

RESEARCH ON THE ICHTYOFAUNA STRUCTURES FROM THREE NATURA 2000 SITES, BETWEEN NOVEMBER-DECEMBER 2010

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Abstract

The current common fisheries policy allows a better integration of requirements for environmental protection in fisheries management, which contributes directly to achieving the objectives of the "Birds" and "Habitats". Marine Natura 2000 sites designated as Special Areas of Conservation (approved by the European Commission Decision 2009/92/EC), which were the subject of this study are: ROSCI 0269 Vama Veche – 2 Mai, ROSCI 0273 Marine area from Capul Tuzla; ROSCI 0237 Submarine structures methanogenic Sf. Gheorghe. In order to achieve a complete inventory of the species as present in the marine Natura 2000 sites under study were organized and conducted research expeditions at sea and along the coast, in the SCI survey sites to make fishing and levies biological samples, measurements and sampling. Ichthyofauna has been used to study samples extracted randomized study, which is part of the general population, but provides sufficient information to characterize the entire population. Fisheries science has shown the greatest diversity in ROSCI 0269 Vama Veche - 2 Mai (20 species) and lowest in ROSCI 0273 Marine area from Capul Tuzla (2 species). These data are considered preliminary, future research will illustrate the correct situation in all sites.

Key words: ichthyofauna, marine sites, Natura 2000

INTRODUCTION

In the last decades, the ichthyofauna of the Black Sea, especially the populations of commercial interest, had suffered severe changes and often unpredictable.

Dependent upon biological specificity of each species of fish, these changes are manifest both in structure, ichthyofauna potential and ethological aspects of the population. For many species of fish populations have declined so rapidly that they have lost the importance of commercial fisheries, while still remaining merely as zoological representatives of the species [2].

Data provided by the actions of control and monitoring to identify the conservation status of species and habitats present in sites.

Conservation measures, which will be set up in offshore sites, will be aimed at the

maintenance or restoration of species and habitat, for which it was, designated the site at a favourable conservation status.

MATERIAL AND METHODS

Fish population studied using randomized samples extracted method, which is a part of the overall population, but offers enough information to characterize the entire population. Samples taken for the study of qualitative and quantitative component consisted of a few pounds of fish taken from randomized trawler sampling with the research vessel "starfish". Samples taking were made during the period November-December 2010, in the perimeters of three sites considered in the study, namely ROSCI 0269 Vama Veche – 2 Mai; ROSCI 0273 Marine area at the Capul Tuzla; ROSCI 0237 Submarine structures methanogenic Sf. Gheorghe.

In the laboratory has studied the structure of the mass, length and age. Biometrical

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measurements were made in accordance with international standards, i.e., the total length (Lt), read at intervals of 5 mm and consolidations to centimetre below. The mass was obtained, in grams, with an accuracy of ± 1 g. Age readings were made on otoliths and scale fish. In order to determine the sex and the degree of maturation of the fish's gonads were carried out dissection specimens taken in the study and the comments made in

the form of different ages according to the frequency of the scale fish appreciation [1].

RESULTS AND DISCUSSIONS

In the ROSCI 0269 *Vama Veche* – 2 *Mai* site, at the trawling in November, 2010, has been captured 20 species, predominantly red mullet (34.29) followed by whiting (26.42). Valuable species (such as turbot and *Alosa* sp.) represented less than 5 % of the catch (Table 1).

Table 1 Species caught in ROSCI 0269 *Vama Veche* – 2 *Mai* site, in November, 2010

