FISH ASSEMBLAGES OF THE MOROCCAN COASTAL AREA OF AL HOCEIMA (MEDITERRANEAN SEA)

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Abstract
The fish assemblage of the marine coastal area of the Al Hoceima National Park has been studied in the framework of a research program for the elaboration of the zoning proposal of the marine park. Collected data show the presence of rich and well diversified assemblages, characterised by a general dominance of small and medium sized specimens.

Keywords: Visual census, Marine Parks, Alboran Sea

Introduction

In the framework of the MedMPA project (regional project for the development of Marine and coastal Protected Areas in the Mediterranean region), financially supported by the European commission and coordinated by the Regional Activity Centre for Specially Protected Areas (RAC/SPA-Tunis), ICRAM has been charged with the scientific coordination of the study of the Al Hoceima National Park in Morocco.

Considering the relevance of fish as one of the most important components through which the effects of protection become evident in marine parks [1-3], and the importance of conceiving management measures for fishery and scuba diving activities [4], two surveys were carried out to characterise the coastal fish assemblages in the coastal area applying visual census techniques.

Material and Methods

The coastline of the Moroccan National Park of Al Hoceima interests about 47 km of Mediterranean coast, characterised by rocky impervious cliffs. The sampling activity was organised subdividing the coastal area into 5 sub-homogeneous coastal units (CU) (Fig. 1), identified on the basis of the main geomorphological features.

Scuba diving paths of 15 minutes were carried out in summer 2002 and 2003 along transects based on four sampling depth ranges (0-3; 4-7; 12-16; 24-30m), in order to acquire semi quantitative data on abundance and size class composition [5]. At least 3 transects were planned *per* CU. The main sea bottom typologies for each path were registered. A Chi-square test was applied to compare the size class composition recorded in the five considered CUs.

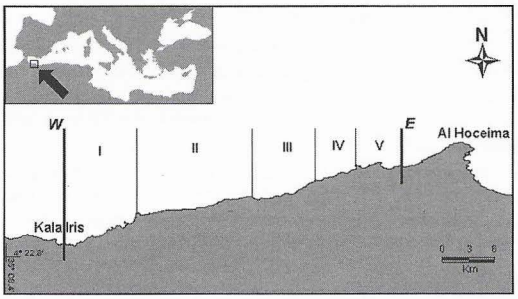

Fig. 1. Study area: the eastward (E) and westward (W) borders of the Al Hoceima National Park are shown. The 5 identified coastal units (I-V) are highlighted.

Results

The low slope encountered on certain transects sometimes did not allow to reach the 12-16 and the 24-30 m depth ranges. On the whole, 52 paths allowed to identify 69 species (10 Eastern Atlantic and South Mediterranean). Sparids, Labrids and Serranids were the most represented families (15, 14 and 8 species respectively).

Only 17 species occurred in all five CUs while another 17 were each censed only in one CU. This may be due specific characteristics like crypticity (*C.conger*, *P.phycis*, *S.notata*, *S.acus*), and rarity (*L.bergylta*, *S.cretense*, *E.aeneus*, *E.marginatus*, *P.auriga*, *S.aurata*, *T.nobiliana*) or because they are associated to soft bottoms (*B.podas*, *Callionymus* sp., *Gobius* sp., *S.cinereus*, *P.erythrinus*). The higher number of species were recorded in the costal unit IV (48). Highest species richness were recorded at 0-3 m and 4-7 m (47 species).

Excluding CU I, which is dominated by small specimens (65.8%), and significantly different from the others (chi-square test, $p<0.001$), the fish assemblage of the marine park was characterised by a general co-dominance of medium sized (from 43.9% to 56.0%) and small specimens (from 33.7% to 43.3%). The large size class is generally less represented (from 8.9% to 15.0%). Taking into account only the first depth range, the I, III and IV CUs were characterised by a high percentage of small specimens (higher than 60%). The higher percentages of large specimens were recorded in the deeper range (24-30 m) in the II and III CUs (23.6% and 24.3% respectively).

Table 1. Species recorded in the five coastal units identified along the study area. (•)) Eastern Atlantic and South Mediterranean species.

