PRODUCTION, CATCH STRUCTURE AND CPUE IN SHKODRA LAKE

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ABSTRACT

The study aimed the evaluation of catch structure, catch effort and population structure of the most abundant fish species of the Shkodra Lake. Evaluation of catch, gear used, effort, number of boats and fishermen were based on data provided from Fishery Management Organization of Shkodra Lake. The census was performed for the year 2014. Fishing activity was performed with 5m length motor boats equipped with gill nets and purse seines (length 500-600m, mesh size respectively 15-30 cm and 50-70 cm) and long lines with about 100 hooks. Only a restricted number of fish species dominates in fish production and therefore in total catch. The main fish species caught in the Lake are: carp (*Cyprinuscarpio*), bleak (*Alburnusscoranza*), prussian carp (*Carassiusgibelio*), roach (*Rutilusprespensis*), striped mullet (*Mugil cephalus*), common rudd (*Scardiniuserythrophthalmus)*, european eel *(Anguilla anguilla).*The total production of Shkodra Lake for 2014 was about 530 ton fish and 5 ton fish (stripped mulled and European eel) were caught by wire traps of Buna River. The catches of roach made 32.3% of total catches followed with carp, prussian carp and bleak with respectively 31.05%, 15.9% and 15.6%.

Keywords: ShkodraLake, catch structure.

INTRODUCTION

Shkodra Lake and its surrounding regions represent one of the most important centers of geodiversity and biodiversity in the Western Balkans and South East Europe. The lake is an example of a well preserved fresh water ecosystem with special geomorphological, hydrological and climatic features. It is characterized by a high biodiversity (species/space ratio = 0.875), which also includes a number of endemic species (Keukelaar et al., 2006; Radovic et al., 2008). Natural conditions are very suitable for the development of biological diversity: there are many types of biotopes in the lake, and it represents a high level of biological production (as a result of its low depth, its entire water mass is found in the photic area) and high oxygen levels.

Although the lake temperature is very variable (8-24^{0}C) there are areas in the largest depths where the temperature is more constant providing favorable conditions for stenoterm organisms. The Shkodra Lake's ichthyic fauna consists of a large number of species, including types of fresh water and a number of marine species that periodically enter the lake. The structure of Lake's ichthyicfauna is influenced by a number of factors such as geographic position and lake character, climate, physical and chemical properties of water and its connection with rivers and the Adriatic Sea. In addition, another factor influencing fauna is the fact that the Lake is part of the Ohrid Lake - Drin River –ShkodraLake hydrological system. There are 50 types of fish in the lake, of which 37 are indigenous types and 13

species introduced (Marić&Milošević, 2011). The Lake water catchment basin is also populated by 7 species of endemic fish. About ten species of fish such as *Cyprinuscarpio, Alburnusscoranza, Anguilla Anguilla, Rutilusprespensis, Scardiniuserythrophthalmus, Mugil cephalus*, chef, etc. are important from the economic aspect. The Cyprinidae family fish are the most common of the lake because the latter is shallow and warm, making it an ideal habitat for the carp family (Cyprinidae). Among the autochthonous cyprinid species there is a tendency to fish for those who have high values such as *Cyprinus carpio* and *Alburnusscoranza*.

MATERIAL AND METHOD

For the assessment of the fishing effort, catch structure and lake productivity, data for catches during 2014 were recorded by fishermen (logbook of monthly catches) licensed and organized in the Fishery Management Organization of Shkodra Lake (FMO of ShkodraLake). The data on fishing tools, the fishing effort used, the number of fishing days per month are provided from the logbooks of fishermen and interviews conducted in the main fishing areas in Shkodra Lake.

RESULTS AND DISCUSSIONS

The fishing activity in the Albanian part of Shkodra Lake is very important. Based on this study, 205 licensed fishing units with 434 fishermen conduct fishing activities in the lake. All fishermen are organized in the Fishery Management Organization of Shkodra Lake. The FMO of the Lake is strengthening and increasing its capacity every year. It has started collecting fishing products from fishermen and is now using various fish conservation equipment, such as for drying and fumigation.

