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Temporal dynamics of shallow subtidal meiobenthos from a beach in Tenerife (Canary Islands, northeast Atlantic Ocean)

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Abstract
A shallow subtidal (3 m deep) meiofaunal assemblage in Los Abrigos Bay, Tenerife, Canary Islands was sampled during May 2000–April 2001. The main aims were to (1) find temporal variations in meiofaunal assemblage structure and overall abundance, as well as in the most abundant meiofaunal species throughout the study period, and (2) identify environmental variables (sedimentary composition, organic matter content, and total nitrogen) that better explain meiofaunal assemblage structure during the study year. The most abundant species were the nematodes *Siphonolaimus* sp. 2 and *Catanema* sp., which represented 46.2% of the overall meiofaunal abundances and varied significantly throughout the study duration. Overall meiofaunal abundance and the most abundant taxonomic groups (nematodes, copepods, and oligochaetes) showed significant temporal variations during the study period. Nematodes overwhelmingly dominated during the study period, ranging from 78% in May to 97.34% in February. Multivariate analyses showed seasonality in meiofaunal community structure during the study year, with the lowest abundances in May.

Key words: Meiofauna, assemblage structure, subtidal, Canary Islands, Atlantic Ocean

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1 Introduction

Seasonal variation in animal populations is often quite predictable. In benthic communities, temporal changes are generally more pronounced in the intertidal than in deeper waters. A plethora of abiotic and biotic variables may account for temporal fluctuations in benthic animal assemblages (Ólafsson and Elmgren, 1997). Temporal distribution of meiofauna (mobile metazoan benthic invertebrates that pass through a 0.5 mm mesh sieve but are retained on a 0.063 or 0.042 mm mesh sieve) is highly variable and scale-dependent (Higgins and Thiel, 1988). Several meiobenthic studies in subtidal areas have failed to detect temporal oscillations in meiofaunal assemblages (Juario, 1975; Warwick and Buchanan, 1971; Boucher, 1980). However, other studies have observed significant seasonality in subtidal meiofauna assemblages (Rudnick et al., 1985, Ólafsson and Elmgren, 1997) throughout a study year.

In recent years, many ecological studies on meiobenthic communities have been carried out in the Canary archipelago (Riera, 2004; Brito et al., 2005). Brito et al. (2005) analysed seasonal variations of "large" meiofaunal/"small" macrofaunal polychaetes (< 0.1 mm) from a *Cymodocea nodosa* seagrass meadow in Tenerife. However, "real" subtidal meiofauna (0.063–1 mm long) have not received attention and so, more baseline data describing species diversity and community structure are needed to further study the importance of meiofauna in shallow subtidal sandy systems.

In the present study, we investigated patterns in the assemblage structure and abundance of meiofauna inhabiting a shallow subtidal site at the Canary Islands through an annual cycle. The main aims were to (1) determine if patterns of assemblage structure or meiofaunal abundances followed any temporal trend, and (2) identify if studied environmental variables (grain size, organic matter, and nitrogen) affected meiofauna assemblage structure throughout the study period.

2 Materials and methods

2.1 *Study area*

This study was conducted from May 2000 to April 2001 at Los Abrigos del Porís Bay, a locality on the southeast coast of Tenerife (Canary Islands, NE Atlantic Ocean, (28°08′58″N, 16°42′54″W) (Fig. 1). The study site is located in a sheltered bay (classified as ultra-dissipative, sensu Short, 1999). Sandy substrates are characterized by volcanic sands with a low percentage of carbonates, and dominated by the presence of medium and fine sands.

Sediment samples were collected monthly by SCUBA divers at one shallow subtidal station (3 m deep). Sediment cores (10 cm^2) were pushed into the sediment to a depth of 30 cm. Five replicates were collected for faunistic determinations and one for analysis of sedimentary variables (grain size, organic matter, and nitrogen).

2.2 *Analysis of sedimentological variables*

To assess grain size composition of the analysed sediment,

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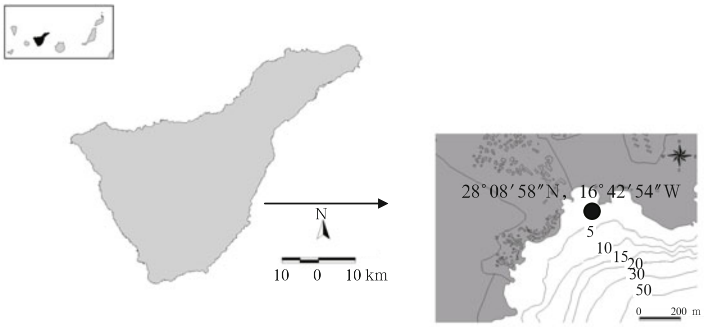

Fig.1. Map of the study area showing sampling location.

100 g sediment from each month was oven dried at 105°C, passed through a graded series (2, 1, 0.5, 0.25, 0.125, and 0.063 mm) of sieves, and then weighed (Buchanan, 1984). Total nitrogen was determined by the Kjeldahl method (Bradstreet, 1965).

2.3 *Analysis of meiofauna*

Samples were preserved in 10% seawater-buffered formaldehyde solution and decanted through 500 μm and 63 μm mesh sieves. The fraction remaining on the 63 μm mesh sieve was separated into different taxonomic groups under a binocular microscope and preserved in 70% ethanol. The extraction method followed procedures of Somerfield and Warwick (1996). Meiofaunal specimens were mounted in jelly glycerine and examined using a LEICA DMLB microscope equipped with Nomarski interference contrast and identified to species level, whenever possible. All meiofaunal specimens were identified using the microscope and subsamples of 200 individuals were used for nematodes (Somerfield and Warwick, 1996). Certain taxonomic groups (i.e., harpacticoid copepods, turbellarians) that needed dissection or taxonomic characters of internal anatomy were determined by their body shape in putative species. Meiofaunal abundances were expressed as a number of individuals per surface area (10 cm^2).

2.4 *Statistical analysis*

Biological assemblage descriptors (total abundance and species richness) were estimated for each sample. Differences in species richness and abundance patterns during months of the study period (the fixed factor) were tested through a one-way ANOVA, after verifying normality using the Kolmogorov-Smirnov test and Levene's test for homogeneity of variances. When the requirements of normality and/or homogeneity of variances were not fulfilled, the Kruskal-Wallis ANOVA (KW ANOVA) test was used instead.

To visualize affinities in assemblage structure through the study period, n-MDS (non-metric multidimensional scaling) was carried out on square root transformed abundance data via the Bray-Curtis similarity index. The ANOSIM routine (Clarke, 1993) was used to explore the significance of differences among months.

The relationship between environmental variables and meiofaunal community structure was explored using BIOENV procedures. All multivariate analyses were carried out by means of the PRIMER 5.2. package (Clarke and Gorley, 2001).

3 Results

3.1 *Sedimentary variables*

The sampling site was dominated by medium sands (0.25–0.5 mm), ranging from a minimum dominance of 31.7% (August 2000) to a maximum of 64.4% (December 2000). Fine sands were the second sedimentary fraction in importance, ranging from 16.6% (May 2000) to 55.9% (September 2000). The remaining sediment types were scarce. Organic matter content was characterized by a mean percentage of 0.90% throughout the study period, with a maximum content of 1.68% (May 2000) and a minimum content of 0.50% (October and November 2000). Nitrogen concentration obtained a mean value of 0.009%, ranging from 0.010% (June 2000, September 2000, and April 2001) to 0.008% (October 2000–February 2001) (Table 1).

