FINDING OF STERLET (*ACIPENSER RUTHENUS*) IN THE SAVA RIVER NEAR ZAGREB

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NALAZ KEČIGE (*ACIPENSER RUTHENUS*) U RIJECI SAVI KOD ZAGREBA

Apstrakt
U ovom radu se potvrđuje prisustvo dva odrasla primerka kečige, nađenih 20 km jugoistočno od Zagreba u reci Savi. Familija Acipenseridae spada među najstarije zrakoperke. Populacija kečige u reci Savi je doživela značajan pad u toku XX veka, a u delovima reke Dunav koji prolaze kroz Austriju i Nemačku, ova vrsta je skoro izumrla i njen opstanak zavisi samo od kontinuiranog poribljavanja. Tokom marta 2011. godine dva odrasla primerka kečige veličine 431 i 570 mm su ulovljeni u reci Savi. Analizirano je šesnaest morfometrijskih i tri merističke karakteristike. Starost kečiga je procenjivana korišćenjem delova pektoralnog peraja, dok je za analizu crevnog sadržaja korišćena prva trećina ukupne dužine creva. Procena crevnog sadržaja je urađena koristeći frekvenciju pojavljivanja (F%) i brojnost (N%) raličitih komponenti hrane. Iz crevnog sadržaja je evidentno da su glavna hrana vrste *Acipenser ruthenus*, Chironomidae, kao i različite larve insekata, pre svih Trichoptera i Odonata.

Ključne riječi: kečiga, Acipenser ruthenus, Sava, Hrvatska
Keywords: sterlet, Acipenser ruthenus, Sava, Croatia

INTRODUCTION

The sturgeons (family Acipenseridae) are among the most ancient ray-finned fishes. This extremely endangered group of animals should be the object of biological

conservation programmes (Birstein, 1993) which, to be efective, require preliminary study of the specific status of sturgeons in the diferent regions of their distribution area. Sterlet (*Acipenser ruthenus* L.) is a fluvial fish which inhabits rivers and their tributaries (Vostradovsky, 1974). Occurs in large rivers, usually in the current and in deep water. In the first place, sterlet is potamodromous (Lucas and Baras, 2001) and moves to flooded areas for feeding (Kottelat and Freyhof, 2007). Like other sturgeons, it aggregates in bottom holes in winter and exhibit little activity. In spring, when ice breaks, it rises from the bottom holes and moves upstream for spawning. Spawns in habitats with strong-current on gravel, rarely on gravel-sand bottom or in flooded sites. Juveniles stay in riverine habitats during their first summer. This species is classified as endangered.

Populations of sterlet in the Sava River have experienced serious decline during the 20th century (Ristić, 1969), and sterlet has been almost extirpated from the German and Austrian section of the Danube River, where its presence depends on continuous stocking efforts (Reinartz, 2002). It has a limited distribution in the basin of the Middle and the Lower Danube (Guti and Gaebele, 2009), and there are ongoing stocking activities with the majority of fish released by Hungary, and to a small extent by Slovakia and Bulgaria (Holčik et al., 2006). In Serbia there is a captive broodstock of *A. ruthenus* at the Danube river, upon which controlled reproduction has been successfully performed since 1988. Specimens of this stock have been imported to Danube river. The objective of the present study is to confirm the occurrence *A. ruthenus* in a Sava river.

MATERIALS AND METHODS

During the March 2011, two adult specimens of *A. ruthenus*, ranging from 431 to 570 mm total length (TL), were captured by local fishermen using hook in a water body about 20 km southeast of Zagreb City. Specimens were examined and identified according to Kottelat and Freyhof (2007). All morphometric and meristic characters were taken following Copp and Kováč (2003) and measurements recorded to the lowest millimetre using a digital calliper, as shown in table 1. All morphometric measurements related to the head region as a proportion relative to head length, and those not related to the head region as proportions of the standard length.

Sterlet age determination was performed using pectoral fin spine sections according to Stevenson and Secor (1999). Briefly, we cut the spines with a laboratory saw and then polished it with emery paper, until sections were transparent enough for microscopic observation. Age was estimated by counting annuli in the fin ray sections. For the analysis of stomach contents the anterior third of the gut was used, with the food organisms still recognizable, weighed and fixed in 4% formaldehyde. When possible, the different food items in the gut were identified to the family or genus level. The identification and the counting were made using a binocular microscope.

