
THE ICHTHYOLOGICAL ASPECTS OF THE CONTAINMENT OF INLAND WATERS IN THE KÉK-KÁLLÓ-VALLEY

A BELVÍZI VÉSZTÁROZÁS HALTANI VONATKOZÁSAI A KÉK-KÁLLÓ-VÖLGYBEN

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Összefoglalás

A Debrecentől keletre futó Kék-Kálló-völgyben kialakított időleges belvízi tározó és a vízfolyás aktuális halközösségét vizsgáltuk 2010 nyarán. A jelentős vízmennyiség haltani hatásai mellett a védett területen a Natura 2000-es "jelölő" fajok mennyiségi viszonyait is felmértük. Megállapítottuk, hogy a régióban szokatlanul nagy vízmennyiség nem járt együtt a halközösség sokféleségének jelentős növekedésével, inkább az inváziós fajok (pl.: *Carassius gibelio*, *Pseudorasbora parva*, *Lepomis gibbosus*) állományának növekedését tapasztaltuk. Az összesen kimutatott 10 faj közül 3 védett (*Gobio gobio*, *Rhodeus sericeus*, *Cobitis elongatoides*) faj került elő, amelyek közül 2 faj a Natura 2000-es program "jelölő" faja is (*Rhodeus sericeus*, *Cobitis elongatoides*).

Summary

During our research in the summer of 2010 we were focusing on the fish fauna inhabiting in the Kék-Kálló-vale's reservoir for inland waters located east from Debrecen. Besides the enormous effect of the water on the living standards of fish, we assessed the quantity of the Natura 2000 „indicator” species. It can be concluded that the amount of water in this region does not necessarily induce diversity in the fish fauna, what we experienced is the growing amount of invasive species (e.g. *Carassius gibelio*, *Pseudorasbora parva*, *Lepomis gibbosus*). All in all 10 species have been assessed of which three (*Gobio gobio*, *Rhodeus sericeus*, *Cobitis elongatoides*) are protected, two of them are “indicator” species (*Rhodeus sericeus*, *Cobitis elongatoides*).

Introduction

The value of the protected natural areas is determined by the groups of the inhabiting species and also by other (geological, hydrological, landscape and culture-historical) values. Nationally some species have significant natural value and deserved to be protected or highly protected. Not only these, but other species mean an overriding importance to the European Community as well. From these species some of them called “indicator species” and their presence requires and justifies designation of Sites of Community Importance (e.g. NATURA 2000).

Several species of the freshwater fish have become scarcer in Europe, therefore gained endangered status and got protection under the European Union law. Those habitats that house these species could be gain outstanding protection. One of the purposes of this sampling is to verify that „indicator” and protected fish species can be found in the waters of the NATURA 2000 protected and High Nature Value landscape (HVN), the Kék-Kálló-valley. During our research we examined the ichthyological aspects of the consequences of the heavy load of the waterfall in the inland waters.

The literatures dealing with the fish fauna of the Nyírség in depth are scarce. The researchers of the fish fauna have not been devoted their attention to this area, mainly because of the limited expanse of the surface water and the lack of natural abounding river water. The composition of the fish fauna of this lake system has been settled in the 1970s with predetermined species and shaped by immigrant species connecting through channels. These processes have not been researched, thus only a few publications are available about the fish fauna of the Nyírség, mainly about the South-Nyírség Erdőpuszta's species. We

only managed to collect professional texts older than 150 years about the fish fauna of this area.

Kovács (1882) enumerates 24 fish species from the neighbouring waters of Debrecen and was first to mention the appearance of *Umbra krameri* from this region. Varga's (1882) list of species contains a mere 7 fish species for the Hajdú-Bihar county. Hankó (1925) reports in the fishery part of Szilády's (1925) essay about 59 species from the Great Plain. His list of species contains the fish living in the reaches of the Danube and Tisza river with the all the other rivers emptying into them. Nagy (1924) gives an account of the presence of 9 species in the region of Nyíregyháza and adds that the waters of the region are unexplored in context of fish fauna aspects. Nagy (1931) mentions 14 fish species from the neighbouring waters of Debrecen.