3.2 *Meiofauna*

A total of 15 taxonomic groups were collected: nematodes, oligochaetes, polychaetes, copepods, turbellarians, tanaids, amphipods, cnidarians, echinoids, misids, ostracods, acari, ne-

Table 1. Values of sedimentary variables throughout the study period in the Los Abrigos subtidal

	May 2000	June 2000	July 2000	August 2000	September 2000	October 2000	November 2000	December 2000	January 2001	February 2001	March 2001	April 2001
Nitrogen/%	0.009	0.01	0.009	0.009	0.01	0.008	0.008	0.008	0.008	0.008	0.009	0.01
Carbonates/%	3.08	6.84	5.13	9.57	7.86	4.62	1.54	5.47	7.01	5.98	6.32	7.18
Organic matter/%	1.68	1.54	1.31	0.77	0.74	0.51	0.5	0.78	0.7	0.54	0.91	0.85
Gravels/%	9.82	5.42	5.64	12.24	2.56	0.46	2.28	0.48	1.56	1.56	7.83	5.72
Very coarse sands/%	6.98	2.44	1.72	4.87	1.18	0.92	1.35	1.09	0.65	1.55	3.72	1.58
Coarse sands/%	7.71	3.62	5.29	5.49	1.17	1.61	2.11	2.58	1.06	2.48	3.4	1.25
Medium sands/%	58.5	52.04	57.41	31.7	35.61	54.21	50.61	64.38	50.82	52.04	42.63	34.44
Fine sands/%	16.57	32.36	25.84	41.91	55.89	40.76	41.89	30.32	44.5	40.32	40.41	54.08
Very fine sands/%	0.39	3.88	3.81	3.46	3.21	1.94	1.63	1.07	1.33	1.88	1.87	2.75
Silt/clay/%	0.03	0.25	0.29	0.32	0.38	0.11	0.13	0.07	0.09	0.17	0.14	0.17

merteans, decapods, and kinorhynchs. Nematodes were the most abundant group with 38 504 individuals (91.11% of the overall abundance), ranging from 78% in May 2000 to 97.34% in February 2001. The second and third most abundant taxonomic groups were oligochaetes and polychaetes, with 683 (1.66%) and 679 (1.65%) individuals, respectively. The remaining taxonomical groups (copepods, turbellarians, ostracods, acari, nemerteans, decapods, and kinorhynchs) were scarce (Table 2).

Table 2. Mean abundances (± SE) of meiofaunal species in the Los Abrigos subtidal throughout the study period

Group	Species	May 2000	June 2000	July 2000	August 2000	September 2000	October 2000
Nematoda	*Actarjania* sp.	0	0	0	0	0	0
Nematoda	*Actarjania* sp. 2	0	0	0	0	0	0
Nematoda	*Ammotheristus* sp.	0.2±0.4	0	0	0	0	0
Nematoda	*Anticoma* sp.	0	0	1.4±2.2	0.4±0.9	0	0
Nematoda	*Ascolaimus* sp.	0	0.2±0.4	0	0	0	0
Nematoda	*Calyptronema* sp.	1.8±2.5	0	0	0	0	0
Nematoda	*Catanema* sp.	41.2±80.1	179.8±55.6	58.6±52.1	45±11.2	97.2±49.1	161±70
Nematoda	*Ceramonema* aff. *yunfengi*	0	0.2±0.4	0.2±0.4	0	0.8±1.8	3.8±5.5
Nematoda	*Metadasynemella* sp.	0.8±1.8	4±7.8	0	1.2±1.1	1±2.2	0.8±1.8
Nematoda	*Choniolaimus* sp.	0.8±1.8	1.2±2.7	0	0	0	0
Nematoda	*Chromadorita* sp.	0.4±0.9	0	0	0	0	0
Nematoda	*Cobbia* sp.	0	0.4±0.5	0	0	0.8±1.8	1.4±1.9
Nematoda	*Cobbia* aff. *truncata*	0	0	0	0	0	0
Nematoda	*Daptonema* aff. *fallax*	0	0	0	0	0	0
Nematoda	*Daptonema* aff. *hirsutum*	4.2±3.3	12.8±8.6	0.4±0.9	18.8±21.1	14.6±19.4	17±5.9
Nematoda	*Dasynemoides* sp.	1.6±1.1	6.6±2.6	0	1±1.4	3±3.1	2.2±3.5
Nematoda	*Desmodorella* aff. *tenuispiculum*	0.6±0.9	0.6±1.3	0	0	0	0
Nematoda	*Diodontolaimus* aff. *sabulosus*	0	0	0	0	0	0.8±1.8
Nematoda	*Enoploides gryphus*	2.6±2.9	1.6±0.9	0	2.6±2.4	2.8±3.8	2±3.1
Nematoda	*Enoplolaimus* aff. *propinquus*	4.2±8.3	0	0	1.2±1.1	0	0
Nematoda	*Enoplus* sp. 2	0.4±0.9	0	0	0	0	0
Nematoda	*Gerlachius* sp.	0	0	0	0	0	0
Nematoda	*Gonionchus* aff. *cumbraensis*	0.8±1.1	0.2±0.4	0	0.4±0.9	2±1.9	6±9.7
Nematoda	*Halalaimus* sp. 3	0	0	0	0	0	0
Nematoda	*Kraspedonema* sp.	0	0	0	0	0	0

Group	Species	November 2000	December 2000	January 2001	February 2001	March 2001	April 2001
Nematoda	*Actarjania* sp.	1.4±3.1	0	0	0	0	0
Nematoda	*Actarjania* sp. 2	0	1.4±1.9	0	0	0.8±1.8	0
Nematoda	*Ammotheristus* sp.	0	0	0	0	0	0
Nematoda	*Anticoma* sp.	0	0	0	0	1.4±3.1	0.8±1.8
Nematoda	*Ascolaimus* sp.	0	0	0	0	0	0
Nematoda	*Calyptronema* sp.	0.6±1.3	0.8±1.8	0	0	0	0
Nematoda	*Catanema* sp.	221.2±168.6	103.2±64.2	165.8±89.4	333.8±94	196.6±99	177.8±68.8
Nematoda	*Ceramonema* aff. *yunfengi*	1.8±2.5	4.6±4	0	2±3.1	0	0
Nematoda	*Metadasynemella* sp.	0	2.4±3.3	0	4.8±5.8	1.6±2.2	0
Nematoda	*Choniolaimus* sp.	0	0	0	0	1.6±3.6	0
Nematoda	*Chromadorita* sp.	0.6±1.3	0.8±1.8	0	0	0	0
Nematoda	*Cobbia* sp.	1±2.2	0	0	0	0	0
Nematoda	*Cobbia* aff. *truncata*	0	1.6±2.2	0	0.6±1.3	0.8±1.8	0
Nematoda	*Daptonema* aff. *fallax*	0.8±1.8	0	0	0	0	0
Nematoda	*Daptonema* aff. *hirsutum*	40.6±49.6	54±25.2	74.6±50.2	26.6±16	58±36	16.8±10.2
Nematoda	*Dasynemoides* sp.	1±2.2	4±2.5	0	3.4±4.1	0.8±1.8	0.8±1.8
Nematoda	*Desmodorella* aff. *tenuispiculum*	0	0	0	0	0	0
Nematoda	*Diodontolaimus* aff. *sabulosus*	0	0	0	0	0	0
Nematoda	*Enoploides gryphus*	6±10.8	28.2±12	7.6±6.7	9.8±10.5	5.4±4.2	1.8±2.5
Nematoda	*Enoplolaimus* aff. *propinquus*	0	0	0	0	0	0
Nematoda	*Enoplus* sp. 2	0	0	0	0	0	0
Nematoda	*Gerlachius* sp.	1±2.2	0	0	0	0	0
Nematoda	*Gonionchus* aff. *cumbraensis*	2.2±2.2	2±3.1	0.8±1.8	0	2.2±3.2	1.6±3.6
Nematoda	*Halalaimus* sp.	0	0	0	0	0	1.6±3.6
Nematoda	*Kraspedonema* sp.	0	0	0	0	0.8±1.8	0
Nematoda	*Laimella* aff. *longicaudata*	0	0	0	0	0	1.6±3.6

