

Impact of shading on meiofauna in a *Posidonia oceanica* meadow



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Introduction:

Aquaculture is threatening *P. oceanica* meadows, a key endemic ecosystem of the Mediterranean coasts. In zones of intensive fish production, this ecosystem tends to collapse and disappear. One of the reasons for this is a decrease in the light that reaches the leaves (direct shading, increase of water turbidity and/or of epiphytic algae density due to nutrient enrichment of the water column and sediment). However, the impact of this shading on the sediment part of this ecosystem is not well known.

Material & methods:

An *in situ* shading experiment was led from the end of May to the end of August 2009 (3 months), at a depth of 10 m, in a reference *P. oceanica* meadow (STARESO, Corsica, France). Three shading nets (Fig. 1) were put in the meadow, at 50 cm above the canopy level, to reach a light extinction of 50%. A control site was also defined near this shading site. The first two centimeters of sampled sediment cores were studied.

Table 1: SIMPER results for the comparison between T=0 and T=3 months at the « Shading » site. Observed taxon abundances (Nb.m⁻², 31 taxa) were used for the analysis. Average dissimilarity between both groups (%), the ratio between the average dissimilarity and its SD, the contribution to group difference (%) and the cumulative contributions (90% cut-off) are presented for every taxa. *=discriminating taxa.

Taxa	Average dissimilarity (%)	Diss./ SD	Contribution to group difference (%)	Cumulative percentage (%)
Foraminifera	19,9	1,72*	47,51	47,51
Nematoda	10,39	1,57*	24,81	72,31
Copepoda	2,61	1,19	6,22	78,54
Nauplii	1,41	1,44*	3,37	81,91
Bivalvia	0,97	1,36	2,3	84,21
Ostracoda	0,87	1,19	2,08	86,29
Gnathostomulida	0,79	1,46*	1,9	88,18
Turbellaria	0,66	0,94	1,58	89,76
Polychaeta	0,62	1,34	1,48	91,25

Conclusion:

Shading by itself provoke a decrease in meiofauna abundance in a *P. oceanica* meadow. So, nutrients and organic matter enrichment of the sediment are not the only processes that affect meiobenthic communities near aquacultures. However, the way by which this phenomenon happens is not clear and involves maybe physiological reactions of the plant.

Aims:

Aims of this study are to determine if there is an effect of shading on the meiofauna living in the sediment of a *P. oceanica* meadow and, if so, to characterize this effect.



Fig. 1: Shading nets: mosquito nets (length: 3m, width, 1m)

Results and discussion:

After three months of shading, the total abundance of meiofauna at the shading site was lower than at the beginning of the experiment, while no significant change was observed at the control site (Fig.2). This is a common characteristic of perturbation due to aquaculture. From table 1, foraminiferans, nematods, nauplii and gnathostomulids were identified as discriminating taxa between T=0 and T=3 months and 72,31% of the observed decrease is explained only by a decrease in foraminiferans and nematods. Those results cannot be explained clearly by the measured physico-chemical parameters of the sediment. However, the number of leaves by shoot of *P. oceanica* and their chlorophyll a content tend to be lower at the end of the experiment, suggesting an effect of shading on the plant.

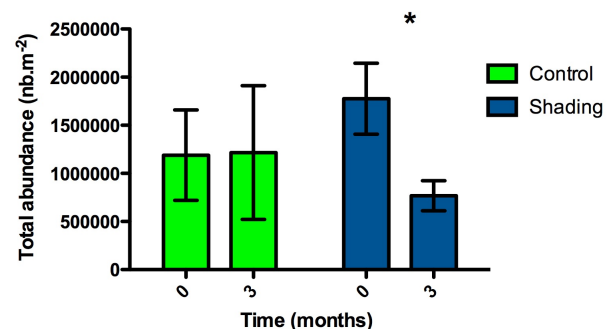


Fig. 2: Total abundance of meiofauna (nb.m⁻²), at the sediment surface (0-2 cm), before (0 month) and at the end of the experiment (3 months), for the control and shading sites (n=3, mean and SD, *=significant difference).