In his essay of the Original Animal World of Alföld Hankó (1933) proves the existence of 31 fish species dating back to the 16th century. Although the essay of Kiss (1943) doesn't have fish fauna aspects, yet clearly verifies the wealth of fish in the region of the Nyírség. It discusses the fishing waters from village to village, giving a list of the most common fish. It mentions the *Misgurnus fossilis* to be found nearly every village, altogether 11 species from the waters of the Nyírség. Székessy (1953) registered 3 fish species from Bátorliget area.

Borsy (1961) literally recites the data from Nagy (1924) and Kiss (1943). The short essay of Keresztessy (1992) pertain to Bátorliget, demonstrating the appearance of 6 species. The publication of Dudás & Sándor (1993) contains a contemporary list of species. In their work they registered the existence of 21 species. From their list of species outstands the *Leuciscus leuciscus* which has not been mentioned before. Juhász & Szendrei's (1993) study about the birdlife of the Reservoir of Haláp touch upon the storks consuming *Misgurnus fossilis*. The remains of the prey of the *Pandion haliaetus* - the ones that visits the reservoir - accertained to be *Carassius gibelio*. *Ardea cinerea* eating *Scardinius erythrophthalmus* has been documented as well. Endes (1997) disclosed 3 species from Brook Tóóc. Juhász (1996) gives the whole list of fish living in the Lake Fancsika in his essay dealing with the natural value of this lake. Juhász (1997, 2000) stresses the importance of some species of the Reservoir of Haláp. An article of 2002 states the results of the in-depth study of a 3 years' work carried out by Juhász & Sallai in field of fish waters.

Material and methods

The observations took place in 9 and 18 June 2010 and 20 June. Before the actual sampling we took tours to designate the typical sampling point, which represented the waters observed by us (*Figure 1.*) In that time the main part of the area is used to contain water for inland flood. The maximum amount of rainfall is in late spring and early in summer. Meaning a significant supply of water to the natural depression vale running in an artificial bed of the Kék-Kálló-vale, (2nd mainflow). The inland water container is protected with round dam, from this water can be controlled by sluice in direction to the flow-through waters. The bed has been filled with huge amount of water. This area represented one of the sampling points.

After wandering over to the other parts of the waterflow we indicated an additional of two sampling points with regard to the bed and the peculiarity of the natural area of the waters. Altogether 3 sampling points have been arranged. The distance between the two farthest points of the waterflow is 4 km. The third one was close to a construction works, a characteristic dam, which gives perfect place to several species.

The sampling was carried out with a hand framed close-woven fishing net and also with a handle landing net used for research. The captured fish were packed into buckets for documentation purposes and after that they had been release back to the water. The research has not been caused death to any of the fish directly.

