khartoum.
12. Ruwa R.K. and Brakel W.H. (1981). Tidal periodicity and size related variation in the zonation of the gasteropod *Nerita plicata* on an East African rocky shore. *Kenya Journal of Science & Technology B (1981) 2: 61 - 67.*
13. Taylor J.D. (1971). Intertidal zonation at Aldabra Atoll. *Philos Trans. Roy. Soc. London B* 260: 173 - 213.
14. Vannini and Chelazzi (1978). Field observation on the rythmic behaviour of *Nerita textilis* (Gasteropoda proaobranchia) *Mar. Biol.* 45: 113 - 121.