

Habitat preferences in the early benthic life of European spiny lobster (*Palinurus elephas*) from the Mediterranean Sea

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INTRODUCTION & OBJECTIVES

The European spiny lobster (*Palinurus elephas*) has a complex life history. Mechanisms of habitat selection by pueruli are unknown for most species of spiny lobsters (Butler and Herrnkind, 2000). The microhabitat they inhabit is very complex, and survival is related to habitat quality, shelter, and protection (Butler *et al.* 1997, Díaz *et al.* 2005). Recent studies of *P. elephas* Early Benthic Juveniles (EBJs) suggest they have a preference for specific habitats. Our objective was to determine the preferred natural habitat of *P. elephas* EBJs in the western Mediterranean and determine whether there are differences in habitat preferences over a wide geographic area.

METHODS

Underwater visual census (UVC) were performed from the surface to 40 m depth. UVC transects consisted of random 5 minute searches, each within a 5m depth range. Habitat preferences were compared among six different locations (Fig 1) with UVC surveys performed during the settlement season (June to September). The following data were recorded for the surrounding habitat of each individual EBJ observed: General habitat characteristics which included: depth, inclination, orientation and type of shelter (date mussel holes (*L. lithophaga*) or natural crevice) and distance to bottom. Species composition of the microhabitat surrounding EBJs which was recorded using close-up pictures (18x13 cm frame).

RESULTS: HABITAT PREFERENCES

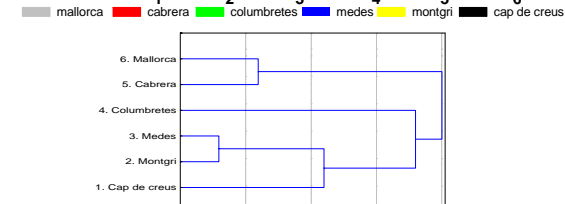
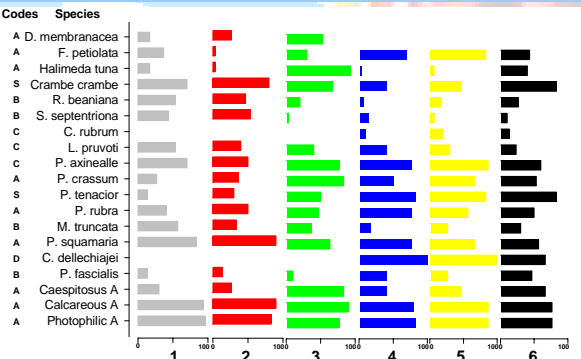


Fig 3. Percentage of appearance of the most frequent microhabitat species surrounding EBJs for each location. N=30 photographs for each site (June-September) Cluster shows locations separated by the microhabitat used by the EBJs. Codes - A,algae; S,sponge; C, cnidarian; B, briozoan; D, ascidian

Variable	Mean	Statistic
Inclination	45-90	p=,01650
Orientation	NW-NE	p=,33450
Bottom distance	0,9	p=,24078

Table1. Statistic analysis of three environmental variables with no differences between sites. One-way ANOVA.



Fig 6. EBJ sheltered in a date mussel hole with a mosaic sponge microhabitat

STUDY AREA



Fig 1. Sampling sites along the Spanish Mediterranean coast. 1. Cap de Creus 2. Medes Islands 3. Montgrí 4. Columbretes 5. Mallorca Coast 6. Cabrera National Park



Fig 2. Early Benthic Juvenile of *Palinurus elephas* foraging outside the shelter at 10 mm Carapace length.

LOCATIONS	MPA	Density (EBJ/100m ²)	SD	Depth (m)	SD
1.Cap de Creus	👍	0.94	0.26	25	8.6
2. Medes	👍	2.50	0.91	13,8	3.5
3. Montgrí	👎	4.89	1.57	11	3.4
4. Columbretes	👍	1.32	0.48	21	7.1
5. Mallorca	👎	0.66	0.14	24	3.2
6. Cabrera	👍	0.47	0.08	25	7.8

Fig 5. Protection status of the sampling localities and the mean densities and mode depth of EBJ of *Palinurus elephas* for all sites during 2005.

HABITATS	EBJ
Big Boulders (>2m Ø)	😊
Sparce boulders(< 2m Ø)	😊
Crest	😐
Walls	😐
Large slope with boulders	😐
Deep rocky habitats	😞
Posidonia oceanica	😞
Sand base with rocks	😞
Deep Canyons	😞
Caves and Tunnels	😞

Table 2. Different spiny lobster habitat preferences classified in three categories. 😊 High, 😐 Medium, 😞 Low.

CONCLUSIONS

Post settlement habitat selection has strict preferences (inclination, bottom distance, macrohabitat, sciaphilic communities). Early benthic juveniles of *P. elephas* prefer holes or crevices which are on vertical surfaces or overhanging surfaces 45-90 degrees from vertical, are less than 1m from the seabed and oriented to the north quadrant. The most commonly selected habitats are on the sciaphilic surfaces of boulders and big boulders. EBJ abundance peaks appear to be linked to a microhabitat community rather than directly to depth. Their preferred microhabitat consists of short erect fleshy algae with sponge mosaics and ascidians. These sciaphilic communities don't disturb the protruding behavior of juveniles and allow nocturnal foraging relatively free of obstacles. There is a difference in the species composition of these communities between sites that reflects a north-south gradient in water clarity.

There are significantly different densities of EBJs between sites during the year of this study. Differences in density of EBJs between locations are not correlated with the level of protection and are more likely a reflection of the larval supply or habitat availability. There appear to be no differences between sites related to environmental parameters (orientation, inclination and bottom distance).