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Relationships between Trophic Structure and Diel Migrations of Isopods and Amphipods in a *Posidonia oceanica* Bed of the Island of Ischia (Gulf of Naples -Italy)

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The complexity of trophic webs in highly productive seagrass systems is related to the multiplicity of the available microhabitats. Diel migrations of seagrass animals along the plant vertical axis represent a microhabitat shift that is a response to both biotic and abiotic factors (Ledoyer, 1962; Greening & Livingston, 1982); feeding requirements versus hiding are one explanation for such shifts (Kitting, 1986).

Isopods and Amphipods are among the major components of Posidonia oceanica vagile fauna (Scipione et al., 1983; Mazzella et al., 1989) and play a fundamental role in trophic webs, both as consumers (Scipione, 1989; Gambi et al., in prep.) and as food for predators (Chessa et al., 1982; Khoury, 1984; Sparla, 1989). Species of these two taxa are also responsible for important diel migrations. Therefore relationships between migrations and feeding habits warrant investigation.

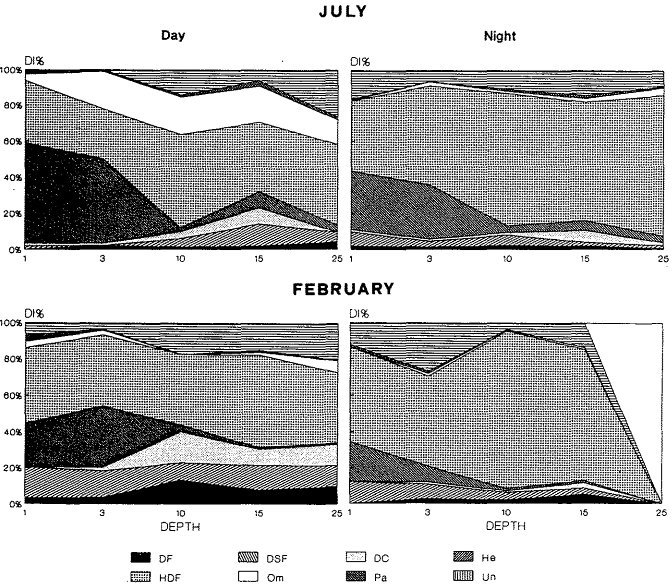
In this framework, research on different taxa of P.oceanica vagile fauna were undertaken, of which the present study is a part. Samples were collected by hand net along a depth gradient (1, 3, 10, 15 and 25m) in Lacco Ameno prairie (Island of Ischia), both daytime and nighttime, in July 1981 and February 1982. Trophic analysis was performed on 9 categories identified according to the literature: Deposit Feeders (DF), Deposit- Suspension Feeders (DSF), Deposit Feeders- Carnivores (DC), Herbivores (He), Detritus Feeders (DeF), Carnivores (Ca), Herbivores- Deposit Feeders (HDF), Omnivores (Om) and Parasites (Pa); species on which information is lacking were designated Unidentified (Un).

Seventeen species of Isopods and 77 of Amphipods were identified.

Total abundance of Isopods in night samples shows increases over day samples from 80 to 996 ind. in July and from 72 to 547 ind. in February. In July, of the 15 recorded species, a clear migrant behaviour was shown only by HDF species (Idotea hectica, Zenobiana prismatica, Cymodoce emarginata and C.hanseni) and Ca species (Jaeropsis dollfusi and Paranthura nigropunctata). In February, of the 16 recorded species, only C.emarginata and C.hanseni show defined patterns. On the whole, the bulk of migrant Isopods is formed by HDF, strongly dominated by C.hanseni juveniles; their quantitative dominance rises from 61% (day) to 86% (night) in July and from 62% to 94% in February. Depth- related zonation of migrant species does not appear to vary significantly between day and night; in particular, C.hanseni, which determines trends of HDF, shows an increasing pattern with depth.