to be continued

Continued from Table 2

Group	Species	May 2000	June 2000	July 2000	August 2000	September 2000	October 2000
Nematoda	*Mesacanthion diplechma*	1.8±2.5	0.6±0.5	0	0	1±2.2	2.2±3.2
Nematoda	*Metachromadora* sp.	0	0	0	0.4±0.9	0	0
Nematoda	*Microlaimus* sp. 1	0.6±0.9	0	0	0	0	0
Nematoda	*Monoposthia* aff. *mirabilis*	4.4±5.9	0	0	2.2±3.9	2.8±4.8	0
Nematoda	*Monoposthia* sp.	0.4±0.9	0.2±0.4	0	0	0	0
Nematoda	*Odontophora* aff. *longisetosa*	0.4±0.9	0	0	0.4±0.9	0	0.6±1.3
Nematoda	*Odontophora* aff. *villoti*	0	0	0	5.4±12.1	0.6±1.3	0
Nematoda	*Odontophora* aff. *wieseri*	3.2±4.1	4±2	0	0.4±0.9	4.8±5	5.4±4.9
Nematoda	*Oncholaimellus calvadosicus*	1.4±2.6	1.6±2.3	2±4.5	27.8±35.3	20±15.8	22.4±9.8
Nematoda	*Oncholaimus campylocercoides*	7.4±8.6	10.6±2.7	1±2.2	35±56.5	20.4±10.9	66.6±27.8
Nematoda	*Onyx* aff. *perfectus*	1.2±1.8	0	0	0	0	0
Nematoda	*Paracomesoma* sp.	0.4±0.9	0	0	0	0	0
Nematoda	*Paralinhomoeus* aff. *tenuicaudatum*	0.2±0.4	0.8±1.8	0	0	0.6±1.3	1.4±1.9
Nematoda	*Paralinhomoeus* aff. *uniovarium*	0	0	0	0	0	0
Nematoda	*Paralinhomoeus* sp.	1±1.7	4.8±8.1	5.8±6.6	8.8±5.4	8.8±7.7	14±12.3
Nematoda	*Paramesonchium* sp.	2.4±5.4	10.2±3.7	1.6±1.5	23±22.8	21.6±20.3	49.8±40
Nematoda	*Paramonohystera* aff. *riemanni*	0	0	0	0	0	0.6±1.3
Nematoda	*Pareurystomina* aff. *bissonettei*	0	0.2±0.4	0.6±1.3	0	0	1.4±1.9
Nematoda	*Phanodermopsis* sp.	0.4±0.9	0	0	0	0	0
Nematoda	*Marylynnia* sp.	0	0	0	0	0	0
Nematoda	*Pomponema* aff. *compactum*	3.8±5	2±2.1	0.8±1.1	11.4±19.7	6.2±5.7	6.8±10
Nematoda	*Pomponema* aff. *reducta*	0	16.2±6.2	5.4±6.5	2.8±2.6	6±3.4	12.4±8.7
Nematoda	*Promonhystera* sp.	0	0	0	0	0	0.6±1.3
Nematoda	*Pseudochromadora* sp. 2	0.4±0.9	0.2±0.4	0.8±1.1	7.8±7.5	19.8±14.3	7.4±4.2
Nematoda	*Rhabdodemania* aff. *imer*	0.2±0.4	0	0.6±0.9	0	0	0
Nematoda	*Rhabdodemania* sp2	0	0.2±0.4	0	0	0	0
Nematoda	*Sabatieria* aff. *longisetosa*	1.4±2.6	0	0	0	0	0

Group	Species	November 2000	December 2000	January 2001	February 2001	March 2001	April 2001
Nematoda	*Laimella* aff. *longicaudata*	0	0	0	0	0	0
Nematoda	*Mesacanthion diplechma*	1.8±4	6±2.5	1±2.2	0	0.8±1.8	1±2.2
Nematoda	*Metachromadora* sp.	0	0	0	0	0	0
Nematoda	*Microlaimus* sp. 1	0	0	0	0	0	0
Nematoda	*Monoposthia* aff. *mirabilis*	1.2±2.7	3.6±5.1	2.6±4	4.6±8.2	0	0
Nematoda	*Monoposthia* sp.	0	0.8±1.8	0	1.2±2.7	0	0
Nematoda	*Odontophora* aff. *longisetosa*	5.6±3.7	16.4±13.1	11.8±5.3	6.8±3.9	3.2±5.2	0
Nematoda	*Odontophora* aff. *villoti*	0	0	5±11.2	0	0	0.8±1.8
Nematoda	*Odontophora* aff. *wieseri*	1.4±3.1	0	0	0	0	0
Nematoda	*Oncholaimellus calvadosicus*	28.2±45.6	54±17	14.6±15.4	10.2±6.6	14.6±6.3	6±6.7
Nematoda	*Oncholaimus campylocercoides*	126.4±84.4	184.8±101.6	44.2±44.1	19±12.4	27.2±12.6	9.2±7.2
Nematoda	*Onyx* aff. *perfectus*	0	0.8±1.8	0	0	0	0
Nematoda	*Paracomesoma* sp.	0	14.4±11.8	10.4±7.9	8±7.6	1.6±3.6	0
Nematoda	*Paralinhomoeus* aff. *tenuicaudatum*	3.8±6.1	3.6±8	0	0	0	0
Nematoda	*Paralinhomoeus* aff. *uniovarium*	1±2.2	0	0	0	0.8±1.8	0
Nematoda	*Paralinhomoeus* sp.	3.8±3.9	6.4±5.1	8±11.2	2.8±3.8	11.2±5.5	23.6±25.2
Nematoda	*Paramesonchium* sp.	33.2±25.2	35.6±19.4	37±32.9	11.8±12	11.4±7	5.8±2.6
Nematoda	*Paramonohystera* aff. *riemanni*	0	11.8±8.3	1.8±4	1.8±2.7	1.6±2.2	1±2.2
Nematoda	*Pareurystomina* aff. *bissonettei*	1±2.2	0.8±1.8	1.6±2.2	1.8±2.7	1.6±2.2	0
Nematoda	*Phanodermopsis* sp.	0	0	0	0	0	0
Nematoda	*Marylynnia* sp.	1±2.2	0	0	0	0	1±2.2
Nematoda	*Pomponema* aff. *compactum*	4.4±3.6	38.4±31.5	31.6±54.1	5.6±10.9	3.8±5.3	3.2±3.7
Nematoda	*Pomponema* aff. *reducta*	12±8.9	3.8±4.5	37.4±17.1	22.2±22	14.6±8.1	13.8±9.9
Nematoda	*Promonhystera* sp.	0	0	0	0	0	0
Nematoda	*Pseudochromadora* sp. 2	5.6±6.9	7.2±7.2	36.8±27.6	7±8	15±18.1	9±17.5
Nematoda	*Rhabdodemania* aff. *imer*	0	0	0	0	0	0
Nematoda	*Rhabdodemania* sp2	0	0	0	0	0	0
Nematoda	*Sabatieria* aff. *longisetosa*	0	0	0	0	0	0
Nematoda	*Sabatieria* aff. *elongata*	11.8±18.4	59.4±13.2	5.6±4.6	33.6±15.3	63.8±30.6	151±41

