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# NUTRITION OF SOME SPECIES OF FISH IN THE MIDDLE BASIN OF MOLDOVA RIVER

#### BY

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Key words: trophic spectrum of fish

In this study the authors present the trophic spectrum at 11 species of fish from the Moldova River Middle Basin – during the last part of summer and the beginning of autumn. We analysed the digestive tubes contents of 254 fish.

The most frequently consumed food eaten is represented by Coleoptera, Diptera and Hymenoptera species. We found plant fragments in all studied digestive tubes contents excepting trout (Salmo trutta fario) and at the broad snouts (Chondrostoma nasus) were found only vegetal fragments.

### Introduction

Knowing the food consumed by the coarse fish represents a complex issue and the scientific articles published until now containe disparate aspects without clarifying the diversity of the components consumed and their role in maintenance the general metabolism.

Animal and vegetal organisms used by fish in their nutritional process show their position in trophic chains from natural aquatic ecosystems.

The natural food of fish in the diverse aquatic basins indicates the status of habitates and ecological niches and their evolution according to circumambience factors and human factor. (1, 3, 6)

The main objective of this study is to point out some aspects of nutrition of some species of fish which live in the Middle Basin of Moldova River.

### Material and methods

The study material consists of 254 gastric contents from 11 species of fish which belong to 2 orders: Clupeiformes Order and Cypriniformes Order.

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<u>Ord. Clupeiformes</u>	Number of full digestive tubes	Number of empty digestive tubes
<u>Fam. Salmonidae</u>		
1. Salmo trutta fario – trout	4	0
Ord. Cypriniformes		
Fam. Cyprinidae		
2. Leuciscus cephalus – chub	110	5
3. Gobio gobio – gudgeon	34	4
4. Carassius auratus gibelio – gold fish	23	0
5. Gobio uranoscopus – longbarbel gudgeon	19	3
6. Chondrostoma nasus – broad snouts	20	0
7. Phoxinus phoxinus – minnow	12	2
8. Gobio kessleri – sand gudgeon	9	2
9. Barbus barbus – barbel	1	0
Fam. Cobitidae		
10. Cobitis aurata balcanica	1	4
11. Noemacheilus barbatulus	1	0
TOTAL	234	20

## Table A. The number of the studied fish' digestive tubes

The collecting of the fish was made from the 6-th of July to the 18-th of September on a area of Moldova River (almost 2 km) between Fantana-Mare and Vadu Moldovei.

Geographycaly speaking, the sector of the river explored belongs to the Middle Basin of Moldova River.

The collectings were made during the daylight, at different hours to notice the activity of feeding in the morning, during the day and in the evening.

The study material, represented by the trophic components, is different from a species to another.

The fish digestive tubes were labeled after the dissection and put into a conservant liquid. Then, the content was analysed in a laboratory with a binocular microscope.

The trophic components were determinated up to order and where it was possible, even to the species.

It's interesting to remark the fact that from 254 analysed digestive tubes, 20 were empty or with some gastrolites pieces.

The analysis of the trophic components from the fishes' food was made from the calitative point of view. The appreciation of the cantity would have been very difficult because the stomacal and intestinal contents were very small.

#### **Results and discussions**

The identified components in the analysed fishes' food had been notified in the tables I-VIII.

In trout (*Salmo trutta fario* – Linnaeus 1758) as have been expected, the food regim is strictly insectivorous, Hymenoptera species being present in the content of the digestive tube to the 50% from the studied specimens. The other insects Diptera, Coleoptera, Trichoptera and Ephemeroptera species are in aproximatively equal proportions from the samples. These informations are indicated in table B

Another species with convinging food analysis is minnow (*Phoxinus phoxinus phoxinus –* Linnaeus 1758). From a trophic point of view, this species belongs to the group of insectivorous fish but its food regim is diverse.(5) of the consumated insects, we can remark Trichoptera and Coleoptera species and Odonata and Ephemeroptera species. Other identified invertebrates in the digestive tubes are shellfish from Decapoda Order and Chilopoda myriapods. It is interesting to remark the fact that there were identified vegetal remains into 5 digestive tubes. This aspect denotes the fact that this species has an omnivorous character (table B).

An omnivorous species with a very diverse food regim is chub (*Leuciscus cephalus cephalus* – Linnaeus 1758). The analyses of the digestive tube content is notified in table B.

From the consumated insects, first we can mention Coleoptera species, then Hymenoptera species and thirdly Trichoptera species. Besides the insects, in the analysed digestive tubes were found molluscs from Gastropoda Division, spiders from Araneae Order and Chilopoda myriapods. It's interesting to remark the fact that into chub's digestive tube were identified fragments from other fishes' bodies and small remains of amphibians. A proof of the omnivorous character of this species is the presence of vegetable food, but also the accidentale presence of some terrestrial insects: Forficula auricularia from Dermaptera Order and Gryllotalpa gryllotalpa from Orthoptera Order.(1, 6)

In gudgeon (*Gobio gobio obtusirostris* – Valenciennes 1844) analyzing table B, we can observe that the trophic spectrum is less reduced, being identified only remains of vegetal food and insects from 4 Orders.(5) From the consumated insects, the most important are Diptera species, Coleoptera species, Heteroptera and Trichoptera species.