Species	Common name	Capture (kg)			Abundance (copies)
		Total	CPUE	%	
<i>Aurelia aurita</i>	moon jellyfish	12.000	12.000	2.42	
<i>Mytilus galloprovincialis</i>	bay mussel	55.000	55.000	11.09	
<i>Liocarcinus vernalis</i>	grey swimming crab	2.000	2.000	0.38	
<i>Rapana venosa</i>	veined whelk	25.000	25.000	5.01	
<i>Crangon crangon</i>	brown shrimp	0.500	0.500	0.08	
<i>Psetta maotica</i>	turbot	8.180	8.180	1.65	2
<i>Mesogobius batrachocephalus</i>	knout goby	0.020	0.020	0.00	1
<i>Neogobius melanostomus</i>	round goby	1.000	1.000	0.20	
<i>Merlangius merlangus</i>	whiting	131.000	131.000	26.42	
<i>Pomatomus saltatrix</i>	bluefish	15.000	15.000	3.03	
<i>Pegusa lascaris</i>	sand sole	0.060	0.060	0.01	2
<i>Alosa immaculata</i>	Pontic shad	0.025	0.025	0.01	1
<i>Mullus barbatus</i>	red mullet	170.000	170.000	34.29	
<i>Hippocampus guttulatus</i>	seahorse	0.100	0.100	0.02	
<i>Trachurus mediterraneus</i>	Mediterranean horse mackerel	75.000	75.000	15.13	
<i>Scorpaena scrofa</i>	red scorpionfish	0.900	0.900	0.17	4
<i>Gobius niger</i>	black goby	0.040	0.400	0.02	
<i>Trachinus draco</i>	weever	0.050	0.500	0.03	
<i>Alosa tanaica</i>	Azov shad	1.100	1.100	0.04	
<i>Gaidropsarus mediterraneus</i>	shore rockling	0.010	0.010	0.00	1
Total		496.985		100.00	

*CPUE - catch per unit effort

Of the amount of 170 kg of red mullet, has taken a sample of 275 biological specimens. Individuals have presented a range of sizes, from 60 to 160 mm / 2.17-55.13 g, with a growing domination of 85-125 mm 6.217-23.608 g. Average length of the body was 106.218 mm and the average mass of 13.859 g (Fig. 1).

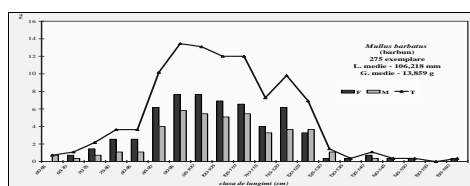


Fig. 1 The structure of lengths and weights classes at the *Mullus barbatus* species

Age composition indicates the presence of specimens in the years between the ages of 0^+ to 3^+ years old. Those aged 1^+ year (49.46%), with average values of length and

mass of 96.82 mm, 9.32 g and 2⁺ years (34.31%, weight and length average 112.13 mm and 15.96 g), formed the basis of the catch of red mullet, followed by the group of 3⁺ years with 4.38 % (average length and weight of 137.71 g, 22.27 mm). The sex ratio was a clear dominance of females (58.18%), compared to males (41.82%).

The fins have been identified by the following formula: D₁ VIII; D₂ I 8; A II 6; P 17; V I 5 and the brachial thorns were 21-23.

Of the 131 kg of whiting, has taken a biological sample and were considered a total of 214 specimens. On the whole, the population was homogeneous, the spectrum of wavelengths fits within the length of 85-190 mm / 6.33-57.50g and dominant being classes 100 to 135 mm / 8.92-21.84 g.

Average length of the body was 117.45 mm and the average mass of 15.58 g (Fig. 2).

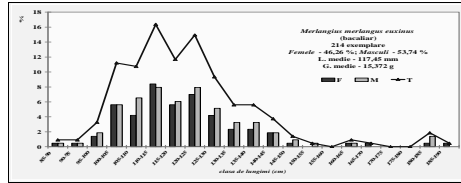


Fig. 2 The structure of lengths and weights classes at *Merlangius merlangus* species

Analysis of composition of age showed the individuals from 1;1⁺ to 3;3⁺ years, domination of 1;1⁺ year (62.68 %) and 2;2⁺ years (32.54 %). The sex ratio indicates a male domination (53.74 %) to female (46.26%). The fins have been identified by the following formula: D₁ 13-17; D₂ 16-20; D₃ 17-22; A₁ 27-32; A₂ 19-22; P 20-21; V 6 and the brachial thorns were 20-23.

At the trawling taken of December 2010 screenshots have appeared in only 7 species of fish; from which dominated sprat (53.01%), followed by whiting (29.10%) (Table 2).