to be continued

Continued from Table 2

Group	Species	May 2000	June 2000	July 2000	August 2000	September 2000	October 2000
Nematoda	*Sabatieria* sp. 3	0	0	0	0	0	0
Nematoda	*Setosabatieria* aff. *hilarula*	0	0	0	0	0	0
Nematoda	*Siphonolaimus* aff. *niger*	0	0	0	0	0	0
Nematoda	*Siphonolaimus* sp. 1	1.6±3.6	2.2±2.7	85.2±41.9	77.2±56.2	104±22.4	50.2±38.9
Nematoda	*Siphonolaimus* sp. 2	3.4±6.5	42±12.1	447±195.5	237.6±156.3	280.8±114.4	82.2±50.7
Nematoda	*Southernia* sp.	0	0	0	0	0	0.6±1.3
Nematoda	*Spirinia parasitifera*	0.2±0.4	0	0	0	0	0
Nematoda	*Synonchiella* aff. *forceps*	6.8±6.7	21.8±3.9	3.4±4.5	5.6±4.2	7.6±5.1	22.2±12.4
Nematoda	*Tarvaia* sp.	0	0.4±0.5	0	0	0	0
Nematoda	*Thalassironus* sp. 1	0	0	1±2.2	0.6±1.3	0.6±1.3	0.8±1.8
Nematoda	*Thalassironus* sp. 2	0	0	0	0	0	0.8±1.8
Nematoda	*Theristus* sp. 2	0	0	0	0	0	0.6±1.3
Nematoda	*Theristus* sp. 3	0	0	0	0	0	0
Nematoda	*Trefusia* sp.	0	0	0	0	0	0
Nematoda	*Trileptium* aff. *parisetum*	1.8±1.6	1±2.2	0.6±0.9	0	0	0
Nematoda	*Vasostoma* sp.	0	0	0.2±0.4	3.6±8	0	1.2±1.6
Nematoda	*Viscosia glabra*	0	0	0	0.4±0.9	0	0
Nematoda	*Xyala striata*	1.4±2.2	0.6±1.3	0	0	0	0.6±1.3
Copepoda	*Tryphonema* sp.	2.8±3	0.2±0.4	0	0.6±0.9	0.2±0.4	0
Copepoda	*Halectinosoma* sp.	1.2±1.6	1.2±1.3	0	2.2±3.3	3.2±5.5	2.6±3.2
Copepoda	*Ectinosomatidae* sp.	7.2±10.4	0.2±0.4	0	0.6±1.3	0	0.8±1.8
Copepoda	*Tisbe* aff. *bulbisetosa*	0.4±0.9	0	0	0	0	0
Copepoda	*Intermedopsyllus* sp.	0.6±0.9	0	0	0	0	0
Copepoda	*Asellopsis* sp.	0.4±0.9	0	0	0	0	0
Copepoda	*Harpacticus* aff. *flexus*	0.8±1.8	0	0	1±2.2	2±2.5	3±2.5
Copepoda	*Canuella* aff. *perplexa*	0	0.6±1.3	0.6±1.3	1.2±2.2	0.8±1.1	1±1.4
Copepoda	*Paralaophonte* sp.	0	0	0	0	0.4±0.5	0

Group	Species	November 2000	December 2000	January 2001	February 2001	March 2001	April 2001
Nematoda	*Sabatieria* aff. *elongata*	93.2±31.1	90.6±37.7	49±23	49.8±42.6	91.4±49.1	35.6±32.8
Nematoda	*Sabatieria* sp.	0	1.4±3.1	0	0	0	0
Nematoda	*Setosabatieria* aff. *hilarula*	0	0.8±1.8	0	0	0	0
Nematoda	*Siphonolaimus* aff. *niger*	0	0	1±2.2	0	0	0
Nematoda	*Siphonolaimus* sp. 1	61.8±91.4	16.6±19.2	52.8±42.5	52.6±51	63.2±30.4	73.2±20.4
Nematoda	*Siphonolaimus* sp. 2	114.6±138.2	15.8±18.2	192.6±193	159.6±130.8	179.4±86.2	369.6±173.2
Nematoda	*Southernia* sp.	0	0	0	0	0	0
Nematoda	*Spirinia parasitifera*	0	6±2.5	5±5.8	1.2±2.7	0	0
Nematoda	*Synonchiella* aff. *forceps*	11.2±12.1	19.2±5.1	11.8±8	20±12.4	23.6±12.6	12.4±16.3
Nematoda	*Tarvaia* sp.	0	0	0	0	0	0
Nematoda	*Thalassironus* sp. 1	0	0	0	0	0	0
Nematoda	*Thalassironus* sp. 2	0.8±1.8	0	0	0	0	0.8±1.8
Nematoda	*Theristus* sp. 2	0	0	0	0	0	0
Nematoda	*Theristus* sp. 3	0	1.6±3.6	0	0	0	0
Nematoda	*Trefusia* sp.	0	2.2±4.9	0	0	0	0
Nematoda	*Trileptium* aff. *parisetum*	0	0.8±1.8	0	0	0	0.8±1.8
Nematoda	*Vasostoma* sp.	1.6±2.3	0	0.8±1.8	0.8±1.8	0	0
Nematoda	*Viscosia glabra*	0	0	0	0	2.4±3.6	1±2.2
Nematoda	*Xyala striata*	1.6±2.3	7.4±8.5	0	1.2±2.7	0.8±1.8	1±2.2
Copepoda	*Tryphonema* sp.	0.4±0.5	1±1	0.4±0.5	0.2±0.4	0.6±0.9	0
Copepoda	*Halectinosoma* sp.	4.4±4.6	9.2±4.7	7.2±3.3	3.4±2.3	9.4±2.5	7±10.3
Copepoda	*Ectinosomatidae* sp.	0	0.8±1.3	0	0	0	0
Copepoda	*Tisbe* aff. *bulbisetosa*	0	0	0	0	0	0
Copepoda	*Intermedopsyllus* sp.	0	0	0	0	0	0
Copepoda	*Asellopsis* sp.	0	0	0	0	0	
Copepoda	*Harpacticus* aff. *flexus*	0.2±0.4	24±12.3	1.4±3.1	0	0	0.2±0.4
Copepoda	*Canuella* aff. *perplexa*	0	0	0	1±1	8.4±4.9	7.2±12.8
Copepoda	*Paralaophonte* sp.	0	0	0	0	0	0
Polychaeta	*Aricidea (Acmira) catherinae*	0	0	0	0	0	0