Each licensed fishing unit owns a boat of about 5 m in length, provided with engine. The boats are also equipped with surrounding nets with a length of 500-600 m with dimensions of net holes 15-30 cm and long lines of 50-70 cm about 1000 m and equipped with about 100 hooks. Only two fishing units are licensed for the use of hand treads: a unit operating in the area of Malësi e Madhe (Kamicë), and another unit in the area of Shkodra (Zogaj). The fishing zones where the operating fishing units are found: Vrake – Malësi e Madhe(25 fishermen); Sterbeq - Malësi e Madhe (15 fishermen); Kalldrum - Malësi e Madhe (19 fishermen); Jubice - Malësi e Madhe (25 fishermen); Flake - Malësi e Madhe (17 fishermen); Zogaj - Shkodra (30 fishermen); Shkodra 2 (15 fishermen); Shiroke-Shkoder (14 fishermen); Kamice - Malësi e Madhe (17 fishermen) and Grizhe - Malësi e Madhe (11 fishermen). The fishing activity in Shkodra Lake is managed by the Fishery Management Organization (FMO) and is controlled by the Fishery Inspectorate of ShkodraDistrict. At the FMO of Shkodra all fishermen performing their activity in the catchment area of ShkodraLake, from VauiDejes to the Buna River estuary are organized.

The main species of fish caught for commercial purposes in Shkodra Lake are *Cyprinuscarpio* and *Alburnusscoranza*, although in certain seasons, eels and cuttlefish are included in the fish that are burdened; this is due to the migratory character of these species and the connection of the lake to the sea through the Buna River.

The largest quantity of fish is caught with nylon bentic nets of various sizes (Alburnusscoranza nets, Cyprinuscarpio nets) with arm thread and long-line hooks. Large nets are used in the winter for fishing *Alburnusscoranza* in two areas: Shiroka and Zogaj. In

the winter period, the biggest catches are the *Alburnusscoranza*, while in other seasons, the catches of other species have a greater burden.

For a long time after the 1990s, no documentation of catches and fishing effort was used in ShkodraLake. Only after the organization of the fishermen at the Lake FMO they were forced to fill in logbooks for their fishing activities.

From the processing of the data collected, it is estimated that in the Albanian part of the Shkodra Lake the total fishery production for 2014 is about 533 tons of fish, of which 32.3% are *Rutilusprespensis*, 31.1% *Cyprinuscarpio*, 15.9% *Carassiusgibelio*, 15.6% 3.6% *Mugil cephalus*, 0.6% perch 0.5%*Anguilla Anguilla* and 0.3% *Scardiniuserythrophthalmus*. Figure 1 shows the total number of catches for 2014 for the most fished species. The annual quantity of fish caught in the River Buna is 5 tons/year, of which 3.6 tons are *Mugil cephalus* and 1.4 tons are *Anguilla Anguilla*.

