
BIODIVERSITY OF ICHTHYOFaUNA FROM LAKE PRESPA, LAKE OHRID AND LAKE SKADAR

T. Talevski¹, D. Milosevic², D. Maric², D. Petrović², M. Talevska¹, A. Talevska³

¹Hydrobiological Institute Ohrid, R.Macedonia

²Department of Biology, Faculty of Science and Mathematics, University of Montenegro, Podgorica. Montenegro

³Student FNS Institut for biology, St.Kiril and Metodi Skopje, R.Macedonia

Correspondence to: Trajce Talevski

E-mail: tratal2001@yahoo.com

ABSTRACT

Lake Prespa, Lake Ohrid, and Lake Skadar are the biggest lakes in the Balkan Peninsula.

In this paper are presented the researches of the fish populations qualitative composition in Lake Prespa, Lake Ohrid and Lake Skadar. In those three lakes as result of negative anthropogenic impact there are changes in fish biodiversity (with more presence of allochthonous species). In this way, unfortunately autochthonous populations of fishes (which are rich by endemic and relict species) are endangered.

By reason of inserting new species, the fish populations are endangered, especially the populations of particular zoographically significant species. So, it is necessary to proceed the procedure to their inserting in the Red list of endangered species.

The abundance of the fish populations in the three biggest lakes in the Balkan Peninsula is in dependence from of their different altitudes, surfaces and depths. Also, the qualitative composition of the fish populations in those lakes depend from the different physic-chemical conditions, biological communities (phytoplankton, zooplankton, bottom fauna), and especially from the macrophyte vegetation.

Keywords: biodiversity, ichthyofauna, Lake Ohrid, Lake Prespa Lake Skadar

Introduction

Lake Prespa, Lake Ohrid and Lake Skadar are transboundaries lakes (**Fig.1**). Lake Ohrid and the Lake Prespa belong to a group of Dessaret basins that originated from a geotectonic depression during the Pliocene epoch up to five million years ago on the western side of the Dinaric Alps. The Prespa is second largest lake in Macedonia. The lake is settled in the south-western part of the Republic of Macedonia and lies in the Prespa valley, between the Resen field and Baba, Suva Gora and Galicica mountain. The lake of Golema Prespa lies at an altitude of 853 above the sea level.

The Lake Prespa is contained from Golema Prespa and Mala Prespa. Mala Prespa Lake is 3 meters above the Golema Prespa Lake. In the Prespa Lake, most important water sources are: Golema River, Brajcinska River and Kranska River.

Lake Ohrid is the deepest lake of the Balkan, with a maximum depth of 297 and a mean depth of 155 m. The water leaves Lake Prespa trickling through underground watercourses in the karst landscape, where it is joined by mountain range precipitation and eventually emerges in numerous springs along the eastern shore and below the water surface of Lake Ohrid. While Lake Ohrid is special as such, by far the most spectacular quality is its impressive endemism from cyprinid and salmonid fish.

Lake Skadar is the largest lake on the Balkan Peninsula. It is situated in the south-eastern part of the Republic of Montenegro, in Zeta-Skadar valley, and in the karst terrain of the southeast Dinaric Alps in Albania. Lake Skadar has a peculiar water regime, with water level fluctuations of up to five metres. The Moraca River contributes 62 percent of the lake's water. About 30 percent of it comes from underground springs called "eyes."