Assessment of the diet was based on the frequency of occurrence (F%) and numerical frequency (N%) of the different diet components, using the following formulas:

$$F\% = \frac{fi}{\sum_f} x100$$

fi = number of stomachs containing each prey items and Σ_f = total number of stomachs with food;

$$N\% = \frac{ni}{\sum_n} x100$$

ni = total number of one food item, Σ_n = total number of food items consumed by the fish (Hyslop, 1980).

RESULTS

Morphometric and meristic traits are given in table 1. *A. ruhtenus* exhibited the following set of characterists: narrow and pointed snout with four long and fringed barbels. Back and flanks are beige. Five rows of scutes, first dorsal scute not fused with head. Ventrals and laterals are very light-colored, nearly white. Inferior lip clearly slit.

Table 1. Morphometric measurements and meristic counts and age of *A. ruhtenus* from Sava river

Morphometric and meristic traits	Specimen 1	Specimen 2
Total length (mm)	431,00	570,00
Standard length (mm)	348,00	453,00
Fork length (mm)	108,82	109,49
Preanal length (mm)	74,70	73,28
Predorsal length (mm)	75,88	77,483
Prepectoral length (mm)	27,05	24,94
Pectoral fin length (mm)	19,70	17,21
Head length (mm)	25,88	26,04
Preorbital length (mm)	50,00	50,84
Preoral length (mm)	62,50	61,016
Prebarbel length (mm)	39,77	40,67
Mouth width (mm)	15,90	16,94
Distance between eyes (mm)	28,40	31,35
Maximum head width (mm)	51,13	43,22
Head width at barbel base (mm)	25,00	23,72
Head width at mouth level (mm)	35,22	34,74
No. of dorsal scutes	11	12
No. of lateral scutes	61	60
No. of ventrolateral scutes	15	13
Age (years)	+5	+8

From the stomach content it is evident that Chironomidae and various insect larvae are primarily food of *Acipenser ruthenus*, of which are important Trichoptera and Odonata. Since the specimens were caught on earthworms (*Lumbricus terrestris*), the same one were found in the stomachs of the analyzed samples (Table 2).

Table 2. The frequency of occurrence (F%), numerical frequency (N%), pergentage of weight of stomach content (W%) of *Acipenser ruthenus* from Sava river

Taxa	F%	N%	W%
Chironomidae	100,00	51,09	1,93
Lumbricus terrestris	50,00	1,09	1,84
Other Insecta	100,00	33,70	5,42
Trichoptera larvae	50,00	10,87	8,85
Odonata anisoptera	50,00	2,17	9,74
Bivalvia	50,00	1,09	0,01
detritus	-	-	72,20

DISCUSSION

The fish from family Acipenseridae are economically extremely valuable and threatened by overfishing. Unreasonable fishing in the Danube River, based on the catch of the younger age categories that are not sexually mature, presents a serious risk for from this family. The major factor driving unsustainable legal and illegal sturgeon fisheries in this region is the fact that beluga caviar is one of the most prized fish products worldwide (Nikčević et al., 2003). Changes in natural habitats caused by human activity, such as pollution, sand digging and regulation of water flows adversely affected the natural sturgeon population. It was noted that the construction of dams and reservoirs affects the propagation of sturgeon because of the population increase in the number of elderly individuals that do not reproduce (Mrakovčić et al., 2006). Also, dams block access to many sturgeon-spawning grounds and, therefore, are considered to be one of the main reasons for the decline of their stocks (Lenhardt et al., 2004).

A. ruthenus is consider endangered by IUCN Red List (Gesner et al., 2010) in Croatia, and listed as vulnerable by the Red book of Freshwater Fish of Croatia (Markovčić et al., 2006).

Nowadays in Croatia a relatively good conditions exist for a start of common action among state representatives, scientists, holders of fishing rights, fishermen and private sturgeon hatcheries to solve the problem of sturgeon extinction risk.

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