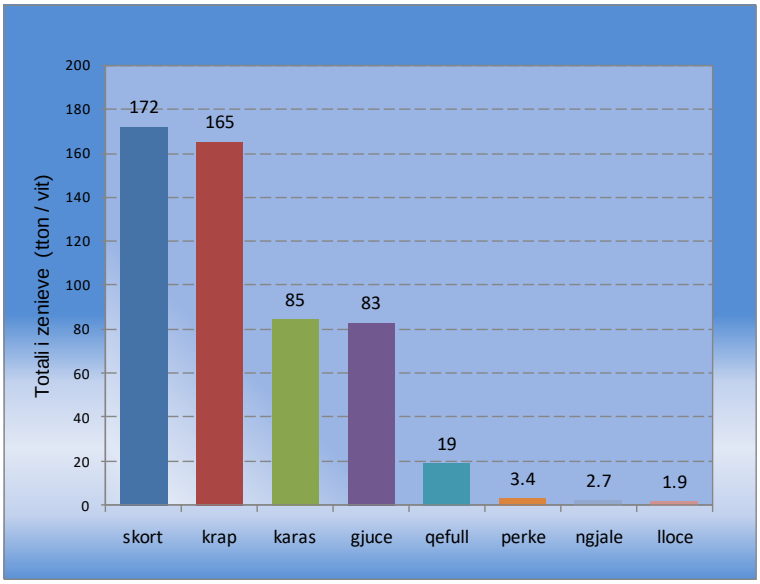

Figure 1. Annual catches according to the most fished types in Shkodra Lake in 2014.

Table 1. Average number of fishing days per month per one effort unit (1 boat, 2 fishermen) of 205 licensed fishing units in ShkodraLake.

January	February	March	April	May	June	July	August	September	October	November	December
13.1	10.8	11.5	1.1	0.3	12.1	13.2	13.3	14.0	13.9	12.6	10.5

As it may be seen from Table 1, the average number of fishing days per year per effort unit is (1 boat, two fishermen) 126. The fishing effort (CPUE) was calculated to be 20.1 kg per fishing unit/day.

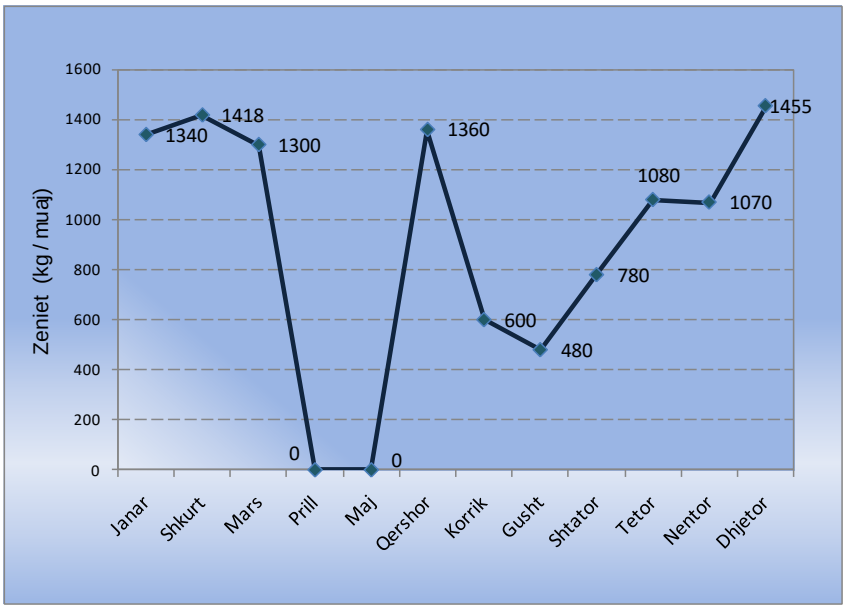

Figure 2. Annual catches according to the most fished types in Shkodra Lake in 2014. (Period April to May is a closed season for commercial fishing in the Lake of Shkodra).