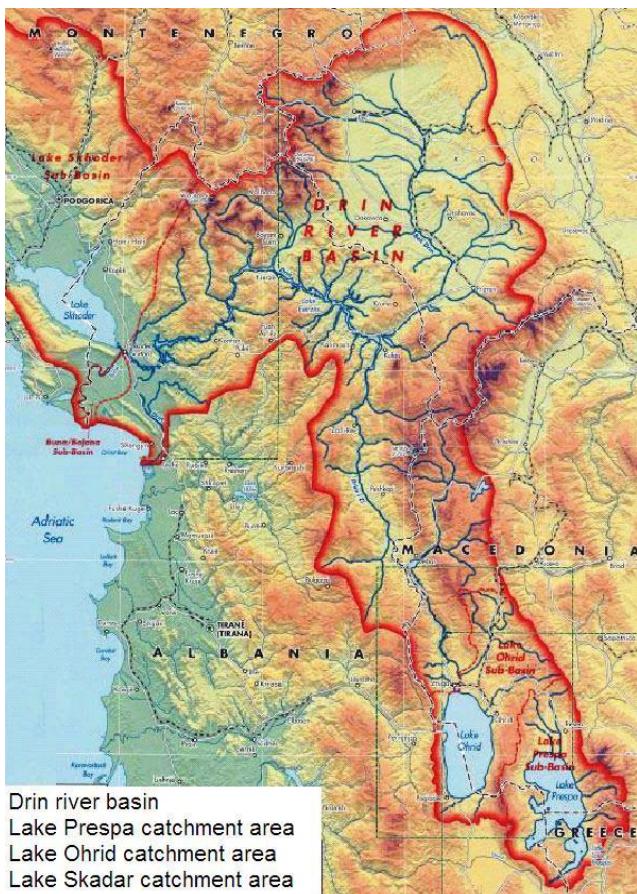


Fig. 1. Map of the Lake Prespa, Lake Ohrid and Lake Skadar and its catchment area

Materials and methods

This paper is result of long-term researches of ichthyofauna from Lake Prespa, Lake Ohrid and Lake Skadar. The researches are performed by the Department of Cyprinid fishes from the Hydrobiological Institute - Ohrid, R.Macedonia and Department of Biology, Faculty of Science and Mathematics, University of Montenegro, Podgorica, Montenegro. The materials for researches were collected from Lake Prespa, Lake Ohrid and Lake Skadar by day and nighttimes experimental fishing with various fishing gill net. Collected materials of ichthyofauna were determined in laboratories.

Results and Discussion

The researches of fish populations from Lake Prespa, Lake Ohrid and Lake Skadar were started in beginning of XIX century. Attention of world scientists in this time interest the speciality of plant and animal world from those lakes. Many Balkan and world scientists (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 18, 19, 20, 28, 29, 30, 33) researched the biodiversity and the

systematic belonging of ichthyopopulation in these lakes, and these researches were performed continuously from this time until now. The biodiversity of ichthyofauna from Lake Prespa, Lake Ohrid and Lake Skadar and its catchement area is present of **Tab. 1**.

In Lake Prespa, Lake Ohrid and Lake Skadar was determined totally 67 native and introduced fish species.

In Lake Prespa were determined 11 native and 12 introduced fish species. In this lake 9 fish species (82%) are endemics: *A. prespensis* Karaman, 1924, *A. belvica* Karaman, 1924, *B. prespensis* Karaman, 1924, *C. prespense* Karaman, 1924, *C. meridionalis* Karaman, 1924, *P. prespensis* Karaman, 1924, *R. prespensis* Karaman, 1924, *S. peristericus* Karaman, 1938, and *S. prespensis* Fowler, 1977.

In Lake Ohrid were determined 21 native and 7 introduced fish species. In this lake 7 fish species (33,3%) are endemics: *S. ohridanus* Steindachner 1892, *S. aphelios*, Kottelat, 1997, *S. balcanicus* Karaman, 1928, *S. letnica* Karaman, 1924, *Salmo lumi* Poljakov, Filip & Basho 1958, *Barbatula sturanyi* (Steindachner, 1892), and *G. ohridanus*, Karaman, 1924.

In Lake Skadar were determined 34 native fish species (9 anadromous/catadromous) and 13 introduced fish species. In this lake 7 fish species (20,6%) are endemics. The endemics autochthonous fishes from Lake Skadar and its catchemt area are: *Alosa sp.*, *B. zetensis* (Šorić, 2000), *C. scodrensis* Elvira, 1987, *G. skadrensis* Karaman, 1936, *P. montenegrensis* Miler & Šanda, 2008, *S. zetensis* Hadžišće, 1962 and *Rutilus sp.*. Only *A. anguilla* (Linnaeus, 1758) and *C. carpio* Linnaeus, 1758 occur in these three lakes.

