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PUMPKINSEED (*Lepomis gibbosus* L. 1758) - UNWELCOME INHIBITANT OF ICHTHYOFAUNA IN THE RESERVOIR STREZEVO IN R. MACEDONIA

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Abstract: Pumpkinseed (*Lepomis gibbosus L*. 1758) represents an allochthonous (introduced) fish species in freshwater ecosystems of Europe. It has shown good adaptation to existing ecological conditions in the back and low flow rate waters. The analysis of some ecological characteristics of the samples, taken from the reservoir Strezevo in R. Macedonia, points to extremely good growth rate in this ecosystem. Despite markedly expressed fluctuations in the number of its population, pumpkinseed has occupied a corresponding ecological niche in the littoral part of habitat. However, due to a wide trophic spectrum and the possible competition for space and places for reproduction, pumpkinseed has become over-abundant, thereby deteriorating the ichthyofauna and state in reservoir Strezevo.

Key words: pumpkinseed, acclimatization, reservoir Strezevo, R. Macedonia.

Introduction

Fresh-water ichthyofauna is a dynamic component of aquatic ecosystems. In recent decades there were dramatic changes in qualitative and quantitative compound in fish stocks in waters in R. Macedonia. That is as a result of fish which are not permanent inhabitants in our waters. One of these kinds of fish is pumpkinseed (*Lepomis gibbosus*). It is an introduced kind which has naturalized a lot in the extended areas and is a serious problem for autochthonous ichthyofauna. It can be seen in its predator affinities, because for its nutrition it consumes roe and youth of other kinds. On the other hand, already existing predators do not consume pumpkinseed as their prey, so it has excellent conditions not only to survive, but to become over-abundant in newly conquered waters.

Pumpkinseed (*L.gibbosus*) is representative of family CENTRARCHIDAE and is autochthonous in North America. According to research of Wheeler (1983), fish of this family has increased in number and inhibited the confluence of

Mississippi river, at the same time inhabiting the Atlantic coast further to central parts of the USA. Largemouth bass (*Micropterus salmoides*) and Bluegill (*Lepomis macrochitus*) had exceptionally large distribution. These two kinds of fish are intentionally introduced in many reservoirs in the USA for sport fishing *(Moehl and Davies, 1993)*.

Representatives of family CENTRARCHIDAE have been successfully introduced in waters in Asia, Africa and Europe. In Europe there are four kinds, and in R. Macedonia only one - the pumpkinseed. All fish of this group are characterized with lively colors, hard, unbranched compacts in frontal part and soft branched in rear part of dorsal fin. Male fish, according to researches of *Garms and Borm (1981)* are significant and interesting because they make nest where they kept inseminated roe and spurge in the first days after being born.

Pumpkinseed is a small fish with maximum length of 20 cm. On the back it is olive - green colored, with dots which are orange on the stomach. There is dark spot on the operculum. In Europe it was introduced in 1887, as aquarium fish but it rapidly spreaded in open waters.

Pumpkinseed is fish with wide range of spreading: Western Europe, Pyrenees, England and other countries *(Povz, 1990; Elvira and Almodovar, 1994)*.

Materials and Methods

In this study was analyzed the pumpkinseed's (*Lepomis gibbosus*) population dense and good growth pace in the reservoir Strezevo in R. Macedonia. Population incerasement in number was studied in the period since 2004 to 2009 year, while the age and growth pace were analyzed on samples collected during 2007^{th}. For age determination were used squamas taken under dorsal fin and measurements of ventrolateral radius. The reconstruction of growth pace in previous period was calculated by logarithm function:

$$\log L = \log a + b \log S,$$

where L is total length, S is squama's size, a and b are calculated parameters *(Cugunova,1959)*.

Results and Discussion

According to lasting several years ichtiological researches in reservoir Strezevo in R. Macedonia it was determinate that fish settlement in reservoir Strezevo is made of basic ecologic groups related to their type of nutrition. There are three basic food chains in nutrition: plantofage (lake Ohrid bleak and silver carp), bentofage (linis, barbel, black barbel, carassius (crucian carp) and silver

carassius and carp) and ihtiofage (predators as trout, pike, catfish, eel and pumpkinseed).