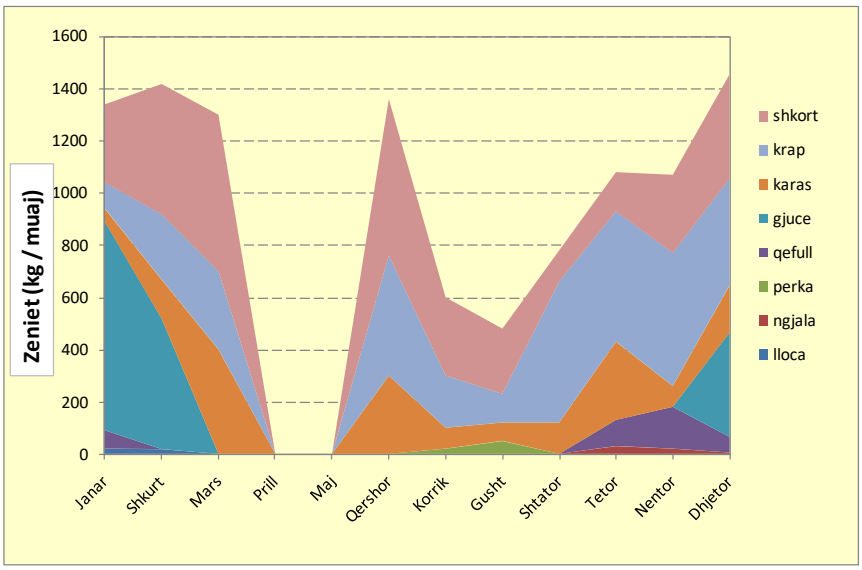

Figure 3. The species composition of commercial fishing in 2014 in ShkodraLake

Compared with 2013 data (Dervishi et al., 2014; Kolaneci et al., 2014), the total lake production in 2014 has increased by 136 tons. The structure of the catches in the Shkrodra lake also presents changes. Despite the increase in total lake productivity in 2014 compared to 2013, the output of *Alburnusscoranza* decreased by 19.3%. The cause of this decline in productivity may be the floods of 2011, 2012 in the river basin of the Drin River and ShkrodraLake, which due to the increase of water level may have damaged the eggs, larvae and juveniles of Alburnusscoranza. Further monitoring of the production of the *Alburnusscoranza*, but also the age composition of its population will give us the necessary information to explain the decline in production. Catches *Rutilusprespensis* increased by 52.1% compared to 2013. It is likely that the catches will be even higher than this, but are not declared by fishermen, as they return to the lake a portion of the fish caught due to a low level market demand for this type of fish. Another negative phenomenon is the decline in the production of migratory fish such as Mugil cephalus, Anguilla Anguilla and kubla. The catches of kubla and *Anguilla Anguilla* in 2014 decreased by 48% and 37.2% respectively

compared to 2013. There are no data from the FMO of Shkodra Lake for this year. It is likely that the reduction of migratory fish populations is the result of the non-spreading of the gates in the Buna River and the illegal catching of fish in the period of their migration into the inland waters. In order to achieve a successful implementation of Fishery Management Plan in Shkodra Lake , it is highly recommended proactive time monitoring and space limitations of fishery in Buna river, as a result it would allow migration of several valuable species like owl , sturgeon, mullets with a high economic trade value for this region. It would allow migration of valuable high economic species like eel, sturgeon, mullets, etc.

REFERENCES

1. Filipi, N. (1957) Iktiofaunaof Shkodra lake.
2. Dhora Dh, Smajlaj Rr, Dhora A, (2008) Catalogueof internal water fish in Albania. Bul. Shk., Ser. Shk. Nat.,58, pp. 100-130.
3. Marić, D. &Milošević, D. (2011). Catalog of freshwater fishes (Osteichthyes) of Montenegro. Montenegrin academy of Sciences and arts. Volume 5, Book 4. Podgorica. pp 114
4. Memia, Sh. (1988) Study of A.alborela, F. and C.carpio, L. population dynamicsin the Lake of Shkodra and Fierza. Dissertation. 70 p.
5. Dervishi, B., V. Kolaneci, A. Çinari, A. Haziraj. (2014) Evaluation of ichthyic species and fishery catch structure in Shkodra Lake. Book of Abstracts, Second International Conference on Applied Biotechnology, September, 22, Tirana, Albania p. 16.
6. Kolaneci, V., B. Dervishi, R. Bakiu. (2014) Evaluation of population's dynamics of carp in Shkodra Lake. Proceedings, Second International Conference on Applied Biotechnology, September, 22, Tirana, Albania p. 63-66.
7. MMPAU (Ministry of Environment, Forests and Water Administration) 2011-2013. Fishery and Aquaculture Management Plan.