These data indicated that ichthyofauna from Lake Prespa had quite independently route, and ichthyofauna in Lake Skadar and Lake Ohrid often has been in direct contact. Between fish fauna of Lake Ohrid and Lake Skadar were determined identically 14 native fish species (**Tab.1**).

Anthrophogenic influence on biodiversity of ichthyofauna is very expressed in the last 50 years of the 20 century. In this period in lakes Prespa, Ohrid and Skadar are determined great number of introduced fish species which is described by Balkan ichthyologists (11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 25, 26, 27, 31, 32).

Even these lakes are classified in the same zoogeographical area, the data indicated that their ichthyofaunas anyway have longest geographical isolation, especially Lake Prespa. Lake Ohrid has specific and unique Salmonidae ichthyofauna, and for Lake Skadar specific (endemic) is fauna in tributaries (*B.*

zetensis, *G. scodrensis*, *P. Montenegrensis*).

TABLE 1.

List of native and introduced fish of Lake Prespa, Lake Ohrid and Lake Skadar and its catchment area

	Species	Lake Prespa		Lake Ohrid		Lake Skadar	
		native	introd.	native	introd.	native	introd.
1.	<i>Acipenser naccarii</i> Bonaparte, 1834 -1841					+	
2.	<i>Acipenser sturio</i> Linnaeus, 1758					+	
3.	<i>Alburnoides ohridanus</i> (Karaman, 1928)			+		+	
4.	<i>Alburnoides prespensis</i> Karaman, 1924	+					
5.	<i>Alburnus belvica</i> Karaman, 1924	+					
6.	<i>Alburnus scoranza</i> (Heckel et Kner, 1858)			+		+	
7.	<i>Alosa falax</i> La Capede, 1803				+	+	
8.	<i>Alosa sp.</i>					+	
9.	<i>Ameiurus nebulosus</i> Lesueur, 1819						+
10.	<i>Anguilla anguilla</i> (Linnaeus, 1758)	+		+		+	
11.	<i>Barbatula zetensis</i> (Šorić, 2000)					+	
12.	<i>Barbatula sturanyi</i> (Steindachner, 1892)			+			
13.	<i>Barbus prespensis</i> Karaman, 1924	+					
14.	<i>Barbus rebeli</i> Köller, 1925			+		+	
15.	<i>Carassius gibelio</i> Bloch, 1782		+		+		+
16.	<i>Chondrostoma ohridanus</i> Karaman, 1924			+			
17.	<i>Chondrostoma prespense</i> Karaman, 1924	+					
18.	<i>Chondrostoma scodrensis</i> Elvira, 1987					+	
19.	<i>Citharus linguatulus</i> (Linnaeus, 1758)					+	
20.	<i>Cobitis ohridana</i> Karaman, 1928			+		+	
21.	<i>Cobitis meridionalis</i> Karaman, 1924	+					
22.	<i>Ctenopharyngodon idella</i> Valenciennes 1844		+				+
23.	<i>Cyprinus carpio</i> Linnaeus, 1758	+		+		+	
24.	<i>Dicentrarchus labrax</i> (Linnaeus, 1758)					+	
25.	<i>Gambusia holbrooki</i> Girard, 1859		+		+		+
26.	<i>Gasterosteus gymnurus</i> Cuvier, 1829					+	
27.	<i>Gobio ohridanus</i> , Karaman, 1924			+			
28.	<i>Gobio skadrensis</i> Karaman, 1936					+	
29.	<i>Hypophthalmichthys molitrix</i> Valenciennes 1844		+				+
30.	<i>Hypophthalmichthys nobilis</i> Richardson, 1845						+
31.	<i>Lepomis gibbosus</i> Linnaeus, 1758		+		+		
32.	<i>Liza ramada</i> Risso, 1826					+	
33.	<i>Megalobrama terminalis</i> Richardson, 1844						+
34.	<i>Mugil cephalus</i> Linnaeus, 1758					+	
35.	<i>Mylopharyngodon piceus</i> Richardson, 1845						+
36.	<i>Oncorhynchus mykiss</i> Walbaum, 1792		+		+		+
37.	<i>Pachychilon pictum</i> (Heckel et Kner, 1858)			+		+	
38.	<i>Parabramis pekinensis</i> , (Basilewsky, 1855)		+				
39.	<i>Pelasgus minutus</i> Karaman, 1924			+		+	
40.	<i>Pelasgus prespensis</i> Karaman, 1924	+					

