

# DATA OF THE FISH POPULATION IN THE LIVING TISZA

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## Abstract

In the Middle Tisza Region, at Kisköre, the so far largest river barrage of Hungary is under construction. The paper furnishes particulars about the fish population of the river reaches falling to the area of the water-basin planned.

The approximately four and half thousand fish exemplars collected during the one-year long fact-finding investigation are representing 32 species, only one of which, *Blicca bjoerkna* L., occurs in large numbers. There are frequent the species *Abramis*, *Silurus glanis* L., and *Stizostedion lucioperca* L. As to their occurrence, further 17 species are common, while 6 species are rare in the river section investigated.

## Introduction

By building the River Barrage at Kisköre, one of the most important activities for remaking the nature in Hungary has begun. According to the plans, in 1973 the industrial damming of the Tisza water commences as a result of which eventually a river reservoir of 127 sq. km surface will be formed (PICHLER 1971).

The ecological factors changing as a result of damming exert their influence, of course, on the natural history of the area and so on the fish population, as well. These years are giving, therefore, the last possibility to form a true picture about the state of this river section before being dammed.

The paper is endeavouring to give a picture of the fish population of the Tisza reaches falling to the area of the water-basin planned.

## Natural conditions of the area

The area investigated is a region of the Middle Tisza that lies between the river kilometres Nos. 403 and 444 — as to its main line — in N. E.—S. W. direction.

Its bordering settlements are: in S. W.: Kisköre, in N. E.: Tiszabólna. The most important riverside settlements are: on the left bank Tiszafüred, on the right bank Poroszló.

The predominant configuration forms of the banks along the river are the alluvial cones from the Holocene and the dead channels. Anthropogeneous formations are the inundation dams, water conduits, highway and railway embankments through

the inundation areas. Few clouds, plenty of sunshine and the relatively little precipitation are characteristic of the climate of the area (BULLA 1962).

This part of the Tisza has a Middle Region character, and its course has remained, even after being regulated, strongly meandering. The amount of the water forwarded is extremely changing. In its water current — that is an important factor for fishing — there can generally be demonstrated two maxima yearly: the floods in spring and in the early summer. On the occasion of floods the water amount transported may exceed manifold the average amount, covering almost continuously the inundation area of relatively large extension the breadth of which may sporadically reach five to six kms.

The bed is formed according to the current of water, its characteristics being the relatively extensive sandbanks, and in the parts of slower current some silting up. As a result of the embankment works, there are but relatively few clayey, steep banks with ravines. There occur often in the bed heaps of stones and rock-filled dams applied for changing the direction of the current line of the river.

The bank vegetation close to the water is formed mostly by willow shrubs. Behind them we find willow-poplar gallery forests, and major stands of the American ash (*Fraxinus pennsylvanica* MARSH.). In the better-lying parts of the inundation area ploughlands, meadows and orchards of lesser extent are to be found. But the treeless areas are more and more extensive as the deforestation for preparing the works of the water-basin advances at a more and more accelerated pace.

### Material of investigation

In the course of our investigations we could not use the procedures that in case of fish-ponds enable the composition of the fish stock to be determined exactly. The draining of a given river or river reach and netting of all its fish is not possible. Therefore, the investigations in this direction cannot give a full picture. In this way, our only aim could be to collect as many data as possible concerning the fish population of this river region. For that purpose, in addition to our own investigations, we have used the special literature on the subject, as well as the fishing statistics of the fishing co-operative and the sport-angler club functioning in the same area, too.

### Literary data

There has not been, so far, any systematical recording about the fish population of these reaches of the Tisza, thus there were no data about that at our disposal in the special literature. At any rate, a number of authors are dealing with fish and fishing in Hungary, and these works are containing some data about the Tisza, as well.

The fundamental work in this domain is that of HERMAN (1887) who, referring partly to his own observations, partly to other authors, is describing 32 species from the Middle Region of the living Tisza. To-day we are accepting 31 of these to be independent species. 25 of the 31 species occurred also in the material collected by us but 6 species could not be found any more in that area: *Hucho hucho* L., *Salmo trutta m. fario* L., *Acipenser nudiventris* LOVETZKY, *Acipenser güldenstädti* BRANDT, *Acipenser stellatus* PALLAS, *Huso huso* BRANDT.

VUTSKITS (1904), treating jointly of the populations in the living Tisza and the backwaters, is recording on 39 species, accepted at present, too.

From the nearer past we mention Vásárhelyi's data (1961). He is recording, partly on the basis of his own experiments, partly of the special literature, on 40 species that may occur in this region of the Tisza. From among the 40 species enumerated — containing both the species of the river and those of the backwaters along it — we have met thirty in the living water in the course of our own investigations.

