SPECIES COMPOSITION AND VARIATION AMONG DIFFERENT DEPTH ZONES IN NORTH AEGEAN SEA

Konstantina Ofridopoulou[1*], Ioannis Dimitriadis[1], Pavlos Vidoris[1], Lazaros Tsiridis[1], Nikolaos Kamidis[1] and Manos Koutrakis[1]

*[1]Department of Marine Fisheries, Fisheries Research Institute (INALE), Hellenic Agricultural Organization – DEMETER, Nea Peramos, 64007 Kavala, Greece - *ofridopoulouk@inale.gr*

INTRODUCTION

Mediterranean is a highly abundant sea with:
- unique geomorphological conditions,
- distinct marine microenvironments,
- rich fishery resources,
- diverse composition of marine bio-communities.

Mediterranean Bottom Trawl Survey Program (MEDITS):
- scientific survey with a bottom trawl,
- initiated in 1993,
- an annual basis,
- providing valuable data.

MATERIALS AND METHODS

Study area:
- North Aegean Sea (GSA22).

Data collection:
- within the framework of the International Bottom Trawl Survey in the Mediterranean (MEDITS)
- otter trawl (MEDITS handbook v9, 2017),
- three years (2019-2021),
- five zones (10-50 m, 50-100 m, 100-200 m, 200-500 m and 500-800 m),
- 65 hauls.

Statistical analysis with PRIMER (Clarke and Warwick 1994):
- data into fourth root (√(√x)),
- species abundance indices,
- Triangular similarity matrix based on the Bray-Curtis Similarity Index,
- PERMANOVA statistical analysis (PERmutational MANOVA),
- PAIR-WISE TESTS statistical analysis,
- SIMPER (species contributions) statistical analysis,
- Canonical analysis of principal coordinates (CAP).

RESULTS

Table 1: Results of SIMPER analysis, showing the average percentage similarities within and between the five MEDITS depth zones.

Depth Zones	10-50 m	50-100 m	100-200 m	200-500 m	500-800 m
10-50 m	52,62				
50-100 m	42,74	53,44			
100-200 m	26,03	36,48	41,31		
200-500 m	9,18	16,93	24,70	47,66	
500-800 m	3,26	5,61	7,30	29,69	50,47

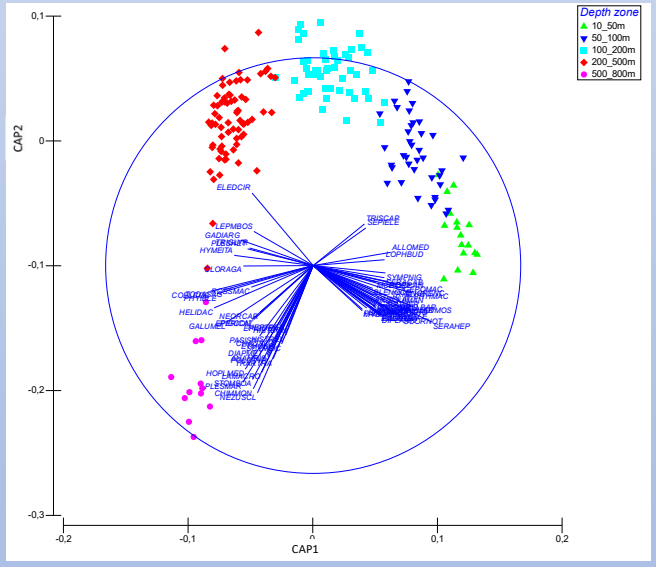

Figure 1. Canonical ordination for the discriminant analysis of depth zones. The two axes CAP1 (35.98%) and CAP2 (12.09) encapsulate 48,07% of the variability in the resemblance matrix. Vector overlay consisting of the multiple partial correlations of the original species abundance with the canonical axes. Each seven-letter code refers to the first four letters of the genus and the first three of the species.

INDICATIVE BIBLIOGRAPHY

Argyris Kallianiotis, Pavlos Vidoris and George Sylaios. (2004). Fish species assemblages and geographical sub-areas in the North Aegean Sea, Greece. Fisheries Research, Volume 68.

Athanasios Tsikliras and Emmanuil Koutrakis. (2010). Summer fish lavral assemblages and station groups in the northern Aegean Sea. Acta Andriatica, Volume 52.

Chryssa Anastasiadou, Nikolaos Kamidis, Pavlos Vidoris, Athanassios Kallianiotis and Argyris Kallianiotis. (2019). Succession in megafaunal assemblages of an artificial reef during a three-year monitoring in the Eastern Mediterranean basin.