41.	<i>Perca fluviatilis</i> Linnaeus, 1758					+	
42.	<i>Phoxinus limaireul</i> Schinz, 1840			+		+	
43.	<i>Pleuronectes flessus</i> Pallas, 1811					+	
44.	<i>Pomatoschistus montenegrensis</i> Miler & Šanda, 2008					+	
45.	<i>Pseudorasbora parva</i> Temmini & Schlegel, 1846		+		+		+
46.	<i>Rhodeus amarus</i> (Bloch, 1782)		+		+	+	
47.	<i>Rutilus</i> sp.					+	
48.	<i>Rutilus ohridanus</i> (Karaman, 1924)			+		+	
49.	<i>Rutilus prespensis</i> Karaman, 1924	+					
50.	<i>Salaria fluviatilis</i> Asso, 1801					+	
51.	<i>Salmo aphelios</i> , Kottelat, 1997			+			
52.	<i>Salmo balcanicus</i> Karaman, 1928			+			
53.	<i>Salmo fariooides</i> Karaman, 1937					+	
54.	<i>Salmo letnica</i> Karaman, 1924		+	+			
55.	<i>Salmo lumi</i> Poljakov, Filip & Basho 1958			+			
56.	<i>Salmo marmoratus</i> Cuvier, 1817					+	
57.	<i>Salmo ohridanus</i> Steindachner 1892			+			
58.	<i>Salmo peristericus</i> Karaman, 1938	+					
59.	<i>Salmothymus zetensis</i> Hadžišće, 1962					+	
60.	<i>Salvelinus fontinalis</i> Mithchill, 1815						+
61.	<i>Scardinius knezevici</i> (Bianco & Kottelat, 2005)			+		+	
62.	<i>Silurus glanis</i> Linnaeus, 1758		+				
63.	<i>Squalius prespensis</i> Fowler, 1977	+					
64.	<i>Squalius squalus</i> Bonaparte, 1837			+		+	
65.	<i>Telestes montenegrinus</i> (Vuković, 1965)			+		+	
66.	<i>Thymallus thymalus</i> Linnaeus, 1758						+
67.	<i>Tinca tinca</i> Linnaeus, 1758		+				+
	Total	11	12	21	7	34	13

The macrophyte vegetation is distributed in the littoral regions of those three lakes. It serves as a habitat, shelter and food for many species of fish and also as breeding site. Also, it plays a large role in the protection of the fishes from theirs predatory.

Because of great number of endemic and relict species of fishes, the researches of biodiversity and the systematic belonging of ichthyofauna in these lakes were performed continuously from this time until now (24).

2. **Drecun D.** (1962) Hydrobiologija Montenegrina. **2**, (1):1-8.
3. **Drenski P.** (1922) Ohridskoto Ezero i negovata ribna fauna. Sofija.
4. **Filipi N.** (1957) Ihtiofauna e liquenit te Shkodres, Buletin, T. I, Tirane.
5. **Heckel T., Kner R.** (1858) Die Süsswasserfische der Ostereichischea Monarchie. Leipzig.
6. **Ivanović B.** (1973) Ichthyofauna of Skadar Lake. Institut za biološka i medicinska istraživanja, 146 pp Titograd.
7. **Karaman S.** (1924) Pisces Macedoniae. Split, pp 1-90.
8. **Karaman S.** (1928) Prilozi ihtiologiji Jugoslavije Glasnik Skopskog naucnog drustva, Skopje knj. 6:.
9. **Karaman S.** (1929) Prilozi ihtiologiji Jugoslavije. Glasn.ik Skop. naucnog drustva, T. VI, Skopje.