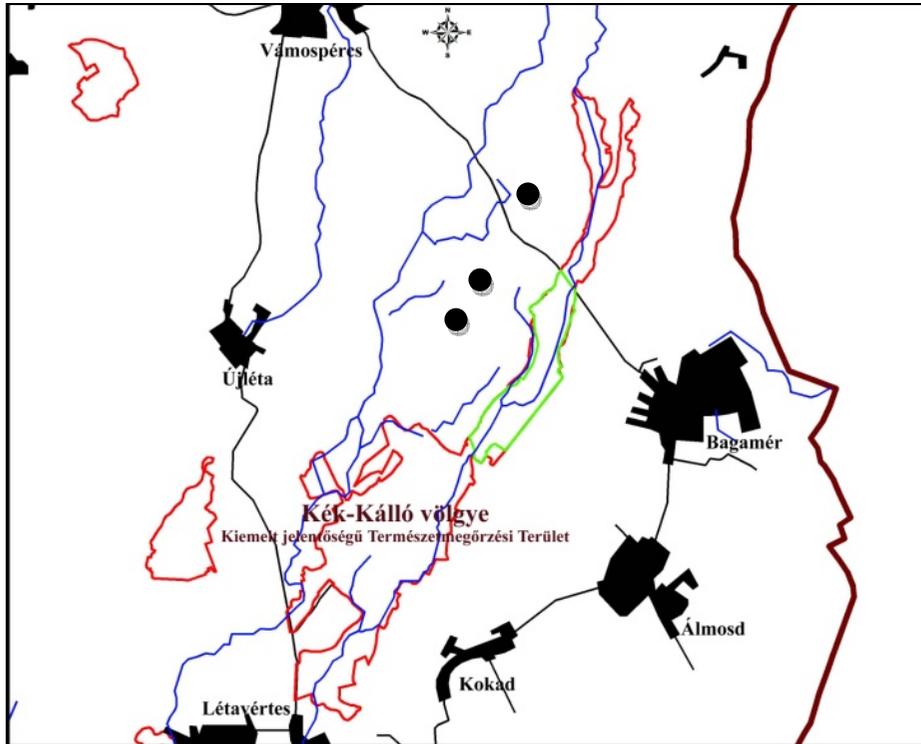


Fig. 1. The NATURA 2000 land of Kék-Kálló-valley, ●: sampling points
1. ábra. A Natura 2000-es terület a Kék-Kálló-völgyben, ●: mintavételi pontok

Results

Using different types of research methods 10 species of fish, approximately 350 specimens have been captured at the three sampling points (Table 1.). The taxonomy is the follows 3 order 4 family:

CYPRINIFORMES

CYPRINIDAE

1. *Rutilus rutilus*
2. *Scardinius erythrophthalmus*
3. *Tinca tinca*
4. *Gobio gobio*
5. *Pseudorasbora parva*
6. *Rhodeus sericeus*
7. *Carassius gibelio*

COBITIDAE

8. *Cobitis elongatoides*

ESOCIFORMES

ESOCIDAE

9. *Esox lucius*

PERCIFORMES

CENTRARCHIDAE

10. *Lepomis gibbosus*

The only common species is the *Carassius gibelio*, of which mature specimens spawned in ideal conditions in the warming reservoir in June. Among the captured fish numerous were mature coming from the water of the reservoir. A huge number of the offsprings from this species gathered on both side of the sluice. Some *Cobitis elongatoides* turned up in the entrance of both sides of the tubes crossing the gate of the sluice at the 1st sampling point. At the second sampling we were unable to verify with measurement the presence of this species, due the shallow level of water.

Table 1. The distribution of the captured fish species by sampling points
1. táblázat. Az egyes mintavételi pontokon megfogott halfajok mennyiségi viszonyai

Species	1st sampling point	2nd sampling point	3rd sampling point
<i>Rutilus rutilus</i>	2	-	-
<i>Scardinius erythrophthalmus</i>	-	-	3
<i>Tinca tinca</i>	1	-	-
<i>Gobio gobio</i>	16	3	-
<i>Pseudorasbora parva</i>	25	5	11
<i>Rhodeus sericeus</i>	-	18	4
<i>Carassius gibelio</i>	235	-	-
<i>Cobitis elongatoides</i>	6	-	-
<i>Esox lucius</i>	1	-	-
<i>Lepomis gibbosus</i>	23	-	-
Species altogether	8	3	3

From the shallow reservoir and at the brink of the bed we found one specimen of *Tinca tinca* and one specimen of *Esox lucius*. From the water coming out of the sluice we found invasive species (*Pseudorasbora parva*, *Lepomis gibbosus*, *Carassius gibelio*). Apart from them elderly (living their second summer) specimens of *Rutilus rutilus* have identified.

At the second sampling point from the lower part of the water flowing from the barrage a lot of *Rhodeus sericeus* turned up. The reason for this is can be explained with the existence of rich vegetation, the harder basis and also with the fact that the water of the swift flowing river contains more oxygen.

At the third sampling point (where the bridge span over the bed) in front of the bridge the bed is paved and after it as well and also it is paved under the bridge. This part of the bed has not been ruled by the vegetation that much and the basis haven't silted. From this part derives new species as the *Scardinius erythrophthalmus*, the *Rhodeus sericeus* and the *Pseudorasbora parva*.

