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## Diet of Pelagic Fish in Zmiinyi Island Coastal Waters (Black Sea)

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### Abstract

Diets of the anchovy, sand smelt, bluefish and horse mackerel, the main pelagic species in the Zmiinyi Island coastal waters have been described and analysed: The Index of Relative Importance, of food items these species of fish have been presented.

Keywords: ichthyofauna, trophic spectrum, The Index of Relative Importance.

### 1. Introduction

According to recent studies (Snigirov et al., 2012), large aggregations of bottom-dwelling and pelagic fish have been registered in the Zmiinyi Island coastal area. By now the species composition of fish community in the island coastal waters has been sufficiently studied. However the biological and ecological aspects of some fish species in the area remain understudied. At present these studies acquire special importance in view of MSFD implementation by the Black Sea countries. This has determined the aim of the present work – study the diet peculiarities of anchovy *Engraulis encrasicolus ponticus* (Alexandrov, 1927), sand smelt *Atherina pontica* (Eichwald, 1831), bluefish *Pomatomus saltatrix* (L., 1766) and horse mackerel *Trachurus mediteraneus ponticus* Aleev, 1956.

### 2. Materials and methods

The methodology of study are described in details in the paper (Snigirov et al., 2012) the most abundant pelagic species were selected in 2013-2014 to study fish diet in the Zmiinyi Island coastal area. Significance of food items in fish diet was calculated using the formulas: Index of Relative Importance (IRI) (Pinkas et al., 1971):

$$IRI (\%) = (N_i\% + P_i\%) \cdot F_i\%$$

where  $N_i$  – quantity of  $i$  – item in fish diet,  $P_i$  – weight of  $i$  – item in fish diet,  $F_i$  – frequency of occurrence of  $i$  – food item in stomachs (guts) of fishes.

### 3. Results and discussion

The average overall length of the anchovy caught near the Zmiinyi Island in 2013-2014 was found to be 10.5-11.6 cm, and the weight 8.1-11.3 g. The highest intensity of anchovy feeding near the island was revealed in autumn 2014, while the lowest intensity was observed in winter period of 2013. The highest quantity of individuals (25%) with empty stomachs was found in winter 2013. In spring and autumn 2014 the share of individuals with empty stomachs were 7.3 and 14.3% respectively. The diet of anchovy comprised of organisms belonging to 15 taxa. The most significant were *Polychaeta* (IRI – 2579.4-3667.6), *Mysidacea* (IRI – 209.8-2600.2), *Amphipoda* (IRI – 102.1-698.6), *Rotatoria* (IRI – 102.5-486.2) and *Copepoda* (IRI – 3.8-835.8). Planktonic larvae of *Polychaeta* and molluscs were also found, though they were much less in number. Under shortage of zooplankton, anchovy have to feed on phytoplankton. The share of phytoplankton in the total weight of food boluses of the analysed individuals ranged from 3.8 to 78.0 %. Average values of total length of the sand smelt specimens were 7.6-8.8 cm, and the weight 3.1-4.9 g respectively. The diet of sand smelt comprised of food items of 17 taxa. *Polychaeta gen. sp.* (IRI – 1994.3-4045.4), *Mysidacea* (IRI – 101.5-858.4) and *Amphipoda* (IRI – 4.7-871.5) prevailed. Planktonic crustaceans played a significant role in the diet of this species. Mean total length values of males and females of horse mackerel in 2013 were recorded at 14.1±0.1 cm, and weight 25.7±0.9 g. In spring and autumn 2014 those values

were length:  $15.6 \pm 0.3$  and  $17.0 \pm 0.4$  cm, and weight:  $37.0 \pm 2.4$  and  $47.5 \pm 4.1$  g respectively. It was established in the course of studies that the diet of horse mackerel comprised of organisms belonging to 16 taxa. In 2013 and 2014 *Polychaeta* (IRI – 2710.0-3295.7) and crustaceans *Amphipoda* (IRI – 1.4-2175.1) were a significant share of horse mackerel diet. In food boluses of big individuals the fry of horse mackerel was found, whose significance in the diet was also quite high (IRI – 295.9-492.1). Bluefish individuals whose average length was 18.7-19.7 cm, and weight 67.0-79.6 g dominated in the catches. The spectrum of their diet was represented by 8 food items. Fish (*En. encrasicholus*, *T. m. ponticus*, *S. s. phalericus* and some others) prevailed in the food boluses of the analysed specimens.

It is thus concluded that the main diet of horse mackerel and bluefish in the coastal waters of the island is fish. For anchovy and sand smelt, in autumn, when significant shoals accumulate near the island and under shortage of zooplankton (their main food) these fish species consume other organisms such as Amphipoda, Isopoda, Mysidacea and other crustaceans, as well as Polychaeta. In cases of shortage of food anchovy have to feed on phytoplankton. The share of phytoplankton in the total weight of food boluses of the analysed individuals made 3.8 to 78.0 %.

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#### 5. References

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