ACKNOWLEDGMENT:

This research was carried out within "National Fisheries Data Collection Framework 2017-2019, 2020-2021". This project is financed by OPFS 2017-2020 under the Hellenic Ministry of Rural Development and Food.

Table 2: Species contribution and cumulative contribution up to 50% of each depth zone's similarity for the five MEDITS depth zones.

Depth zone: 10-50 m
Average similarity: 52,62%

Species	Av.Sim	Contrib.%	Cum.%
Sardina pilchardus	4,64	8,82	8,82
Diplodus annularis	3,86	7,33	16,15
Serranus hepatus	3,37	6,41	22,56
Mullus barbatus	3,32	6,31	28,87
Spicara flexuosa	2,64	5,01	33,89
Engraulis encrasicolus	2,55	4,84	38,73
Pagellus erythrinus	2,16	4,11	42,84
Trachurus trachurus	2,03	3,85	46,69
Alloteuthis media	1,82	3,47	50,16

Figure 2. MEDITS Haul 1, 2020, 10-50 m.

Depth zone: 50-100 m
Average similarity: 53,44%

Species	Av.Sim	Contrib.%	Cum.%
Engraulis encrasicolus	9,17	17,15	17,15
Trachurus trachurus	4,43	8,29	25,44
Illex coindetii	3,25	6,08	31,52
Spicara flexuosa	2,83	5,29	36,8
Sardina pilchardus	2,65	4,96	41,76
Serranus hepatus	2,57	4,81	46,56
Merluccius merluccius	2,51	4,69	51,25

Figure 3. MEDITS Haul 51, 2020, 50-100 m.

Depth zone: 100-200 m
Average similarity: 41,31%

Species	Av.Sim	Contrib.%	Cum.%
Parapenaeus longirostris	3,9	8,19	8,19
Gadiculus argenteus	3,34	7	15,19
Merluccius merluccius	2,57	5,38	20,58
Plesionika heterocarpus	2,46	5,15	25,73
Illex coindetii	2,32	4,87	30,6
Coelorinchus caelorhincus	2,31	4,84	35,44
Micromesistius poutassou	2,25	4,71	40,15
Capros aper	1,87	3,92	44,07
Chlorophthalmus agassizi	1,84	3,87	47,94
Lepidorhombus boscii	1,6	3,35	51,29

Figure 4. MEDITS Haul 15, 2020, 100-200 m.

Depth zone: 200-500 m
Average similarity: 47,66%

Species	Av.Sim	Contrib.%	Cum.%
Trachurus trachurus	5,35	12,95	12,95
Illex coindetii	3,71	8,99	21,94
Capros aper	2,29	5,54	27,48
Macroramphosus scolopax	2,24	5,42	32,89
Merluccius merluccius	2,21	5,34	38,23
Scyliorhinus canicula	2,11	5,1	43,34
Alloteuthis media	1,96	4,74	48,07
Trisopterus capelanus	1,49	3,6	51,67

Figure 5. MEDITS Haul 11, 2020, 200-500 m.

Deppth zone: 500-800 m
Average similarity: 52,62%

Species	Av.Sim	Contrib.%	Cum.%
Coelorinchus caelorhincus	4,6	9,12	9,12
Hoplostethus mediterraneus	3,73	7,39	16,51
Plesionika martia	3,5	6,93	23,44
Phycis blennoides	3,32	6,58	30,02
Nezumia sclerorhynchus	2,94	5,82	35,85
Galeus melastomus	2,79	5,52	41,37
Merluccius merluccius	2,76	5,47	46,84
Lampanyctus crocodilus	2,49	4,93	51,76

Figure 6. MEDITS Haul 12, 2020, 500-800 m.

CONCLUSIONS

By the statistical analysis of the records for the 261 species and 14 genera identified in 168 hauls of MEDITS during the three year period 2019-2021, taking into account their presence and abundance for each haul, emerged that:

- ✓ years do not differ statistically significantly, as expected, since only a short period of time is under investigation,
- ✓ the depth zones differ statistically significantly between each other and the hauls of each depth zone are grouped together distinctly based on the composition and abundance of the species they include,
- ✓ within each of the five depth zones, there are 8 to 10 species whose cumulative contribution explains at least 50% of the similarity of the depth zone,
- ✓ the depth zones included in the continental slope and of those included in the continental shelf show the greatest similarity between them and the least between those two sub-environments.

These records could be a valuable tool in the description and assessment of the local marine communities' biodiversity and consequently be taken into account for any future fisheries management plan.