Table 2 Species caught in ROSCI 0269 Vama Veche - 2 Mai site, in December, 2010

Species	Common name	Capture (kg)			Abundance (copies)
		Total	CPUE	%	
<i>Aurelia aurita</i>	moon jellyfish	1.130	2.26	11.04	
<i>Sprattus sprattus</i>	sprat	5.430	10.86	53.01	
<i>Merlangius merlangus</i>	whiting	2.980	5.96	29.10	
<i>Alosa tanaica</i>	Azov shad	0.330	0.66	3.22	
<i>Engraulis encrasicolus</i>	anchovy	0.130	0.26	1.27	
<i>Trachurus mediterraneus</i>	Mediterranean horse mackerel	0.020	0.00	0.20	1
<i>Platichthys flesus</i>	flounder	0.200	0.40	1.95	1
<i>Neogobius melanostomus</i>	round goby	0.020	0.04	0.20	2
Total		10.240		100.00	

Analysis of the structure of the classes and the lengths of the catches of sprat showed mature specimens of compartment underlined the presence and a great deal of uniformity of be vies.

The length spectrum of sprat individuals were employed shall within the limits of classes of lengths of 80-110 mm / 3.938-6.96 g, dominant being the classes of 90-100 mm / 4.98-5.54 g (Fig. 3). The average length of the body was 92.473 mm and the average weight of 5.531g.

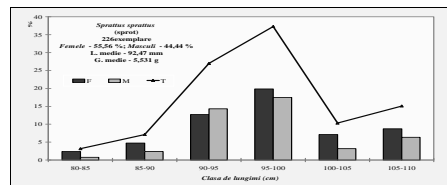


Fig. 3 The structure of lengths and weights classes at the *Sprattus sprattus* species

Age composition of the catches of sprat shall indicate the presence of 1;1⁺ and 3;3⁺ years; basis catch was the individuals of 2;2⁺ (65.08 %); and 3;3⁺ (30.16 %). Females had a proportion of 46.26% and 53.74% for males.

The fins have been identified by the following formula: D II 15-17; A II 17-18; P 16-17; V 7-8, C 19; pelvic scutes 29-33 and the brachial thorns were 45-56.

In the ROSCI 0273 *Marine area from Capul Tuzla*, in November 2010 was captured only 2 fish species: sprat (92.52%) and anchovy (Table 3).

Table 3 Species caught in ROSCI 0273 *Marine area from Capul Tuzla* site, in November, 2010

Species	Common name	Capture (kg)			Abundance (copies)
		Total	CPUE	%	
<i>Aurelia aurita</i>	moon jellyfish	37.200	37.2	7.44	
<i>Sprattus sprattus</i>	sprat	462.800	462.8	92.52	
<i>Engraulis encrasicolus</i>	anchovy	0.200	0.2	0.04	20
Total		500.200		100.0	

Of the amount of 462, 80 kg of sprat, has taken a biological sample and were considered a total of 201. Analysis of the structure of the classes and the lengths of the catches of sprat has highlighted the presence of mature specimens and a great homogeneity of beviés. The length spectrum of individuals employed sprat was within the classes of lengths of 55-90 mm / 1.08-3.55 g, dominant being the classes of 65 to 80 mm / 1.73-2.61 g (Fig. 4).

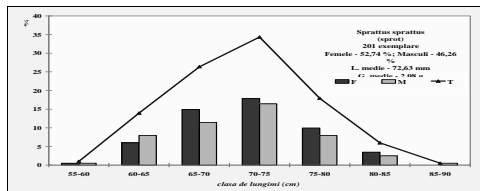


Fig. 4 The structure of lengths and weights classes at the *Sprattus sprattus* species

The average length of the body was 72.673 mm and the weight average of 2.08 g.

Age composition of the catches of sprat indicates the presence of only 1;1⁺ year specimen. Females were dominant, taking the percentage of 52.74.

The fins have been identified by the following formula: D II 15-17; A II 17-18; P 16-17; V 7-8, C 19; pelvic scale 29-33 and the thorns were 45-56.

In ROSCI 0237 *Submarine structures methanogenic Sf. Gheorghe* site at samples taken in November 2010, at the first sampling were fishing 9 fish species and 3 invertebrate species; have dominated bay mussel, which represented more than 90 % of

capture (Table 4). In the second sampling, were fishing 14 fish species, with the dominance of whiting (Table 5).