Discussion

From the restricted time given we had for the research of fish fauna we can only gain data about the actual presence of the fish fauna that can be found in real time. General conclusions cannot be drawn from the results, it requires monitoring. It can be seen that the vast majority of the fish is gathering around the construction works, because only a few species are able to bear and live with the full coverage of vegetation and the silting bed. During the research we expected to come across with the *Misgurnus fossilis*, but no specimen have occurred. The reason for this could be explained with the possible error in the applied method or else this species is generally extinct from this area indeed. On the other hand this species is reported (Juhász, Sallai, 2002) from several part the South-Nyírség previously. All in all it can be pointed out that two indicator species of the NATURA 2000 (*Rhodeus sericeus*, *Cobitis elongatoides*), and three nationally protected species (*Gobio gobio*,

Rhodeus sericeus, *Cobitis elongatoides*) have turned up within this limited time of examination. Besides these four indigenous and three non-native species (*Pseudorasbora parva*, *Carassius gibelio*, *Lepomis gibbosus*) consisted the fish fauna in the Kék-Kálló, during that specific time.

We have to add that at the 1st sampling point two interesting specimen of the amphibian species (larvae and fully developed) have been captured and identified. Numerous larvae of the *Triturus dobrogicus* have been collected, both larvae in developing process and fully developed larvae as well. The several specimens we found there are indigenous in the Carpathian adding even more value to this area. The *Pelobates fuscus* deserves attention with its numerous tadpoles. This species also requires special protection on European level and is a subject of several international treaties. The breeding places of this species in this region are not well-known, this research proved the existence of a wide-spread population.

In order to get to know the fish fauna in depth it is inevitably necessary to take more samplings on several occasions. It can be determined that the fauna is vulnerable, since in some years the stream bed entirely dries up, in the following years it's abounding in water. The rescue of the species of the actual fauna is to prevent them being dry out and this is the present task of the nature and environmental protection. If the inland water reservoirs would be flooded for a longer time that would mean perfect conditions for spawning for several species. The barrage that partly supply the Daru wetland with water should be converted into a more fish friendly one, to continuously provide way through for the fish. It would be reasonable in time of the abundance of water that the rampant vegetation should be thinned out. That would allow easier movement for fish.

References

- Dudás M., Sándor, I. (1993): Gerinces állatok: halak, kétéltűek, hüllők, emlősök. In Gyarmathy I. (szerk.): *A Hajdúsági Tájvédelmi Körzet*. Debrecen, 59-62.
- Endes M. (1997): A Tócsó-patak völgyének gerinces faunája. In Orosz G. T. (szerk.): *A Tócsó-völgy környezeti állapota és természeti értékei*. Magyar Humánökológiai Társaság, Debrecen, 135-144.
- Hankó B. (1925): Halak - Pisces. In Szilády Z. (szerk.): Nagy Alföldünk állatvilága. *A Debreceni Tisza István Tudományos Társaság Honismertető Bizottságának Közleményei*, Debrecen, p.145-150.
- Hankó B. (1933): A hajdani Alföld ősi állatvilága. *A Debreceni Tisza István Tudományos Társaság Honismertető Bizottságának Közleményei*, Debrecen, 8. 29. 1-83.
- Juhász L., Szendrei L. (1999): Madárvilág a Halápi tározón. *Debreceni Déri Múzeum Évkönyve*, 5-37.
- Juhász L. (1997): Vízvilág az Erdőpusztán. *Calandrella*, XI/1-2: 62-71.
- Juhász L., Sallai Z. (2002): A Dél-Nyírség halfaunája. *Debr. Déri MúzeumTud. Évk. 2000-2001/-es kötet.*, 17-45.
- Keresztessy K. (1992): The fishes of Bátorliget Nature Reserves. *Misc. Zool. Hungarica*, 7: 79-80.
- Kovács J. (1882): Állattani ösmertetés. In Zelizy D. (szerk.): *Debreczen Sz. Királyi Város Egyetemes Leírása*. Debreczen, p. 166-180.
- Nagy J. (1931): 2. Állatvilág - Halak. In Kiszely Gy. (szerk.): *Debreczen Sz. Kir.Város Magyarország városai és vármegyéi*, Vármegyei Könyvkiadó, Budapest, 218-220.
- Székessy V. (1953): Bátorliget hal-faunája. Pisces. In Székessy V. (szerk.): *Bátorliget élővilága*, Akadémiai Kiadó, Budapest, p. 430.
- Varga G. szerk. (1882): A megye állatvilágának rövid áttekintése. In: Varga G. (szerk.): *Hajdumegye leírása. A Magyar Orvosok és Természetvizsgálók 1882. Debreczenben tartott XXII-dik Nagy Gyűlésének alkalmából*, Debreczen, p.142-145.



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