

BIODIVERSITY OF DEMERSAL FISH IN THE SOUTHERN TYRRHENIAN SEA (WESTERN MEDITERRANEAN)

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Abstract

The biodiversity of demersal ichthyofauna was analysed using the ecological indices of Shannon-Weaver (H') and Pielou's (E). The data comes from seven Medits trawl surveys carried out from 1994 to 2000 in the Southern Tyrrhenian Sea. A total of 88 demersal fish species was collected. Demersal fish diversity is strictly correlated with the depth.

Keywords: Biodiversity, demersal fish, Tyrrhenian Sea

Introduction

Studies on diversity in biological communities has been carried out over the last twenty years by ecologists and applied to different ecosystems. In particular, demersal fish biodiversity studies have been carried out in different Italian seas, the North Tyrrhenian (1), the South Adriatic (2) and the Ionian seas (3). The demersal fish biodiversity in an area of the South Tyrrhenian Sea was analysed using the Shannon-Weaver diversity index (H') and Pielou's evenness index (E).

Materials and methods

The data reported here was gathered during seven trawl surveys carried out, from 1994 to 2000, during the Medits project (International bottom trawl survey in the Mediterranean Sea) funded by the European Community.

They were conducted every year between the end of spring and the middle of summer. The study area was situated between Suvero Cape (the Calabrian coast) and S. Vito Cape (the Sicilian coast) (Fig. 1). The gear used had a small codend (20 mm, stretched mesh) and 2-2.5 m of vertical opening (4). A total of 194 hauls were carried out randomly allocated into 5 depth strata (A: 10-50 m; B: 51-100 m; C: 101-200 m; D: 201-500 m; E: 501-800 m). All fish were identified and counted (N/h), the mean number (1994-2000) of each stratum was calculated. Pelagic species, occasionally collected by gear, were excluded for this study, as well as the individuals with N/h values less than 4. For each stratum and year the Shannon-Weaver (H') and Pielou (E) indices were calculated. Because the annual variations of both indices E and H' were not significant, the mean index, calculated over the seven years, has used (Tab. 1).



Fig. 1 - Study area

From Suvero Cape (Calabria) do S. Vito Cape (Sicily)

Results and discussion

A total of 88 demersal fish species with 265.720 specimens were collected in the study area. The diversity and evenness indices mean values in five strata are reported in table 1. Generally the diversity and evenness values showed a similar trend in accordance to the depth.

The H' and E indices showed the highest values in the B stratum with 2,96 and 0,7 respectively. In this stratum a mean of 23 species was recorded with 8507 specimens. For the A stratum the diversity value is also high (2,83) and the evenness index shows a value of 0,64. 20 species (mean value) were in this stratum found with a number of specimens totalling 4384. The most abundant species in the first two strata are *Trachurus trachurus* (n° specimens totalling 11014), *Mullus barbatus* (n° specimens totalling 10944), *Pagellus acarne* (n° specimens totalling 10840), *Spicara flexuosa* (n° specimens totalling 8898) and *Lepidotrigla cavillone* (n° specimens totalling 6050). On the contrary the D stratum showed the lowest H' (2,12) and E values (0,47). The most abundant species is *Clorophthalmus agassizi* (n° specimens totalling 44334).

Tab. 1 - Shannon-Weaver diversity index (H') and Pielou's (E) values (mean, s.d., min., max).

strata	n of hauls	H'mean	s.d.	H'min	H'max	Emean	s.d.	Emin	Emax
A	27	2.83	0.6	1.94	3.34	0.64	0.12	0.45	0.76
B	27	2.96	0.6	1.64	3.31	0.7	0.14	0.33	0.72
C	42	2.55	0.5	1.88	3.27	0.54	0.10	0.39	0.7
D	49	2.12	0.5	1.18	2.42	0.47	0.12	0.24	0.62
E	49	2.46	0.8	1.51	3.82	0.6	0.17	0.39	0.88

For the C stratum the diversity value is 2.55 and the evenness index shows a value of 0,54. Finally in stratum E both H' (2,46) and E (0,60) values were quite high.

Analysing the data here reported, it is clear that demersal fish diversity is strictly correlated with the depth. The lowest strata (10-50 m and 51-100 m) showed the highest biodiversity, but the stocks have a low homogeneity structure due to many dominant species. The D stratum (201-500 m) showed the lowest diversity because of the heavier dominance of some species (*C. agassizi*, *A. sphyraena*, *G. argenteus*) which often reach a number of specimens higher than the other species that characterize the other bathymetric strata. On the contrary, in the deepest stratum (501-800 m), although both the ecological indices showed low values, the diversity is quite high because the species are represented by homogeneous individual numbers. In particular, during 2000 this stratum registered the highest H' values (3,82) compared to all other strata and years.

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