PRELIMINARY STUDY ON FISH ASSEMBLAGES IN THE MARINE PROTECTED AREA "PENISOLA DEL SINIS – ISOLA DI MAL DI VENTRE" USING *VIDEO VISUAL CENSUS*

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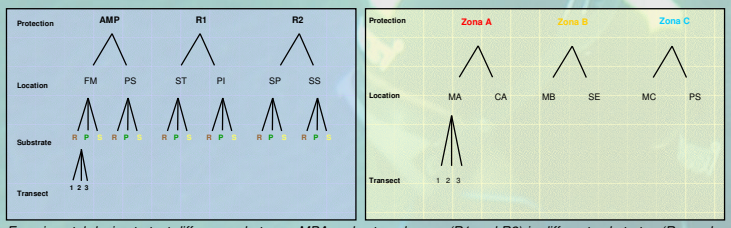
INTRODUCTION

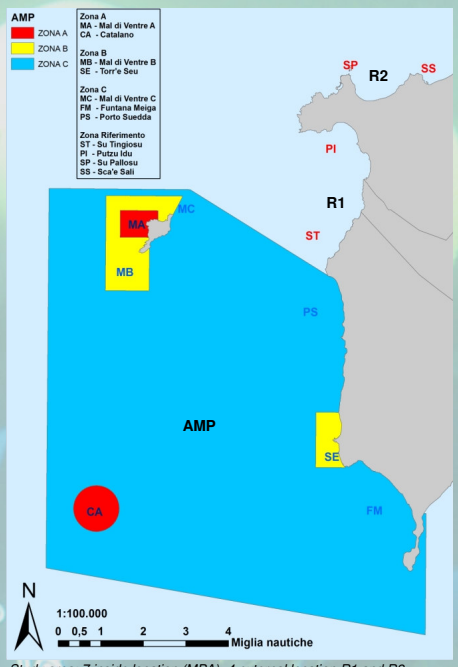
A survey was carried out in order to evaluate abundance and distribution of fish assemblages in the MPA and bordering areas, as a part of the EMPAFISH project (European Marine Protected Areas as tools for Fisheries management and conservation), and in collaboration with the MPA "Penisola del Sinis-Isola di Mal di Ventre". The method used was *Video Visual Census* (*V.V.C.*), which allows to obtain a permanent record of transect and to study the whole fish assemblage, reducing work and survey time and minimizing counting errors of fish aggregation.

MATERIALS AND METHODS

Each transect (25x5m; depth 4-8m) was recorded by a digital underwater video camera (Sony DCR-TRV30E). A rapid passage (5-6m/minute) was used to record benthopelagic species, while a slower one, was used to record benthic species and species hidden in shelters.



Experimental design to test differences between MPA and external areas (R1 and R2) in different substrates (R = rock, P = P. oceanica, S = sand) and between different protection areas (A = no take, B = partial, C = general).



Study area: 7 inside location (MPA), 4 external location R1 and R2.

The number of species and the number of individual fish was calculated in every transect. The Bray-Curtis similarity matrix was used to generate the 2-dimensional non–metric multidimensional scaling (nMDS). Factors differences was tested, in population structure, with similarity analysis (ANOSIM, Clarke and Warwick, 2001).

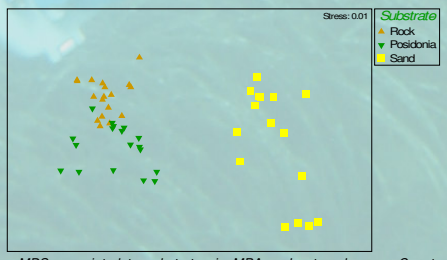
The similarity percentage procedure (SIMPER) was used to identify the fish species mostly contributing to the differences between inside/outside location and the different protection level in MPA. Analysis of variance (ANOVA) was used to test for differences between MPA and external area and areas with different protection regime.

The variables utilized were the number of species, the number of individual fish considering all species and only non-gregarious species.