to be continued

Continued from Table 2

Group	Species	May 2000	June 2000	July 2000	August 2000	September 2000	October 2000
Polychaeta	*Brania arminii*	0	0.4±0.9	0	0	0	0
Polychaeta	*Capitomastus minimus*	0	0.4±0.9	0	0.8±1.3	0.2±0.4	0
Polychaeta	*Notomastus latericeus*	0.2±0.4	0	0	0	0.2±0.4	0
Polychaeta	*Cauleriella bioculata*	0	0	0.2±0.4	0	0	0
Polychaeta	*Cirriformia tentaculata*	0	0	0	0	0	0
Polychaeta	*Cirrophorus furcatus*	0	0	0	0	0	0.4±0.9
Polychaeta	*Cirrophorus perdidoensis*	0.2±0.4	0	0	0	0	0
Polychaeta	*Dispio uncinata*	0	0.4±0.9	0.4±0.9	0	0	0
Polychaeta	*Exogone breviantennata*	0	0	0	0	0	0.2±0.4
Polychaeta	*Microphthalmus pseudoaberrans*	0.4±0.9	0	0	0	0.4	0.8
Polychaeta	*Ophelia bicornis*	0.2±0.4	0	0	0	0	0
Polychaeta	*Protodrilus* aff. *rubropharyngeus*	0.2±0.4	0	0	0	0	0
Polychaeta	*Parapionosyllis macaronesiensis*	0	0	0	0	0	0
Polychaeta	*Parapionosyllis minuta*	0	0.2±0.4	0	0	0	0
Polychaeta	*Parapionosyllis n.* sp.	0	0	0.2±0.4	0.2±0.4	0	0
Polychaeta	*Perinereis cultrifera*	0	0	0	0	0	0
Polychaeta	*Periquesta canariensis*	0.4±0.5	9.6±20.4	0.2±0.4	0.4±0.5	0.2±0.4	0.2±0.4
Polychaeta	*Petitia amphophthalma*	1±2.2	0	0	0	0	0
Polychaeta	*Pionosyllis spinisetosa*	0	1.2±0.8	1.4±2.1	1.4±3.1	0.2±0.4	0
Polychaeta	*Protodorvillea kefersteini*	0.2±0.4	0	0	0	0	0
Polychaeta	*Rhynchospio glutaea*	0.6±0.9	0.2±0.4	0.8±1.3	0.8	1.6±2.1	1.2±1.1
Polychaeta	*Schoeredella laubieri*	0.6±0.5	1.2±0.8	0	0	0.4±0.5	0
Polychaeta	*Scoloplos armiger*	0	0	0	0	0	0
Polychaeta	*Sphaerosyllis xarifae*	0	0	0	0	0	0
Polychaeta	*Spio decoratus*	0.2±0.4	0	0	0	0	0
Polychaeta	*Spio filicornis*	0.6±1.3	4.6±2.2	2.4±2.8	7.6±3.8	3.8±5.4	4.2±1.6
Polychaeta	*Streptosyllis bidentata*	3.6±3.5	0.6±0.5	0	0.2±0.4	0	0
Polychaeta	*Streptosyllis campoyi*	0.6±0.9	0	0	0	0	0.2±0.4
Polychaeta	*Syllides edentulus*	0	0	0.4±0.9	0	0	0

Group	Species	November 2000	December 2000	January 2001	February 2001	March 2001	April 2001
Polychaeta	*Aricidea (Acmira) catherinae*	0	0	0	0.4±0.9	0	0
Polychaeta	*Brania arminii*	0	0	0	0	0	0
Polychaeta	*Capitomastus minimus*	0.4±0.9	0.4±0.5	0.2±0.4	0.2±0.4	0	0
Polychaeta	*Notomastus latericeus*	0	0	0	0	0	0
Polychaeta	*Cauleriella bioculata*	0	0	0	0	0	0
Polychaeta	*Cirriformia tentaculata*	0	0	0	0	0	0.2±0.4
Polychaeta	*Cirrophorus furcatus*	0.2±0.4	0	0	0	0	0.6±0.9
Polychaeta	*Cirrophorus perdidoensis*	0	0	0	0	0	0
Polychaeta	*Dispio uncinata*	0	0	0.2±0.4	0	0	0
Polychaeta	*Exogone breviantennata*	0	0	0	0	0	0
Polychaeta	*Microphthalmus pseudoaberrans*	0	0.2±0.4	0	0	0	0
Polychaeta	*Ophelia bicornis*	0	0	0	0	0	0
Polychaeta	*Protodrilus* aff. *rubropharyngeus*	0	0	0	0	0	0
Polychaeta	*Parapionosyllis macaronesiensis*	0	0	0	0	0.2±0.4	0
Polychaeta	*Parapionosyllis minuta*	0	0	0	0	0	0
Polychaeta	*Parapionosyllis n.* sp.	0	0	0	0	0	0.4±0.5
Polychaeta	*Perinereis cultrifera*	0.2±0.4	0	0	0	0	0
Polychaeta	*Periquesta canariensis*	0.8±1.3	0.8±0.4	0.2±0.4	0.8±0.4	0.4±0.5	0.2±0.4
Polychaeta	*Petitia amphophthalma*	0	0.6±0.5	0	0.2±0.4	0	0
Polychaeta	*Pionosyllis spinisetosa*	0.6±0.5	0.2±0.4	0.6±0.9	1.8±3.5	0.2±0.4	0.4±0.5
Polychaeta	*Protodorvillea kefersteini*	0	0	0	0	0	0
Polychaeta	*Rhynchospio glutaea*	1.6±1.1	0.6±0.5	1.8±1.3	0.4±0.5	3.4±0.5	1.8±2.5
Polychaeta	*Schoeredella laubieri*	2±3.5	1±0.7	0	0.2±0.4	0	0
Polychaeta	*Scoloplos armiger*	0.4±0.9	0	0	0	0	0
Polychaeta	*Sphaerosyllis xarifae*	0.2±0.4	0	0	0	0	0
Polychaeta	*Spio decoratus*	0	0	0	0	0	0
Polychaeta	*Spio filicornis*	9.4±7.8	8.2±4.1	7.4±3.8	1.4±1.5	10±4.6	7.2±5.1
Polychaeta	*Streptosyllis bidentata*	0.2±0.4	0	0.6±0.9	0.4±0.5	0	0
Polychaeta	*Streptosyllis campoyi*	0.4±0.5	1.8±2	0.6±0.9	0.6±0.9	0	0
Polychaeta	*Syllides edentulus*	0	0	0	0	0	0

to be continued

Continued from Table 2

Group	Species	May 2000	June 2000	July 2000	August 2000	September 2000	October 2000
Polychaeta	*Syllides japonicus*	0.2±0.4	0	0	0	0	1±1.4
Polychaeta	*Syllis armillaris*	0	0	0	0	0.2±0.4	0
Polychaeta	*Syllis garciai*	0	0	1.4±1.9	0	0	0
Turbellaria	*Acoela* sp. 1	0	0	0.2±0.4	0	0.2±0.4	0.2±0.4
Turbellaria	*Catenulida* sp. 1 *(L)*	1.8±1.5	1	3.6±3.4	5.4±4.8	5±2.5	2.6±0.5
Turbellaria	*Catenulida* sp. 2 *(S)*	0.2±0.4	1.2±2.2	0	1.6±1.1	3.6±3.9	0.6±0.5
Turbellaria	*Catenulida* sp. 3 *(M)*	3±3.5	0.8±1.8	0	0.4±0.5	1.2±1.3	1.8±2.4
Turbellaria	*Catenulida* aff. *catenulidae*	0.2±0.4	0.2±0.4	0	0	0.8±1.1	2±1.2
Turbellaria	*Proseriata* sp. 1	1±1.4	0.2±0.4	0	0.2±0.4	1±1.2	0
Turbellaria	*Proseriata* sp. 2	0	0.2±0.4	0	0	1±1.2	0
Turbellaria	*Rhabdocoela* sp. 1	0.2±0.4	0	0	0	0.2±0.4	0.4±0.5
Oligochaeta	*Aktedrilus* sp.	1.2±1.3	23.6±35.2	15.6±18.8	1±1	0.8±1.3	0.8±1.3
Oligochaeta	*Coralliodrilus* sp.	0	1.4±2.6	0.6±1.3	0	0	0.2±0.4
Oligochaeta	*Enchytraeidae* sp.	0.2±0.4	4.4±4.3	3±4.2	0.2±0.4	0	0
Oligochaeta	*Grania* sp.	1.2±1.8	7.6±11.5	3±4.1	0.6±0.9	0.4±0.9	0.8±1.8
Oligochaeta	*Heterodrilus* sp.	0	11.2±21.3	4±6.3	0	0	0.2±0.4
Oligochaeta	*Heterodrilus* sp. 1	0	0	1±1.4	0	0	0
Oligochaeta	*Tubificidae* sp.	0	0	0	0	0	0
Acari	Acaridae	0	0	0	0	0	0.2±0.4
Cnidaria	*Halamnohydra* sp.	0.2±0.4	0	0	0	0	0
Echinodermata	*Echiuroidea*	0.2±0.4	0	0	0	0	0
Amphipoda	*Bathyporeia elegans*	0.2±0.4	0	0.2±0.4	0	0	0
Amphipoda	*Lysianassidae*	0	0	0	0	0	0
Amphipoda	*Pontocrates arenarius*	0	0	0	0	0	0.2±0.4
Amphipoda	*Urothoe* sp.	0.2±0.4	0	0	0	0	0
Decapoda	*Callianassa tyrrhena*	0	0	0	0	0.2±0.4	0
Nemertea	*Ototyphlonemertes* sp. 1	0	0	0	0	0	0
Misidacea	*Gastrosaccus sanctus*	0	0.6±0.9	0	0	0	0
Ostracoda	*Cypridina* aff. *mediterranea*	0	0	0.2±0.4	0	0	0
Tanaidacea	*Apseudes talpa*	0.8±1.1	0	0	0	0	0.6±0.5

