EGYPTIAN SANDY BEACH MEIOFAUNA AND BENTHIC DIATOMS

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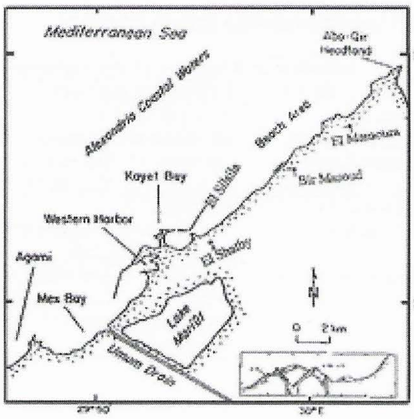
Abstract

Egyptian Mediterranean meiofauna has received limited attention until now. The earlier studies were qualitative rather than quantitative (1, 2, 3). This first quantitative analysis of meiofauna along the Mediterranean coast of Alexandria, Egypt was carried out at three different sandy beaches (El Mamoura E-M, Bir Masoud B-M, and El Shatby E-S) from April to December 1996. It was primarily aimed at a comparative description of meiofaunal population abundances and composition in two habitats within each of three beaches. Physicochemical factors (temperature, salinity, grain size, and total organic matter) and samples of suspected food (diatoms) were measured in conjunction with meiofaunal samples from April to December 1996. At each survey, meiofaunal was sampled within two habitats, supralittoral and intertidal to characterize within site variability at the three beaches (Fig. 1).

Key words: Meiofauna; Alexandria; Egypt; Diatoms; Harpacticoida; Nematoda; grain size



The E-S beach which is intermittently exposed to waste water pollution is differed from both E-M and B-M. The sea water temperature (SW^{N}C) varied from 29^{N}C in July and 18^{N}C in December. The sea water salinity (SWl) and pore water salinity (PWl) separated E-M and B-M beaches from E-S.

Overall mean PWl was 37.62l, 37.89l, and 36.55l respectively at E-M, B-M, and E-S. The median grain size (N) at E-S showed medium coarse sand especially in the intertidal habitat while at E-M and B-M was fine grain sand. Overall mean N ranged between 2.00 (E-M and B-M) and 1.08 (E-S). The highest total organic matter (%TOM) was recorded twice at E-S (1.25% in April) and at B-M (1.85% in July). Overall mean %TOM was 0.56% (E-M and B-M) and 0.63% (E-S).

Mean total meiofaunal abundances ranged from 2434 individuals 10cm $^{-2}$ at E-S, 1225 individuals 10cm $^{-2}$ at E-M, and 1083 individuals 10cm $^{-2}$ at B-M (Fig. 2). They were more abundant in the supralittoral than in the intertidal habitat. The communities comprised sixteen groups. Seven were dominant averaging 98.1% overall (Ciliophora, Harpacticoida, Nematoda, Archiannelida, Gastrotricha, Foraminifera, and Turbellaria).

Mean Harpacticoida abundances showed maxima in the moderately warm months (spring-autumn) at all three beaches and minima during summer. Eight interstitial and one phytal species were recorded. One Cylindropsyllidae (*Arenopontia nesaie*), one new subspecies Paramesochridae (*Kliopsyllis constrictus egyptus*), two new Ectinosomatidae (*Arenosetella bassantae* and *Noodtiella toukae*), one Ameiridae (*Nitocra spinipes*), two Diosaccidae (*Amphiascus parvus* and *Amphiascus* sp.), one Peltidiidae (*Alteutha* sp.), and one Tetragonicipitidae (*Phyllopodopsyllus pauli*). Two new species and one new subspecies were published separately (4).

Nematodes were analyzed to trophic guilds. Four different trophic groups were distinguished (deposit feeders, epistrate, scavengers, and predators)? Mean variance of deposit feeders and epistrate was lower at E-S compared to E-M and B-M. Scavengers were higher at E-S. Predators were different among beaches.

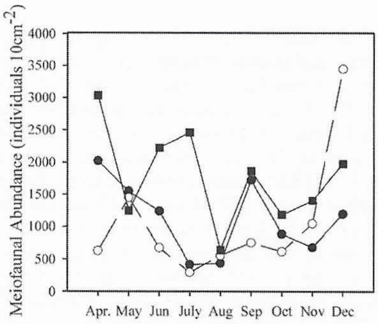
The abundance of benthic diatoms was high at E-M (ranging from 15 10^3 cells $^{-3}$ to 665 10^3 cells^{-3}) and low at E-S (ranging from 2 10^3 cells $^{-3}$ to 115$10^3$ cells $^{-3}$). Over the year and at all three beaches, the diatom abundance sustained two peaks one during spring – summer and one in winter.

To assess the importance of benthic diatoms as a food source for different meiofaunal groups, Principal Component Analysis (PCA) was done. The data set consisted of factor scores resulting from the PC analyses on diatom species data, PC analyses on Harpacticoida species, log transformed total data of meiofauna, dominant meiofaunal groups data, and arcsine transformed Nematode trophic groups data. This analysis was called "**Biotic analysis**". Results indicated that diatoms have a different relationship with different meiofaunal groups especially with Harpacticoida, Archiannelida, Foraminifera, Ciliophora, Turbellaria, and Nematoda. This relationship differs in sign and magnitude.

To illustrate typical associations of organism groups in relation to their physical environment,

Another PCA analysis was performed. The data set of the Biotic analysis was used after merging with the square root-root transformed data of %TOM, PWl, N, SW^{N}C, sorting , and log transformed SWl. This analysis was named **"Biotic and abiotic analysis".** Results revealed that, on PC2 all the biotic variables loaded negatively, while all abiotic variables loaded positively. On PC1, Hapacticoida, meiofauna, predators, and scavengers loaded negatively. In contrast, diatoms, epistrate, deposit feeders, N, PWl, SW l, and SW^{N}C loaded positively on PC1. The relation between biotic and abiotic variables was generally negative.

The biotic and abiotic analyses were used to differentiate among beaches. The E-S beach was different from E-M and B-M which were similar. The E-M and B-M beaches were similar with high abundance of diatoms and high percentage composition of nematode deposit feeders and epistarte. Their pore and sea water salinity and their grain size were also higher. In contrast, E-S beach which is downstream from effluent had higher grain size, lower salinity, and its %TOM was 0.1% higher. It was occupied by a higher abundance of meiofauna and Harpacticoida, and a high predators and scavenger's percentage.



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