



MODERN TECHNOLOGIES OF REPRODUCTION NATIVE FISH SPECIES

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**Network of Aquaculture Centers in Central-Eastern Europe (NACEE)
Institute of Fisheries of the National Academy of Agrarian Sciences of Ukraine**

**MODERN TECHNOLOGIES
OF PROPAGATION AND RESTOCKING
OF NATIVE FISH SPECIES**

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ASSESSMENT OF THE SIMILARITY DEGREE OF *Gobiidae* FOOD COMPOSITION FOR FORMING POLYCULTURE IN THE SHABOLATSKY ESTUARY

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Shabolatsky estuary is located in the northwestern area of Black Sea and was formed as Dnistro river estuaries, which were separated by a sand bar from the sea. The estuary belongs to the type of semi-open, brackish-water estuaries-lagoons. For centuries, the Shabolatsky estuary served as a place for marine and freshwater fish and was traditionally used for ranching mariculture [1].

One of the most important components of the ichthyocomplex of the Shabolatsky estuary are gobiids represented by the two most widespread fish species – round goby *Neogobius melanostomus* and grass goby *Zosterisessor ophiocephalus* [1].

An analysis of the food relationships for gobies, one of the main objects of ranching mariculture in the Shabolat estuary, showed that the maximum similarity degree in the diet compositions of the grass goby and round goby was observed in autumn (SD – 33.2), the minimum – in spring (SD – 20.8) (Table 1) [2].

Table 1

**Similarity degree of the diet composition of gobies from the Shabolatsky estuary
in different seasons 2009–2012**

Nutrition objects, in percentages by weight	<i>Zosterisessor ophiocephalus</i>	<i>Neogobius melanostomus</i>	<i>Zosterisessor ophiocephalus</i>	<i>Neogobius melanostomus</i>	<i>Zosterisessor ophiocephalus</i>	<i>Neogobius melanostomus</i>	<i>Zosterisessor ophiocephalus</i>	<i>Neogobius melanostomus</i>
	Spring		Summer		Autumn		Average for the year	
<i>Nereis diversicolor</i>	8,4	–	7,3	6,6	1,3	1,5	7,2	1,7
<i>N. sp.</i>	4,6	–	4,1	–	–	–	4,2	–
<i>Abra ovata</i>	3,6	1,8	–	0,2	–	0,02	2,4	0,7
<i>Mytilaster lineatus</i>	1,0	1,1	–	0,5	–	0,03	0,4	0,3
<i>Hydrobia sp.</i>	1,3	–	–	0,2	–	0,1	0,8	0,3
<i>Mysidae gen sp.</i>	–	–	1,4	0,1	–	0,1	0,1	0,4
<i>Idothea baltica</i>	22,2	8,0	47,5	4,5	79,8	23,4	36,8	12,7

Continuation of the table 1

Nutrition objects, in percentages by weight	Zosterisessor ophiocephalus	Neogobius melanostomus	Zosterisessor ophiocephalus	Neogobius melanostomus	Zosterisessor ophiocephalus	Neogobius melanostomus	Zosterisessor ophiocephalus	Neogobius melanostomus
	Spring		Summer		Autumn		Average for the year	
<i>Sphaeroma serratum</i>	7,0	53,4	2,0	15,3	–	26,3	5,3	37,1
<i>Gammarus lacusta</i>	35,5	0,2	18,2	11,1	8,4	6,6	27,8	4,8
<i>Gammarus sp.</i>	5,1	–	1,5	0,9	1,9	4,5	3,8	1,8
<i>Palaemon adspersus</i>	2,8	11,0	1,6	12,0	–	10,3	1,1	9,0
<i>Pomatoschistus marmoratus</i>	–	20,6	1,5	11,7	–	17,5	0,5	16,1
<i>Zosterisessor ophiocephalus</i>	1,0	–	9,5	–	–	–	2,7	–
<i>Neogobius melanostomus</i>	6,7	–	0,5	4,7	–	2,2	4,1	0,7
<i>N. fluviatilis</i>	0,6	–	0,5	21	–	9,5	0,3	8,3
SD	20,8		29,3		33,2		31,2	

In general, the similarity of the diets of these goby species from the Shabolatsky estuary is not great. They occupy close, but different food niches. Therefore, both species are quite suitable for forming polyculture for fish ranching [2].

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ASSESSMENT OF THE DIET OVERLAP OF MULLET (MUGILIDAE) FOR POLYCULTURE IN THE SHABOLATSKYI LAGOON

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Shabolatskyi (Budakskyi) lagoon is one of the water bodies of the north-western Black Sea region, which is characterized by high biological diversity and fish productivity.

The native ichthyofauna of the lagoon includes *Mugil cephalus* (Linnaeus, 1758), *Liza saliens* (Risso, 1810), and *Liza aurata* (Risso, 1810). In the 80s-90s of the 20th century, a *L. haematocheilus* population (Temminck & Schlegel, 1845) was formed in the Shabolatskyi estuary and is capable of self-reproducing [1].

An analysis of the trophic relationships of the main objects of fish ranching in the

Shabolatskyi estuary showed that the highest diet overlap was observed among mullets (*Mugilidae*) (Table 1) [2].

*Table 1. Average annual diet overlap indices for all length-age groups of mullets (*Mugilidae*) during the feeding period in 2012-2014*

Species		<i>Mugilidae</i>			
		<i>L. saliens</i>	<i>M. auratus</i> / <i>L. aurata</i>	<i>L. haematocheilus</i>	<i>M. cephalus</i>
<i>Mugilidae</i>	<i>L. saliens</i>	–	72.3	56.2	55.6
	<i>M. auratus</i> / <i>L. aurata</i>	72.2	–	58.7	58.5
	<i>L. haematocheilus</i>	56.2	58.7	–	78.7
	<i>M. cephalus</i>	55.6	58.5	78.7	–

The average annual diet overlap values of *L. haematocheilus* and *M. auratus* / *L. aurata* were 78.7, *L. saliens* and *M. cephalus* — 72.2. For mullets, the highest similarity was the qualitative composition of the diets for all species in the spring period [3]. In summer, the composition of food changed significantly that reduced the tension of trophic relationships. In autumn, the greatest similarity was observed for age-1+ *L. saliens* and *M. auratus* / *L. aurata* (diet overlap index – 74.5), age-1+ and age-2+ of *L. haematocheilus* and *M. cephalus* (diet overlap indexes – 84.2 and 85.0, respectively). At the same time, the diets of *L. haematocheilus* and *M. auratus* / *L. aurata* differed significantly from *L. haematocheilus* and *M. cephalus*. If the majority of the diets of the first fishes were animal prey, detritus and plant components prevailed in the latter. Trophic relationships among all mullets foraging in the Shabolatskyi lagoon were quite tense in recent years, which largely affected their growth rates and the weight of table fish. This fact must be taken into account in the directed formation of fish ichthyocenosis in the lagoon, in order to organize fish ranching.

In the Shabolatskyi lagoon, it is advisable to introduce fish ranching practices of the controlled cultivation of mullets in cages and specially fenced areas of the lagoon. Also, it is necessary to pay serious attention to the development of active methods of harvesting commercial fish during free fattening [4].

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