REFERENCES

1. **Drecun D.** (1957) Ihtiofauna Skadarskog jezera. Nasa poljoprivreda , 3, Titograd.

-
10. **Kottelat M., Freyhof J.** (2007) Handbook of European Freshwater Fishes. Kottelat, Cornol, Switzerland and Freyhof , Berlin, Germany.
11. **Knežević B.** (1981a) Glasnik Republičkog Zavoda za zaštitu prirode-Prirodnačkog muzeja, **14**: 79-84.
12. **Knežević B.** (1981b) Poljoprivreda i šumarstvo, **37** (3): 73-76.
13. **Knežević B. and Jovanović, R.** (1973) Glasnik Republičkog Zavoda za zaštitu prirode-Prirodnačkog muzeja, **16**: 75-76.
14. **Knežević B., Marić D.** (1979) Glasnik Republičkog Zavoda za zaštitu prirode-Prirodnačkog muzeja, **12**: 177-180.
15. **Knežević B., Marić D.** (1986) Ichthyos, **3**: 13-17.
16. **Knežević B., Vuković, T. and Ražnatović, B.** (1978) Glasnik Republičkog zavoda za zaštitu prirode – Prirodnačkog muzeja, **11**: 75-78
17. **Marić D.** (1991) Ichthyos, **1**: 18-24.
18. **Poljakov G.** (1958) Peshqit e chaiperse. Tirane.
19. **Stanković S.** (1960) W. Junk, Den Haag, Monogr.biol. **9**, pp.357.
20. **Taler Z.** (1954) Jugoslavije Glasnik Prir. muz. Srpske zem., Ser. B, knj. 5-6, Beograd.
21. **Talevski T.** (1996) *Rhodeus sericeus amarus* (Bloch, 1782) new species of alochtonous ichthiofauna from Lake Ohrid I Congres of biologist from Macedonia, 146, Ohrid
22. **Talevski T.** (2001) Autohtonous and alochtonous fish species in Lake Ohrid and its catchment area, 30 Proceeding 33 annual Conference "WATER 2001, Arandjelovac, S.R.Jugoslavija p.p.263-268
23. **Talevski T.** (2004) Anthropogenic influence on changes of cyprinid fishes population from Lake Ohrid Proceeding 33 annual Conference "WATER 2004". Borsko jezero, S.R. Jugoslavija, p.p. 239-244
24. **Talevski T., Milosevic D., Maric D., Petrovic D., Talevska M., Talevska A.,** (2009) Anthropogenic influence on biodiversity of ichthyofauna and macrophyte vegetation from Lake Ohrid and Lake Skadar. Proceedings International Conference "Lakes and Nutrient Loads" in press
25. **Točko M. N.** (1959) Zbornik na rabotite, Hidrobioloski zavod, Ohrid, God. VII. br.9.: 1-3.
26. **Točko M. N.** (1982) Ekological characteristics of the Rainbow introduced trout (*Salmo gairdneri* Richardson) from Lake Ohrid. Abstracts, IV.Congres of Europ. ichtioologists, Hamburg: 311.
27. **Točko M. N.** (1982 b) Biosistematiqa, Vol.**8**, No. 2: 167-174.
28. **Vladlkov. V. & Petit G.** (1930) Sur quelques possions d'eau douce d'Albanie. Bull. Soc. Zool. France, 55.
29. **Vladlkov. V. & Petit G.** (1930 a) A propos des Salmonides du Lac d'Ohrida. Bull.du Museum Paris, II: 5.
30. **Vuković T. & Ivanović B.** (1971) Slatkovodne rive Jugoslavije. Zemaljski muzej Bosne i Hercegovine, Sarajevo, pp 1-265
31. **Vuković T., Kažić D. and Knežević B.** (1975) Bull.Sci.,Yugosl. **20**: 1293.
32. **Vuković, T., Knežević, B.** (1978) Ribarstvo Jugoslavije, **33** (6): 142.
33. **Šorić, V. M.** (2000) *Acta biologica iugoslavica - serija E: Ichtyologia*, **32**(1), 59-69.