Most common kinds in the reservoir are bleak, carassius, pumpkinseed and chub.

In order to perceive kind adaptation in existing conditions, we have made analyze on growth pace. The sample consisted of 28 units caught in the period spring - summer in 2007th year. The logorhythm function for the proportion between body length (L) and the size of squama diagonal radius (S) is:
log L = 0.3391 + 0,9297 log S.

The samples were from third group of age (age 2+) until sixth (5+) year. Measured body lengths were from 72mm to 121mm (Tab.1).

Table 1. Growth of body length pace for pumpkinseed *(Lepomis gibbosus*) in reservoir Strezevo

		Body length		Reconstruction of body length in mm				
Age	n	Average	Variation	l1	l2	l3	l4	l5
2+	11	81	72-86	45	71			
3+	8	91	83-100	47	67	83		
4+	6	104	96-109	44	64	78	95	
5+	3	112	106-121	50	69	78	101	110
		Average values (mm)		46	68	80	97	110
		Annual growth (mm)			22	12	17	13

The biggest length grow pace pumpkinseed achieves during the first year of life. In the third year there is a little regression in grow pace, due to period of maturity for sexual reproduction.

The references for pumpkinseed grow pace is deficient with data, so we have made comparison with grow pace of the population in reservoir Tapada Pequena, in south-east Portugal *(Godinho and Ferreira, 1996)*. Measured body length of pumpkinseed in that ecosystem was: age 1+ - 55,3 mm, 2+ - 73.3 mm, 3+ - 81.1 mm, 4+ - 90,1 mm and 5+ - 92,5 mm. If we do compare these results with the results from reservoir Strezevo, we can conclude that there is significantly more intensive growth of the population than in our ecosystem.

Pumpkinseed spawning is during the period April - May. The results showed that all fish were sexually matured at age from 2+ - 5+, which leads to conclusion that there is good naturalization to existing ecologic conditions. Maximum fertility for one fish at age of 3+ was 4357 eggs.

Pumpkinseed is fish that lives in stocks among plants along the coast. It is very aggressive and predatory, typical alerter. Except planktonic crustaceans (*Copepoda, Cladocera*) it eats insect *Diptera* larvaes, *Macrophytes* and youth of other fish. *(Vuković and Ivanović, 1971; Garmo and Borm, 1981; Godihno and Ferreira, 1996)*. Due to these nutrition characteristics, competition for living

spaces and reproduction places, intense number increase in population, pumpkinseed can threaten autochthonic ichthyofauna in our water ecosystems.

Conclusion

Pumpkinseed (*Lepomis gibbosus*) is allochthonous fish in fresh-water ecosystems in Europe. It has naturalized in existing ecological conditions in stagnant and low flow rate waters. The analysis of some ecological characteristics of the samples, taken from the reservoir Strezevo in R. Macedonia showed to extremely good growth pace in this ecosystem. Despite markedly expressed fluctuations in the number of its population, pumpkinseed has occupied a corresponding ecological niche in the littoral part of habitat. However, due to wide trophic spectrum and the possible competition for space and places for reproduction, pumpkinseed has become over-abundant, thereby deteriorating the ichthyofauna and state in reservoir Strezevo.

Sunčanica (*Lepomis gibbosus* L. 1758) - nepoželjan član akumulacije Streževo u Republici Makedoniji

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Rezime

Sunčanica (*Lepomis gibbosus L.* 1758) predstavlja alohtonu (novointrodukovanu) vrstu u slatkovodnim ekosistemima Evrope. Pokazala je dobru aklimatizaciju na postojeće ekološke uslove u stajaćim i slabo protočnim vodotocima. Analiza nekih ekoloških karakteristika kod primeraka iz akumulacija Streževo u R. Makedoniji, ukazuje na izuzetno dobar tempo dužinskog rasta u ovom jezerskom ekosistemu. Iako je populaciona brojnost podložna značajnim fluktuacijama, može se zaključiti da je vrsta zauzela odgovarajuće ekološko utočiste u priobalnom regionu staništa. Zbog širokog trofičkog spektra, kao i moguće kompeticije za prostor i mesta reprodukcije, omasovljenje sunčanice pogoršava stanje ihtiofaune ovog ekosistema.

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