Amphipods reach the highest abundance in night samples both in July (51 species; 2,378 ind.) and February (38; 1,534) in comparison with day samples of July (33; 857) and February (63; 809). The most represented trophic groups were He (mostly Amphithoe helleri, A.ramondi and Hyale schmidti), which are dominant in superficial stations, mainly in July (57.81%), and which show an increase (from 166 to 326 ind.) from day to night; HDF, mostly represented by Aora spinicornis, Apherusa chiereghinii and Dexamine spinosa, are present along the whole transect, mainly at intermediate and deep stations, and show a massive increase from day to night samples, considering both months, from 310 to 1,211 ind., also at 1m, where they become dominant in February (42.5%). The other trophic groups are less represented and only DF and DSF show an increase in night samples, the latter at shallower stations. Some species, as Amphilochus picadurus, Peltocoxa gibbosa and Apherusa vexatrix, which show a deep distribution at daytime, are well represented at night in the shallower stand.

On the whole, He and HDF are strongly dominant both at night and day and diel migrations are generally undertaken by species belonging to these two groups (Fig. 1). The increase at night of plant feeders may be the result of a migration towards food sources located at the upper layers of the canopy, such as epiphytic micro- and macroalgae of leaf blades. Diel variation in vertical distribution is probably due to a number of factors which act equally all along the transect, such as predation, and to others which seem to be more limiting at shallow stands, such as light intensity and temperature. Based also on observations made for other phanerogams (Nagle, 1968), at the level of the leaf stratum HDF seem to play a major role in the energy transfer to higher trophic levels, a role that was formerly underestimated.



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The *Posidonia oceanica* (L.) Delile Meadows of Egyptian Waters. Amphipods from the Alexandria Meadows

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Seasonal collections of the Amphipods of a Posidonia meadow at 5-7 m depth were carried out in 1987-1988 in Miami Bay, Alexandria, the samples were collected from 100 cm^2 quadrates using a rectangular frame. The population composition, abundance, richness, diversity index and evenness were determined.

The Posidonia beds, with their associated communities are of considerable importance along the Mediterranean infralittoral zone of Alexandria region, but very little information is available about their ecosystem. Scellenberg (1936) mentioned eleven species associated with Posidonia meadows off the coast of Alexandria. Latter, Atta (1985) identified 14 Gammaridean and 3 caprellidean Amphipods associated with the meadows.

A total of 27 species (Gammarideae and Caprellideae) were identified from a total of 9570 individual/m^2. Amphilochus manudens, Amphithoe rubricata, Aora spinicornis and Lembos karamani are new records for Alexandria waters. Maera inaequipes ranks first in abundance (22%).in the meadows followed by Ericthonius brasiliensis (20%), Jassa marmorata (18%), Elasmopus pectenicrus (16%), Corophium acherusicum (5%), Microdeutopus obtusatus (5%), Amphithoe ramondi (3%), Caprella acanthifera (2%), Leucothoe spinicarpa (2%), Hyale prevosti (1%), Corophium sextonae (1%). Several other species occurred regularly but in small numbers. Schellenberg recorded also Ampelisca unidentata, Tritaeta gibbosa and Amphithoe helleri.

Comparison with other Mediterranean localities shows that 18 species are common to most Mediterranean Posidonia beds including the Alexandria meadows (Scipione and Fresi, 1984; Scipione and Chessa, 1986; Krapp-Schickell, 1976; Schellenberg, 1936; Atta, 1985 and present records). The relative abundance of the species however is variable and depends on the depth and proximity of the meadows from the coast. According to Ledoyer (1966) the "typical" Posidonia community is the deep one. The present study shows "contagion" of the investigated beds by intruding Amphipod species from the nearly infralittoral rocky communities, in addition to the typical Posidonia species. The numerical abundance and the number of species were significantly much greater in Spring than during other seasons, this is reflected also by the richness (R). Diversity (H'), however, increases in Winter as shown in Table 1.

Table 1. Total number of species and individual/m^2, diversity index (H', Shannon & Weaver), richness (R, Margalef), evenness (J', Pielou) at different seasons in Alexandria meadow.

Season	No.of species	number of individual/m^2	H'	J'	R
Spring	24	3240	1.93	0.61	2.85
Summer	17	3390	1.80	0.64	1.97
Autumn	15	2220	2.00	0.74	1.82
Winter	14	720	2.11	0.80	1.98

Acknowledgement

The first author is gratful to Dr. Roger Lincoln, British Museum of Natural History (Crustacea section) for his guidance during her stay in 1983. The authors are also thankful to Mr. H. Mansour and Dr. S. Hosny for their cooperation.

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