Family	Species	Coastal Unit
Atherinidae	*Atherina* sp.	I,III,IV,V
Apogonidae	*Apogon imberbis*	II,III,IV,V
Blenniidae	*Parablennius gattorugine*	I,III
	Parablennius incognitus	IV,V
	Parablennius pilicornis (•)	**All**
	Parablennius rouxi	II,III,IV,V
	Parablennius sanguinolentus	I,III
	Scartella cristata (•)	II,V
Bothidae	*Bothus podas*	IV
Callionymidae	*Callionymus* sp.	IV
Congridae	*Conger conger*	II
Engraulidae	*Engraulis encrasicholus*	III,V
Gadidae	*Phycis phycis*	IV
Gobiidae	*Gobius bucchichii*	I,IV,V
	Gobius cruentatus	II,III,V
	Gobius sp.	IV
Haemulidae	*Parapristipoma octolineatum*(•)	I
Labridae	*Coris julis*	**All**
	Ctenolabrus rupestris	II,III,IV,V
	Labrus bergylta (•)	II
	Labrus viridis	III,IV
	Symphodus cinereus	II
	Symphodus doderleini	I,II,III,IV
	Symphodus mediterraneus	**All**
	Symphodus melanocercus	II,III,IV,V
	Symphodus melops	**All**
	Symphodus ocellatus	**All**
	Symphodus roissali	**All**
	Symphodus rostratus	II,IV,V
	Symphodus tinca	**All**
	Thalassoma pavo (•)	**All**
Moronidae	*Dicentrarchus labrax*	I,II,V
Mugilidae	*Mugil* sp.	I,II,III,V
Mullidae	*Mullus barbatus*	III,IV
	Mullus surmumetus	**All**

Family	Species	Coastal Unit
Muraenidae	*Murena melena*	I,V
Pomacentridae	*Chromis chromis*	**All**
Scaridae	*Sparisoma cretense* (•)	I
Scorpaenidae	*Scorpaena maderensis*	III,IV
	Scorpaena notata	IV
	Scorpaena porcus	I,II
Serranidae	*Anthias anthias*	II,III,IV
	Epinephelus aeneus (•)	IV
	Epinephelus costae (•)	II,III
	Epinephelus marginatus	I
	Serranus atricauda (•)	I,II
	Serranus cabrilla	**All**
	Serranus hepatus	II,IV
	Serranus scriba	I,III,V
Sparidae	*Boops boops*	**All**
	Dentex dentex	II,III
	Diplodus annularis	IV,V
	Diplodus cervinus cervinus	I,II,IV,V
	Diplodus puntazzo	I,III,IV,V
	Diplodus sargus	**All**
	Diplodus vulgaris	**All**
	Oblada melanura	**All**
	Pagellus acarne	II,III,IV,V
	Pagellus erythrinus	IV
	Pagrus auriga (•)	IV
	Pagrus pagrus	II,III,IV
	Sarpa salpa	**All**
	Sparus aurata	IV
	Spondyliosoma cantharus	II,III,IV,V
Syngnathidae	*Syngnathus acus*	IV
Torpedinidae	*Torpedo nobiliana*	V
Trachinidae	*Trachinus draco*	III,IV
Tripterygiidae	*Tripterygion delaisi*	I,V
	Tripterygion tripteronotus	**All**

Discussion and Conclusion

The fish assemblage of the Al Hoceima National Park is rich in species and characterised by the relevant presence of Eastern Atlantic and South Mediterranean elements, which testifies the role of the proximate Gibraltar strait. These peculiarities stress the importance of this national park in protecting a very unique Mediterranean fish assemblage in the framework of a network of Mediterranean marine protected areas.

The scarce occurrence of large specimens highlights a relevant fishing pressure, thus emphasizing the importance of implementing new specific protection measures.

Acknowledgments. Prof. S. Benhissoune of the Faculty of Sciences- University of Agadir, Morocco, management of the Ministère des Eauxs et Forêts and of National Park of Al Hoceima, and the personnel of the I.T.P.M.

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