RESULTS AND DISCUSSION

Families	Species	MPA	R1	R2
Apogonidae	*Apogon imberbis*	+	-	-
Atherinidae	*Atherina boyeri*	+	-	+
Blenniidae	*Parablennius gattorugine*	+	-	+
	Parablennius rouxi	+	-	+
Bothidae	*Bothus podas*	+	-	-
Callionymidae	*Callionymus pusillus*	+	+	+
Centracanthidae	*Spicara maena*	-	-	+
Gobiidae	*Gobius bucchichi*	+	+	+
	Gobius geniporus	+	-	-
Labridae	*Coris julis*	+	+	+
	Labrus merula	+	+	+
	Labrus viridis	+	+	-
	Symphodus cinereus	+	+	+
	Symphodus mediterraneus	+	+	+
	Symphodus melanocercus	+	+	+
	Symphodus ocellatus	+	+	+
	Symphodus roissali	+	+	+
	Symphodus rostratus	+	+	+
	Symphodus tinca	+	+	+
	Thalassoma pavo	+	+	+
	Xyrichtys novacula	+	-	-
Mugilidae	*Liza aurata*	+	-	-
Mullidae	*Mullus barbatus barbatus*	+	+	+
	Mullus surmuletus	+	-	+
Muraenidae	*Muraena helena*	+	-	+
Pomacentridae	*Chromis chromis*	+	+	+
Sciaenidae	*Sciaena umbra*	+	-	-
Scorpaenidae	*Scorpaena porcus*	+	-	+
Serranidae	*Epinephelus marginatus*	+	-	-
	Serranus cabrilla	+	+	+
	Serranus scriba	+	+	+
Sparidae	*Diplodus annularis*	+	+	+
	Diplodus puntazzo	+	-	-
	Diplodus sargus sargus	+	+	+
	Diplodus vulgaris	+	+	+
	Lithognathus mormyrus	+	+	-
	Oblada melanura	+	-	+
	Sarpa salpa	+	+	+
	Spondyliosoma cantharus	+	+	+
Trachinidae	*Trachinus draco*	+	+	-
	Tripterygion delaisi	+	+	-
	Tripterygion tripteronotus	+	-	-
Total	42	41	25	29

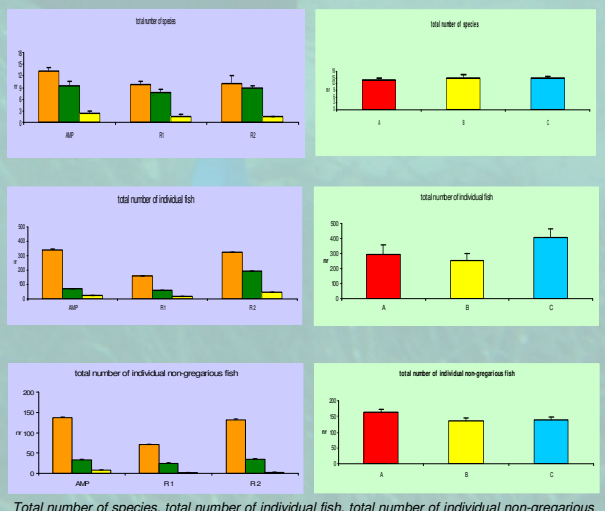
List of species in the 11 localities considered.



nMDS associated to substrates in MPA and external areas. Counted species: 36 on rock, 22 on P. oceanica *and 9 on sand. ANOSIM (R=0.636; p<0.01).*

(a)	MPA		R1		R2	
Species	Contrib %	Species	Contrib %	Species	Contrib %	
Coris julis	57.38	*Coris julis*	56.84	*Coris julis*	71.27	
Symphodus tinca	21.04	*Symphodus tinca*	17.11	*Symphodus tinca*	12.87	
Diplodus vulgaris	5.26	*Diplodus vulgaris*	8.99	*Diplodus vulgaris*	4.04	
Serranus cabrilla	4.91	*Serranus cabrilla*	5.64	*Serranus scriba*	3.99	
Serranus scriba	2.56	*Diplodus annularis*	3.64			
(b)	A		B		C	
Species	Contrib %	Species	Contrib %	Species	Contrib %	
Coris julis	67.83	*Coris julis*	52.92	*Coris julis*	53.07	
Thalassoma pavo	11.87	*Symphodus tinca*	20.59	*Symphodus tinca*	23.28	
Symphodus tinca	8.22	*Diplodus vulgaris*	13.99	*Diplodus vulgaris*	8.46	
Diplodus vulgaris	3.64	*Serranus cabrilla*	4.46	*Serranus cabrilla*	4.07	

SIMPER results. The most important species that characterize transects inside/outside AMP (a) and areas with different protection level (b).



Total number of species, total number of individual fish, total number of individual non-gregarious fish inside(MPA)/outside(R1 and R2), in different substrates (rock = , P. oceanica = and sand =) and in different zones (A, B and C).

42 fish species were identified in the study. A clear separation in abundance was found depending on different substrates (rock > *P.oceanica* > sand) and no significant differences among different protection levels. The location shows significant differences in abundance of non-gregarious fish. Species were homogenously distributed in the study area with *Labridae* and *Sparidae* as the most important families. The no-take zones are characterized by an elevated number of *Thalassoma pavo*.

This work represents a preliminary study on fish assemblage in the Sinis MPA and adjacent areas. The results can provide a reference point for the management of this MPA, and a starting point for future work on the effect of the protection scheme.
The V.V.C. permits a relatively easy underwater work, since it minimizes underwater time, allowing to concentrate a high number of observations within a limited amount of time.

REFERENCES
Clarke K.R, Warwick R.M. (2001) – Changes in marine communities: an approach to statistical analysis and interpretation. Primer-E, Plymouth Marine Laboratory, Plymouth.