

A note on the zooplankton distribution and diversity in a tropical mangrove creek system, Gazi, Kenya

Melckzedeck K. W. Osore

Kenya Marine and Fisheries Research Institute, P.O. Box 81651, Mombasa

Abstract

Gazi Creek is situated at some 40 km south of Mombasa (Kenya 4° 25' S, 39° 50' E) sampling stations are located in the creek mouth (stn 1), in the inner creek (stn 3) and intermediate (stn 2). Sampling is done twice a month; it starts from stn 1 through stn 2 up to stn 3. A 335 μm Mesh size net is towed in near surface water for 5 minutes and the collected sample preserved in 5% formaldehyde. Hydrographic parameters are recorded during sampling.

The work at Gazi is undertaken to survey the Zooplankton composition both qualitatively and quantitatively. 22 important taxa have been studied to determine their seasonal variation in abundance and distribution. Zooplankton population are highest in March (374 animals m^{-3}). The abundance gradually falls during the S.E. monsoon period (May–September) to the lowest value in August (30 animals m^{-3}) (see Fig. 1). Copepoda is the most abundant taxon throughout (48.5–92.4%) (see Table 1). This group is found throughout the creek. Nevertheless, it is evident that the creek mouth has a higher diversity of copepoda compared to the inner creek. Using the Margalef Index a consistently higher value has been observed in stn 1 compared to stn 3 (see Table 2). The surface water temperature decreases during the S.E. monsoon (28.0 to 25.5 °C) and it rises during the N.E. monsoon (29.0 to 35.5 °C). The trend in temperature variation corresponds broadly with zooplankton abundance (see Fig. 1), suggesting that zooplankton thrive best in warmer water. High Zooplankton counts were also observed around May (326 animals m^{-3}) during the long rains; probably due to high amounts of nutrients input. Generally, average monthly pH values vary only slightly but the pH up the creek is almost always lower than at the creek mouth. Salinity is quite constant at 35‰.

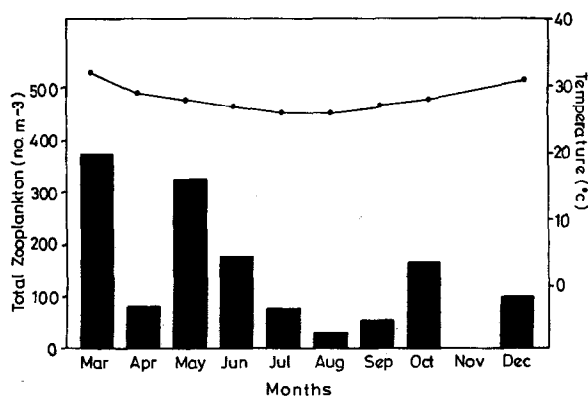


Fig. 1. Mean monthly total zooplankton variation and mean monthly surface water temperature for the three stations (average) at Gazi during March to December 1990.

Table 1. Percentage composition of important Zooplankton groups as average of the three stations at Gazi during March to December 1990.

Group	1990									
	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Copepoda	83.36	79.10	62.56	76.49	75.05	76.85	48.49	92.42	–	84.26
Medusae	0.18	0.16	0.31	0.09	0.00	0.00	0.00	0.04	–	0.00
Brachyura zoea	0.62	11.51	18.85	1.16	5.04	2.50	26.87	0.91	–	2.02
Caridea	0.28	0.06	1.91	0.68	3.86	2.26	6.33	0.76	–	0.35
Chaetognatha	0.17	0.86	2.84	0.42	3.24	0.99	0.71	1.19	–	0.75
Ostracoda	0.13	0.58	0.16	0.09	0.28	0.82	0.63	0.19	–	0.27
Mollusca	0.29	1.55	1.68	5.08	4.86	8.41	3.10	0.70	–	1.33
Fish larvae	0.11	0.00	0.19	0.16	0.77	0.38	1.05	0.18	–	0.23
Nauplii	8.59	1.34	0.28	0.16	0.95	4.65	1.83	0.99	–	6.62
Amphipods	0.21	0.43	0.33	1.75	0.68	1.68	1.31	0.38	–	0.48
Appendicularia	0.29	2.08	0.85	0.43	0.68	0.00	0.00	0.63	–	0.11
Polychaeta	0.13	0.84	0.58	0.25	0.94	1.37	0.63	0.16	–	0.45
Isopoda	0.11	0.00	0.24	0.93	0.27	1.03	0.63	0.34	–	0.71
Fish eggs	0.10	0.41	8.06	0.43	1.92	0.82	6.14	0.18	–	1.18
Cumacea	0.16	0.06	0.00	0.34	0.50	0.72	0.26	0.25	–	0.38
Stomatopoda	0.02	0.00	0.06	0.00	0.00	0.27	0.71	0.16	–	0.00
Penaeidae	0.02	0.00	0.06	0.00	0.21	0.03	0.00	0.05	–	0.18
Cirripede nauplii	0.02	0.34	0.00	0.00	0.00	0.03	0.00	0.05	–	0.15
Brachyura megalopa	0.00	0.10	0.54	0.09	0.30	1.03	0.47	0.11	–	0.29
Siphonophora	0.00	0.06	0.64	0.09	0.18	0.00	0.00	0.00	–	0.00
Euphausiacea	0.00	0.00	1.19	0.00	0.00	0.00	0.00	0.00	–	0.00
Sergestidae	0.00	0.00	0.0	0.00	0.09	0.00	0.00	0.00	–	0.00
Others	0.05	0.32	0.00	0.00	0.00	0.03	0.54	0.18	–	1.50

Table 2. Monthly variation in diversity of Copepods in the three stations at Gazi during March to December 1990. The Margalef Index is used.

Month	Diversity		
	Stn 1	Stn 2	Stn 3
March	1.25	0.80	0.46
April	1.29	1.17	0.97
May	1.79	2.02	1.77
June	1.12	1.87	0.82
July	1.99	1.87	1.85
August	2.82	2.30	2.04
September	1.86	2.05	1.66
October	1.73	1.22	0.84
November	–	–	–
December	1.64	1.43	1.63