In longbarbel gudgeon (*Gobio uranoscopus friči* – Vladykov 1925) we can see a more variated trophic spectrum than in gudgeon. The results are notified in table B. There were identified spiders from Araneae Order. In the consumed food prevail the insects from Coleoptera Order and remains of vegetal food.

The sand gudgeon (*Gobio kessleri kessleri* – Dybowsky 1862) the results were notified in table B. The largest percentage from the numbers of the studied digestive tubes is represented by Coleoptera species, then Diptera species and remains of vegetable food were reported in one case.

At broad snouts (*Chondrostoma nasus nasus –* Linnaeus 1758) the analyses of food consumed denote the fact that this fish is an exclusive consumer of vegetal food

(table B). The vegetal components consumed by broad snouts couldn't have been identified because they were found like a green macerate substance.(3)

In cold fish (*Carassius auratus gibelio* – Bloch 1783) we can observe a vegetal food regim (table B). The vegetal food appears in all the analysed samples (23 digestive tubes). Animal food, represented by Coleoptera species, was found in 13 analysed digestive contents and Hymenoptera species were found in 5 digestive tubes. There were still identified remains of shellfish from Decapoda Order.(6)

The calitative analyses of the trophic regim in Barbus barbus, Cobitis aurata balcanica and Noemacheilus barbatulus species hasn't been possible to realise because of the unrelated number of the specimens.

#### Conclusions

1. The analysed food of those 11 species of fish from Moldova River shows the fact that from among the nutritive components the central position is occupied by insects and the most important are: Coleoptera, Diptera and Hymenoptera species.

2. Small percentages of vegetal food are present in the digestive tube in all fish species except the trout and at broad snouts was found only vegetal food.

3. Most insects from investigated fish food are aquatic grubs caught in the habitat where these species live and just few of them are flying insects.

4. The presence of gastrolites in all investigated species except trout confirms the role of these particles in the digestive process IN omnivorous species and at vegetal species, too.

#### References

- 1. Battes, K., Simalcsik, F. (1975) Lucr. Stat. "Stejarul" Limnologie, 165-175
- 2. Bănărescu, P. (1964) Fauna R. P. R. Pisces Osteichthies, Edit. Acad. R. P. R., București
- 3. Cărăuşu, S. (1952) Tratat de ihtiologie, Edit. Acad. R. P. R. București
- 4. Matei, D., Manea, Gh. (1990) Lucr. S. C. P. Piscicola Iași; 1,47-48 (volum omagial)
- 5. Simalcsik, F., Battes, K. (1973) Lucr. Stat. "Stejarul" Limnologie, 119-128
- 6. Stăncioiu S., Munteanu G., Căruntu V., Metaxa I. (1995) Simpozion Internațional AQUAROM '95, Galați - România

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		Species of analysed fish							
Order	S.t.f.	P.p.p	L.c.c.	. G.g.o.	G.u.f.	G.k.k	C.n.n.	C.a.g.	
	Number of analysed fish								
Coleoptera	1	3	74	12	7	6	-	13	
Hymenoptera	2	1	22	-	-	1	-	4	
Trichoptera	-	3	16	1	1	1	-	1	
Diptera	1	-	8	14	5	3	-	-	
Odonata	-	2	6	-	2	-	-	1	
Heteroptera	-	1	5	1	1	-	-	1	
Orthoptera	-	-	2	-	-	-	-	-	
Homoptera	-	-	1	-	-	-	-	-	
Ephemeroptera	1	2	1	-	-	-	-	-	
Dermaptera	-	-	1	-	-	-	-	-	
Decapoda	-	1	-	-	-	-	-	1	
Araneae	-	-	2	-	3	1	-	1	
Subcls. Chilopoda	-	1	1	-	-	-	-	1	
Cls. Osteichthyes	-	-	5	-	-	-	-	-	
Cls. Amphibia	-	-	3	-	1	-	-	-	
Cls. Gastropoda	-	-	3	-	-	-	-	-	
vegetal remains	-	5	35	11	7	1	20	23	

Table B.	The food comp	ponents found	in the	anal	ysed s	species	of fish
			n	•	e	1 1	P* 1

Legend:

S.t.f. – Salmo trutta fario

P.p.p. – Phoxinus phoxinus phoxinus

L.c.c – Leuciscus cephalus cephalus

G.g.o. – Gobio gobio obtusirostris

G.u.f. – Gobio uranoscopus friči

G.k.k. – Gobio kessleri kessleri

 $C.n.n-Chondrostoma\ nasus\ nasus$ 

C.a.g. - Carassius auratus gibelio

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