### Fishing statistics

While in the special literature the qualitative data of the composition of the stock of fish are prevailing, in the fishing statistics the quantitative outlook is coming to the front. The basis of the classification in this case is not the systematical arrangement but the commercial value of species. The group "mixed white fish" that is common in the registers contains species systematically very much differing from one another that are all representing very low values.

In respect of some more valuable fish species the recordings of fishing co-operations are performed even according to species. These data are, anyway, to be treated very carefully, being frequently very inaccurate.

The hooking results of the sport-angler club, drawn up on the basis of voluntary notices, are unreal to such an extent that we had to desist from using them.

From the fishing statistics, in our opinion, we can accept the following:

The largest amount of the draught is the mixed white fish among which, in this river region, according to our observations, mainly *Blicca bjoerkna* L. and the species of the genus *Abramis* can be classed, besides many other species of smaller quantity.

Apart from the members of this group, a considerable quantity is represented also by the following species: *Silurus glanis* L., *Stizostedion lucioperca* L., *Esox lucius* L., *Barbus barbus* L., *Cyprinus carpio* L., *Ictalurus melas* REFINESQUE.

### Our own investigations

The aim of our work was to analyse the catching results of the various fishing instruments. Our collections of facts were carried out in a twenty-km part of the river Tisza between river kms Nos. 419 and 439, between August 10th 1970 and November 25th 1971. That reach of the Tisza falls in its full extent to the area of the water-basin planned.

### Materials and methods of investigation

In the course of the about one year long period of investigation, the collection of material took place with fish-basket, hook, dragnet.

With fish-baskets we systematically collected in three reaches of the living Tisza: on the confines of Tiszavalk, Tiszafüred, and Tiszaörvény. The collections were carried out between August 10th 1970 and September 16th 1971, in the three reaches together on 156 occasions. During the work done on the spot, as a result of 4490 fish-basket catchings, we got facts of about 3590 fish exemplars (Table 1, b).

Catches with hook took place in a systematical way in two reaches of the Tisza: on the confines of Tiszafüred and Tiszaörvény. There was a casual fact-finding for us, in addition, the possibility of overlooking the catchings of one sport-angler or two. The collections were carried out between June 13th and October 10th 1971, on 119 occasions altogether. In the course of that we could collect 529 exemplars (Table 1, c).

Fishing with dragnet was carried out in two parts of the Tisza: on the confines of Tiszaörvény and Domaháza, between August 14th and November 25th 1971, on four occasions. Here we got data about 282 exemplars of fish (Table 1, d).

The determination of the material collected was performed according to BERINKEY (1966) and WOYNÁROVICH (1969). In case of the hard-separated Cyprinidae we have applied Vásárhelyi's method (1956) of determining by help of throat teeth. (*ossa pharyngea inferiora*). The species-hybrids are not indicated separately but included in the species approximated the most by them. On the other hand, we have included into our recordings also some fish that got back into the river, namely some catchable undersized ones and some "noble" fish caught in a close season. In the summary also these take, of course, part.

### Results of investigations

Investigating onyl a short region of an open area, and that, too, but for a comparatively short time and with selective instruments, we cannot construct a fauna register. Thus without a faunalistic demand, we are publishing the following data only for giving some starting basis to later investigations whose aim will be to estimate the effect of damming up the water, exerted on the fish population.

1. Data concerning the qualitative composition of fish population the 4401 fish exemplars are representing 32 species, included in 8 families.

Acipenseridae: 1 species

*Acipenser ruthenus* L.

Anguillidae: 1 species

*Anguilla anguilla* L.

Esocidae: 1 species

*Esox lucius* L.

Cyprianidae: 19 species

*Rutilus rutilus* L.

*Leuciscus idus* L.

*Leuciscus cephalus* L.

*Scardinius erythrophthalmus* L.

*Ctenopharyngodon idella*

VALENCIENNES

*Aspius aspius* L.

*Alburnus alburnus* L.

*Blicca bjoerkna* L.

*Abramis brama* L.

*Abramis sapa* PALLAS

*Abramis ballerus* L.

*Vimba vimba* L.

*Chondrostoma nasus* L.

*Pelecus cultratus* L.

*Gobio gobio* L.

*Barbus barbus* L.

*Cyprinus carpio* L.

*Carassius carassius* L.

*Carassius auratus gibelio* BLOCH

Ictaluridae: 1 species

*Ictalurus melas* RAFINESQUE

Siluridae: 1 species

*Silurus glanis* L.

Gadidae: 1 species

*Lota lota* L.

Percidae: 7 species

*Perca fluviatilis* L.

*Acerina cernua* L.