Group	Species	November 2000	December 2000	January 2001	February 2001	March 2001	April 2001
Polychaeta	*Syllides japonicus*	0	0	0	0	0.4±0.5	1.6±2.6
Polychaeta	*Syllis armillaris*	0	0	0	0	0	0.6±1.3
Polychaeta	*Syllis garciai*	0	0	0	0	0	0
Turbellaria	*Acoela* sp. 1	0.6±1.3	0.8±0.8	0.6±1.3	0.4±0.5	0	0
Turbellaria	*Catenulida* sp. 1 *(L)*	2.8±1.1	2.6±2.2	6.8±2.6	1.8±1.6	0	0
Turbellaria	*Catenulida* sp. 2 *(S)*	0.4±0.5	0.6±0.9	1±1	0.2±0.4	0	0
Turbellaria	*Catenulida* sp. 3 *(M)*	0	2.4±1.7	1.2±1.8	0	0	0
Turbellaria	*Catenulida* aff. *catenulidae*	2±1.4	2.6±2.7	3.6±2.6	0.2±0.4	0	0
Turbellaria	*Proseriata* sp. 1	0.8±1.8	1±1	5.8±4.9	2	0	0
Turbellaria	*Proseriata* sp. 2	0	0	0	0	0	0
Turbellaria	*Rhabdocoela* sp. 1	0	0	0.4±0.5	0	0	0
Oligochaeta	*Aktedrilus* sp.	2.4±4.3	0.2±0.4	0.4±0.5	0.4±0.5	5.8±11.9	13±21.4
Oligochaeta	*Coralliodrilus* sp.	0	0	0	0	0	0.2±0.4
Oligochaeta	*Enchytraeidae* sp.	0.8±0.8	0	0	0	0.4±0.9	3.8±8.5
Oligochaeta	*Grania* sp.	3.8±6.5	0.2±0.4	0	0	3±6.7	11.6±23.7
Oligochaeta	*Heterodrilus* sp.	0.2±0.4	0	0	0	3.4±7.6	0.8±1.1
Oligochaeta	*Heterodrilus* sp. 1	0	0	0	0	0	0.2±0.4
Oligochaeta	*Tubificidae* sp.	0	0	0	0.4±0.5	2.2±3.9	0.4±0.9
Acari	Acaridae	0	0.2±0.4	0	0	0	0
Cnidaria	*Halamnohydra* sp.	0	0	0	0	0	0
Echinodermata	*Echiuroidea*	0	0	0	0	0	0
Amphipoda	*Bathyporeia elegans*	0	0	0.2±0.4	0	0.2±0.4	0
Amphipoda	*Lysianassidae*	0.2±0.4	0	0	0	0	0
Amphipoda	*Pontocrates arenarius*	0.6±0.9	0	0.4±0.9	0.4±0.5	0.6±1.3	0
Amphipoda	*Urothoe* sp.	0	0	0	0	0	0
Decapoda	*Callianassa tyrrhena*	0	0	0	0	0	0
Nemertea	*Ototyphlonemertes* sp. 1	0	0	0	0.2±0.4	0	0
Misidacea	*Gastrosaccus sanctus*	0	0	0	0	0	0
Ostracoda	*Cypridina* aff. *mediterranea*	0	0.2±0.4	0	0	0.2±0.4	0
Tanaidacea	*Apseudes talpa*	2±2.1	13.6±8.9	0	0.8±0.8	0	0

to be continued

Meiofauna density ranged from 151.63 ind./10 cm^2 (May 2000) to 853.46 ind./10 cm^2 (January 2001) (Fig. 2). Meiofaunal abundances were more or less stable throughout the study year, however, a sharp decrease occurred in May 2000, posteriorly recovered two months later (July 2000). As expected, meiofaunal abundance showed highly significant differences during the study period (one-way ANOVA, F=17.612; $p \ll 0.000\ 1$) (Fig. 2, Table 3).

3.3 *Nematodes*

Nematode abundances ranged from 117.6 ind./10 cm^2 (May 2000) to 800 ind./10 cm^2 (January 2001). Nematode densities obtained highly significant differences throughout the sampling period (one-way ANOVA, F=19.476, $p \ll 0.001$) (Fig. 3, Table 3). A total of 74 species of free-living nematodes were identified. The most abundant species were *Siphonolaimus* sp. 2 (10 623 ind.) and *Catanema* sp. (8 907 ind.), which made up ca. 50% of the overall meiofaunal abundance. *Siphonolaimus* sp. 2 abundances ranged from 3.4 ind./10 cm^2 (May 2000) to 447 ind./ 10 cm^2 (July 2000) (Fig. 4, Table 2). *Catanema* sp. abundances ranged from 41.2 ind./10 cm^2 (May 2000) to 334 ind./10 cm^2 (February 2001) (Fig. 5, Table 2). Both species showed significant differences throughout the study period (*Siphonolaimus* sp. 2, F=6.10, $p \ll 0.000\ 1$; *Catanema* sp., F=5.24, $p \ll 0.000\ 1$) (Table 3). In contrast, the species *Ammotheristus* sp., *Enoplus* sp., *Rhabdodemania* sp., and *Tarvaia* aff. *peruvensis* were scarce (Table 2).

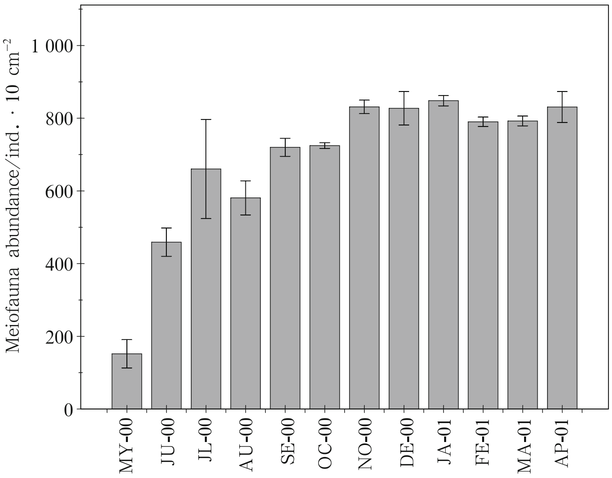

Fig.2. Meiofaunal abundances (±SE) throughout the study period (May 2000–April 2001).