At Mediterranean horse mackerel has collected a sample of 76 fishes, which was composed of young specimens, with length spectrum between 70-130 mm / 2.860-18.14 g, between the ages of 1;1⁺ and 3;3⁺, dominant being the classes of 95-120 mm / 7.85-13.41 g, age old 2;2⁺ years (Fig. 5). Proportion of females was 51.32 % and of male 48.68 %.

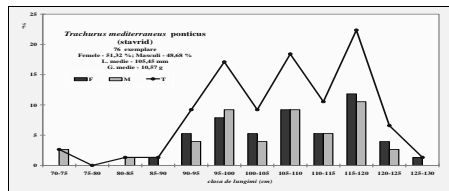


Fig. 5 The structure of lengths and weights classes at the *Trachurus mediterraneus* species

Formula fins structure was: D₁ VII-IX; D₂ I 27-32; A II; I 23-30; P I 19-21; V I 5; line side shields 80-88 and the brachial thorns were 54-56.

The quantity of 10 kg Azov shad, has taken a biological sample of 146 fishes.

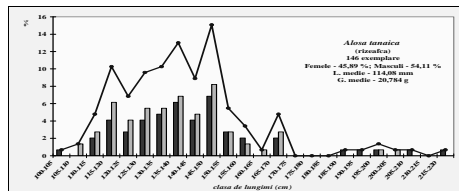


Fig. 6 The structure of lengths and weights classes at the *Alosa tanaica* species

The analysis presented a range of sizes, from 100-220 mm/7.12-76.93 g, with a dominance class 115-150 mm/11.037-24.163g (Fig. 6).

The average length of the body was 114.08 mm and the average mass of 20.84 g.

Females were at number 67 and males of 79. The fins have been identified by the following formula: D III 13; A III 18; P I 16; V I 8; C 22 and the brachial thorns were 78.

Table 4 Species caught in ROSCI 0237 Submarine methanogene area Sf. Gheorghe site, in November, 2010 at first samples taken

Species	Common name	Capture (kg)			Abundance (copies)
		Total	CPUE	%	
<i>Ascidæ</i>	sea squirts	2.000	2	4.93	
<i>Mytilus galloprovincialis</i>	bay mussel	30.000	30	73.92	
<i>Crangon crangon</i>	brown shrimp	0.015	0.015	0.04	3
<i>Liocarcinus vernalis</i>	grey swimming crab	0.050	0.05	0.12	10
<i>Psetta maotica</i>	turbot	0.000	0	0.00	0
<i>Symphodus (Crenilabrus) roissali</i>		0.040	0.04	0.10	1
<i>Platichthys flesus</i>	flounder	0.030	0.03	0.07	2
<i>Trachurus mediterraneus</i>	Mediterranean horse mackerel	0.100	0.1	0.25	4
<i>Spratus sprattus</i>	sprat	0.200	0.2	0.49	
<i>Alosa immaculata</i>	Pontic shad	3.000	3	7.39	
<i>Pegusa lascaris</i>	sand sole	0.120	0.12	0.30	1
<i>Gaidropsarus mediterraneus</i>	shore rockling	0.030	0.03	0.07	1
<i>Merlangius merlangus</i>	whiting	5.000	5	12.32	
Total		40.585		100.00	

Table 5 Species caught in ROSCI 0237 Submarine methanogene area Sf. Gheorghe site, in November, 2010 at secondary samples taken

Species	Common name	Capture (kg)			Abundance (copies)
		Total	CPUE	%	
<i>Aurelia aurita</i>	moon jellyfish	5.000	3.33	0.68	
<i>Rapana venosa</i>	veined whelk	100.000	66.66	13.54	
<i>Psetta maotica</i>	turbot	10.000	6.66	1.35	16
<i>Dasyatis pastinaca</i>	stingray	14.800	9.86	2.00	2
<i>Platichthys flesus</i>	flounder	6.000	4.00	0.81	30
<i>Trachurus mediterraneus</i>	Mediterranean horse mackerel	10.000	6.66	1.35	
<i>Mytilus galloprovincialis</i>	bay mussel	10.000	6.66	1.35	
<i>Spratus sprattus</i>	sprat	0.500	0.33	0.07	
<i>Alosa tanaica</i>	Azov shad	10.000	6.66	1.35	
<i>Alosa immaculata</i>	Pontic shad	3.000	2.00	0.41	
<i>Neogobius fluviatilis</i>	monkey goby	3.000	2.00	0.41	
<i>Mullus barbatus</i>	red mullet	100.000	66.66	13.54	
<i>Pegusa lascaris</i>	sand sole	2.000	1.33	0.27	20
<i>Acipenser stellatus</i>	sevruga	6.000	4.00	0.81	3
<i>Acipenser gueldenstaedtii</i>	osetr	4.000	2.66	0.54	2
<i>Huso huso</i>	beluga	4.000	2.66	0.54	2
<i>Gobius niger</i>	black goby	0,100	0.07	0.01	3
<i>Merlangius merlangus</i>	whiting	450.000	300.00	60.94	
Total		738.400		100.00	