Table 3. Results of univariate ANOVA testing for differences in overall meiofaunal abundance and nematode, copepod, and oligochaete abundances throughout the study period (May 2000–April 2001)

Source of variation	Overall meiofaunal abundance			Nematode abundance			Copepod abundance		
	MS	*F*	*p*	MS	*F*	*p*	MS	*F*	*p*
DF	209 750	17 162	≪ 0.000 1*	2 289 756	19 476	≪ 0.000 1*	440.05	4.238	0.000 2*

Source of variation	Oligochaete abundance			*Siphonolaimus* sp. 2 abundance			*Catanema* sp. bundance		
	MS	*F*	*p*	MS	*F*	*p*	MS	*F*	*p*
DF	1 225.18	1.411	0.199	96 464.37	6.103	≪ 0.000 1*	36 009	5.243	≪ 0.000 1*

Notes: * Significant differences (p <0.01). MS represents mean squares and DF degrees of freedom.

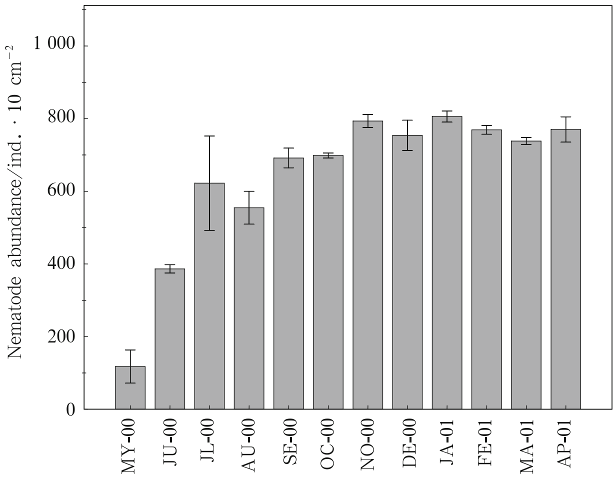

Fig.3. Nematode abundances (±SE) throughout the study period (May 2000–April 2001).

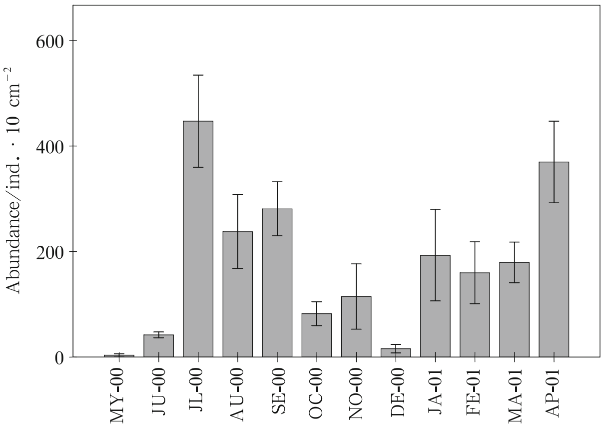

Fig.4. Nematode *Siphonolaimus* spB. Average abundances (±SE) from May 2000 to April 2001.

3.4 *Oligochaetes*

Oligochaete abundances ranged from being less than 3 ind./10 cm^2 (December 2000, January 2001, and February 2001) to 52 ind./10 cm^2 (June 2000) (Fig. 4). This taxonomic group did not show significant differences in its abundance throughout the study period (F=1.411, p=0.199) (Table 3). A total of seven oligochaete species were identified. The most abundant species were *Aktedrilus* sp. (326 ind.) and *Grania* sp. (161 ind.). In contrast, the species *Coralliodrilus* sp. (12 ind.) and *Heterod-*

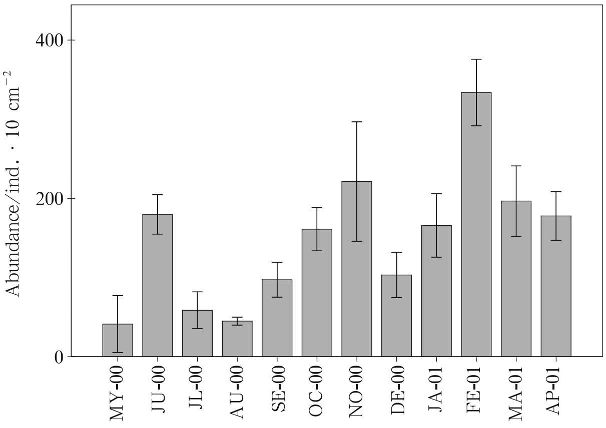

Fig.5. Nematode *Catanema* sp. Average abundances (±SE) from May 2000 to April 2001.

rilus sp. 1 (6 ind.) were scarce (Table 2).

3.5 *Copepods*

Copepod abundances ranged from 1 ind./10 cm^2 (July 2000) to 35 ind./10 cm^2 (December 2000) (Fig. 6). Significant variations were found in copepod abundances during the study year (F=4.238; p=0.000 2) (Table 3). A total of nine copepod species were identified. The most abundant species were *Halectinosoma* sp. (255 ind.) and *Harpacticus* aff. *flexus* (163 ind.). In contrast, the taxa *Tisbe* aff. *bulbisetosa*, *Asellopsis* sp., and *Paralaophonte* sp. were scarce (Table 2).

3.6 *Polychaetes*

Polychaete abundances ranged from 7 ind./10 cm^2 (February 2001) to 18 ind. 10 cm^{-2} (June 2000) (not shown). A total of 33 polychaete species were identified. The most abundant species was the *spionid Spio filicornis* (334 ind.). In contrast, 13 species were scarce (Table 2).

3.7 *Turbellarians*

Turbellarian abundances ranged from 3 ind./10 cm^2 (June 2000 and July 2000) to 21 ind./10 cm^2 (January 2001) (not shown). A total of eight turbellarian species were identified. The most abundant were *Catenulida* sp. 1 (198 ind.) and *Proseriata* sp. 1 (75 ind.). In contrast, the species *Proseriata* sp. 2 and *Rhabdocoela* sp. 1 were scarce (Table 2).

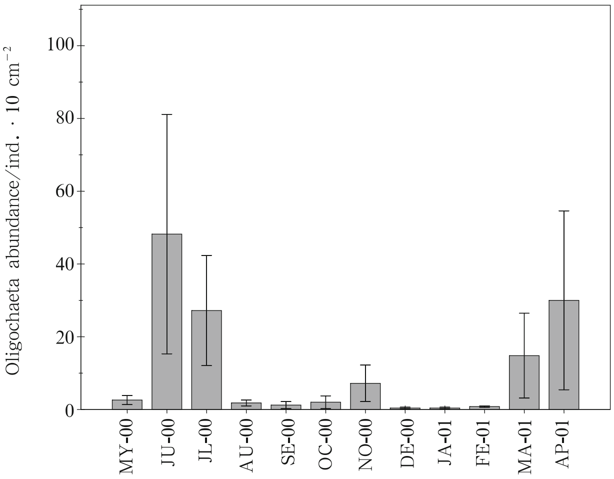

Fig.6. Oligochaeta. Average abundances (±SE) from May 2000 to April 2001.

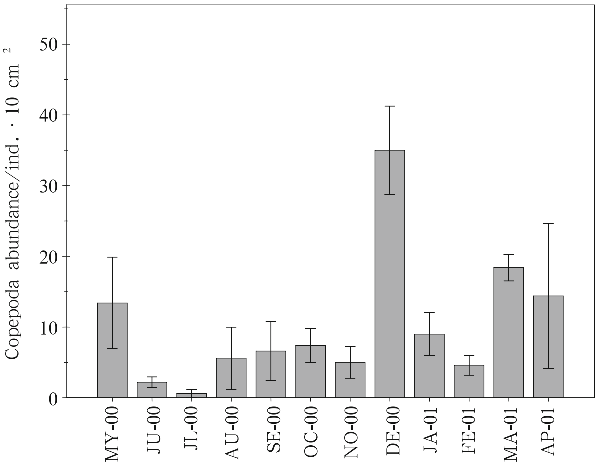

Fig.7. Copepoda. Average abundances (±SE) from May 2000 to April 2001.

3.8 *Minor groups*

Minor taxa were constituted by acari, decapods, echinoids, amphipods, nemerteans, ostracods, kinorhynchs, and tanaids. A total of 13 species were identified, four of which were amphipods (*Pontocrates arenarius*, *Bathyporeia elegans*, *Lysianassidae*, and *Urothoe* sp.), while one species contributed to each of the remaining taxonomic groups. The most abundant species was the tanaid *Apseudes talpa* (89 ind.), followed by the amphipod *Pontocrates arenarius* (11 ind.). In contrast, seven species were scarce throughout the study period (Table 2).

3.9 *Multivariate analysis*

The cluster analysis using means of all months of the study year produced a dendrogram with six distinct groups (Fig. 8), which were also observed in the n-MDS (Fig. 9). The samples clustered in the dendrogram presented a high similarity (>50%). Samples clustered in Group I corresponded to July 2000 (53% of similarity), while those clustered in Group II corresponded to May 2000 (56% of similarity). Samples from March and April 2001 were included in Group III (64% of similarity) and those of June 2000 were included in Group IV (65% of similarity). At the level of 69% of similarity, the remaining months of the year were separated into two groups (V and VI). Group V (August, September, October, and November 2000) and Group VI (December 2000, January 2001, and February 2001) were separated at the level of 70% of similarity. Group V was characterized by intermediate abundances of nematodes and Group VI obtained high densities of nematodes, polychaetes, and turbellarians.

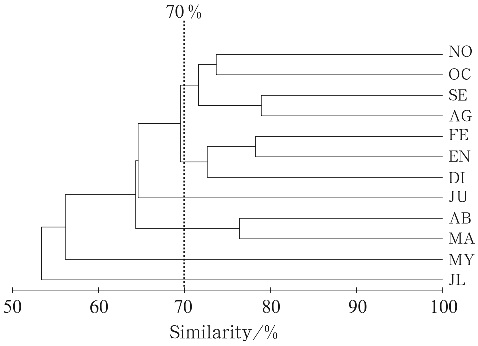

Fig.8. Dendrogram of similarity of sampling months during the study period (May 2000–April 2001).

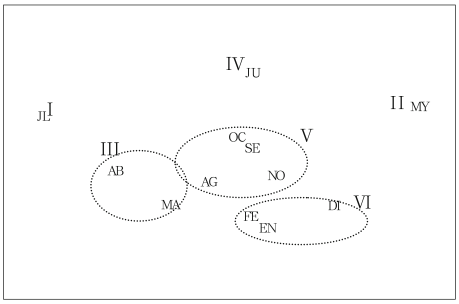

Fig.9. Multidimensional scaling (MDS) of sampling months during the study period (May 2000–April 2001) (stress=0.14).

In terms of species composition, Group I (July 2000) was dominated by two nematode species belonging to the genera *Siphonolaimus* (sp. 1 and sp. 2) and *Catanema* sp. Group II (May 2000) was characterised by high densities of the nematodes *Catanema* sp., *Oncholaimus campylocercoides*, and the harpacticoid copepod *Ectinosomatidae* sp 1. Group III (March and April 2001) was dominated by the nematodes *Siphonolaimus* (sp. 1 and sp. 2) and *Catanema* sp. Group IV (June 2000) was overwhelmingly dominated by the nematode *Catanema* sp. and, to a lesser extent, by the nematodes *Sabatieria celtica* and *Siphonolaimus* sp. 2. Group V (August, September, October, and November 2000) were characterised by the nematodes *Siphonolaimus* sp. 2 and *Catanema* sp. Group VI (December 2000, January 2001, and February 2001) was dominated by the nematodes *Catanema* sp. and *Siphonolaimus* sp. 2, followed by *Oncholaimus campylocercoides* and *Sabatieria celtica.*

Meiofaunal assemblage structure showed temporal variations throughout the study period (May 2000–April 2001) (one-way ANOSIM, R=0.249, p=0.003). This result was mainly due to the temporal variability of the nematodes *Siphonolaimus* sp. 2 and *Catanema* sp. that overwhelmingly dominated the meiofaunal assemblages. BIOENV analysis showed that variations in the percentages of organic matter, fine sands, and very fine sands clearly affected the meiofaunal assemblage structure of the sampling station (p=0.769) (Table 4). Thus, the former environmental variables, which showed temporal variations in the sampling location, were best for explaining meiofaunal abundances during the study period.

4 Conclusions

In the present study, we observed a response through time at the assemblage level and major taxonomic groups, resulting in a temporal trend of meiofauna in the studied location. The trend was mainly caused by temporal fluctuations of the two most abundant species (nematodes *Siphonolaimus* sp. 2 and *Catanema* sp.), which dominated the meiofaunal assemblage during the study period. These variations were partially explained by temporal shifts of sedimentary variables (e.g., grain size composition and organic matter content).

Table 4. Summary of results from BIOENV analysis

Correlation	Variables
0.769	Organic matter, fine sands, and very fine sands
0.768	Nitrogen, organic matter, fine sands, and very fine sands
0.752	Organic matter, fine sands, very fine sands, and silt/clay
0.751	Nitrogen, organic matter, fine sands, very fine sands, and silt/clay
0.735	Fine sands and very fine sands
0.733	Nitrogen, fine sands, and very fine sands
0.723	Nitrogen, fine sands, very fine sands, and silt/clay

Notes: Faunal abundances were square root transformed and environmental variables were $\log_{10}(x+1)$ transformed.

Interstitial subtidal species are faced with two gradients: physical-horizontal (sediment stability) and chemical-vertical (oxygen concentration) gradients (McLachlan and Jaramillo, 1995; Armonies and Reise, 2000). The combination of those horizontal and vertical gradients may generate a complex spatial matrix of living conditions (Fenchel et al., 1967). In intertidal and subtidal seabeds, meiofaunal abundances vary according to temperature, tidal exposure, wave action, grain size, oxygen availability, substratum porosity, water percolation, organic input, and other factors. (Coull, 1988; Gheskiere et al., 2005). In general, nematodes dominate benthic meiofauna communities, comprising more than half of the overall meiofaunal abundances (McLachlan, 1983), as occurred in the present study. Harpacticoids are usually subdominant or a secondary group in terms of abundance (McIntyre, 1969).

The dominance of the nematodes *Siphonolaimus* sp. 2 and *Catanema* sp. was probably due to the trophic strategies of these species, which could be an advantage in oligotrophic environments, such as the study area (Canary Islands). Strong evidence has been found from the genus *Catanema* that it derives most of its carbon from autotrophic sulphur bacteria (Tom Moens *pers. comm.*). It is likely to get its energy from bacteria that act as endo- or ectosymbionts. In the case of endosymbionts, *Catanema* probably do not feed on them, although *Catanema* may digest part of them as they live in the intestine, but instead utilize dissolved secreted carbon sources from the bacteria. As ectosymbionts, *Catanema* could do the same (dissolved organic matter may penetrate through the cuticle) or they may feed on the bacteria growing on their cuticles (Tom Moens *pers. comm.*). However, a simpler explanation is that *Catanema* species may just feed on free-living bacteria, but that needs to be checked in future works. No detailed information about *Siphonolaimus* trophic strategies has been found in prior works.

In short, meiofaunal assemblages showed temporality in the sampling location throughout the study period. This temporal variation was partially explained by differences in the percentages of fine sands, very fine sands, and organic matter content throughout the study period. However, a detailed ecological study (including physical variables and biological interactions) is necessary in order to accurately explain temporal variations in this area.

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