The quantity of 100 kilograms has taken a biological sample and was considered a total of 167 fishes of red mullet. The population of

red mullet was enclosed within a length of 70-125 mm / 4.39-28.275 g, dominant being the classes of 80-105 mm / 6.99-15.24 g.

Average length of the body was 94.77 mm and the average mass of 11.904 g (Fig. 7).

The age composition indicates the presence of specimens in the age range 0;0⁺ to 3;3⁺ years. The old 1;1⁺ years (52.10%), with average values of length and mass of 83.67 mm, i.e. 9.89 g and 0;0⁺ (30.54%, length and weight of 83.67 mm and 7.026 g), formed the basis of the catch of red mullet, followed by the group of 2;2⁺ years with 14.97% (average length and weight of 108.1 mm, respectively 21.66 g) (Fig. 7). The sex ratio was clearly dominated by males (53.89%), compared to females (46.11%).

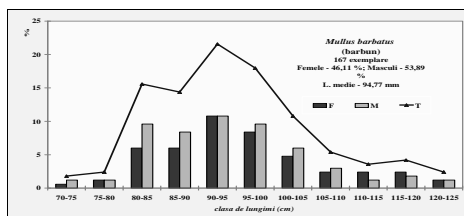


Fig. 7 The structure of lengths classes at the *Mullus barbatus* species

The fins have been identified by the following formula: D₁ VIII; D₂ I 8; A II 6; P 17; V I 5 and the thorns were 21-23.

The whiting (318 individuals), the spectrum of length was within the range 80-200 mm / 63.87-62.90 g, dominant being the classes of 95-135 mm / 6.64-17.83 g. The average length of the body was 114.45 mm and the average mass of 11.632 g (Fig. 8).

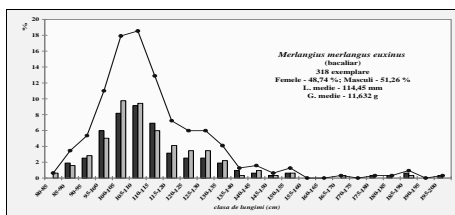


Fig. 8 The structure of lengths classes at the *Merlangius merlangus* species

Age composition revealed the emergence of individuals from 0;0⁺ to 3;3⁺ years, with the domination of 1;1⁺ years (67.52%) and

2;2⁺ years (29.90%) individuals. The sex ratio indicates a male domination (51.26%).

Formula fins structure was: D₁ 13-17; D₂ 16-20; D₃ 17-22; A₁ 27-32; A₂ 19-22; P 20-21; V 6 and the brachial thorns were 20-23.

CONCLUSIONS

In the three marine sites analyzed, ichthyofauna had a different structure, as follows:

1. In ROSCI 0269 *Vama Veche – 2 Mai* site, they had captured most of the fish species dominated by sprat, red mullet and whiting; while valuable species (turbot, *Alosa* sp.) have been underrepresented.

2. The ROSCI 0273 *Marine area from Capul Tuzla* site was the poorest in captures (2 species). The population of sprat was dominant, being made up of young individuals by 1;1⁺ year.

3. In ROSCI 0237 *Submarine structures methanogenic Sf. Gheorghe* site, the whiting has prevailed. There are valuable species such as turbot (juvenile), horse mackerel, sturgeons and *Alosa* sp.

4. The data obtained shall be considered as preliminary data, future research, illustrating the situation correctly at all sites. It should be considered that few fish species lead a sedentary life, most of them by movements in areas more or less removed.

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