*Acerina schraetzer* L.

*Stizostedion luciperca* L.

*Stizostedion volgensense* GMELIN

*Asoro streber* SIEBOLD

*Aspro zingel* L.

From among the enumerated ones, 30 species are mentioned by VÁSÁRHELYI (1961), as well, but two species are missing from his list. These are: *Ctenopharyngodon idella* VALENCIENNES and *Carassius auratus gibelio* BLOCH.

In case of *Ctenopharyngodon idella* VALENCIENNES, we can only speak of some exemplars escaped from fish-hatcheries as that species under our weather conditions

do not multiply. Nevertheless, a few individuals have been caught in the living Tisza, too, from year to year. Similar experiences were recorded earlier by Tóth (1970), in case of the Danube.

*Carassius auratus gibelio* BLOCH got into the river similarly after escaping from a fish-hatchery but during the period, about a decade, after that they have multiplied in a considerable degree, and at present they are already a common species in the Tisza.

2. Data concerning the quantitative composition of fish population: the material collected with various methods is summarized, expressing the quantitative distribution of species in percentile terms (Table 1, e-f).

From among the data, the high percentage of *Blicca bjoerkna* L. is conspicuous. This species formed almost one-third of the number of examplars caught. They are followed by *Abramis sapa* PALLAS with an approximately 10 per cent value, then by *Abramis ballerus* L. and *Abramis brama* L. with nearly identical (7 and 8) percentages. The four species are forming together more than a half of the material collected.

From among the economically considerable, so-called "noble" fish, the follo-

Table 1. Summary of the fish species collected with various instruments

| Fish species<br>a                     | Fish-basket<br>b | Hook<br>c         | Net<br>d | Total<br>e | Per cent<br>f |
|---------------------------------------|------------------|-------------------|----------|------------|---------------|
| <i>Acipenser ruthenus</i> L.          | 9                | 27                | 97       | 133        | 3.02          |
| <i>Anguilla anguilla</i> L.           | —                | 1                 | —        | 1          | 0.02          |
| <i>Esox lucius</i> L.                 | 182              | 1                 | —        | 183        | 4.15          |
| <i>Rutilus rutilus</i> L.             | 34               | —                 | —        | 34         | 0.77          |
| <i>Leuciscus idus</i> L.              | 20               | 32                | 3        | 55         | 1.25          |
| <i>Leuciscus cephalus</i> L.          | 34               | 7                 | —        | 41         | 0.93          |
| <i>Scardinius erythrophthalmus</i> L. | 1                | —                 | —        | 1          | 0.02          |
| <i>Ctenopharyngodon idella</i> VAL.   | 2                | —                 | —        | 2          | 0.04          |
| <i>Aspius aspius</i> L.               | 4                | 28                | 3        | 35         | 0.79          |
| <i>Alburnus alburnus</i> L.           | —                | 1                 | —        | 1          | 0.02          |
| <i>Blicca bjoerkna</i> L.             | 1241             | 20                | 67       | 1328       | 30.18         |
| <i>Abramis brama</i> L.               | 312              | 7                 | 13       | 332        | 7.54          |
| <i>Abramis sapa</i> PALL.             | 394              | 2                 | 48       | 444        | 10.09         |
| <i>Abramis ballerus</i> L.            | 332              | 7                 | 19       | 366        | 8.31          |
| <i>Vimba vimba</i> L.                 | —                | —                 | 1        | 1          | 0.02          |
| <i>Chondrostoma nasus</i> L.          | 40               | —                 | —        | 40         | 0.91          |
| <i>Pelecus cultratus</i> L.           | 9                | 51                | 1        | 61         | 1.39          |
| <i>Gobio gobio</i> L.                 | —                | 1                 | —        | 1          | 0.02          |
| <i>Barbus barbus</i> L.               | 182              | 20                | 2        | 204        | 4.63          |
| <i>Cyprinus carpio</i> L.             | 98               | 1                 | 5        | 104        | 2.36          |
| <i>Carassius carassius</i> L.         | 20               | —                 | —        | 20         | 0.45          |
| <i>Carassius auratus gibelio</i> BL.  | 68               | —                 | 3        | 71         | 1.61          |
| <i>Ictalurus melas</i> RAF.           | 78               | 12                | —        | 90         | 2.04          |
| <i>Silurus glanis</i> L.              | 186              | 220               | 15       | 421        | 9.56          |
| <i>Lota lota</i> L.                   | 2                | 3                 | 3        | 8          | 0.18          |
| <i>Perca fluviatilis</i> L.           | 16               | —                 | —        | 16         | 0.36          |
| <i>Acerina crnua</i> L.               | 15               | 41                | —        | 56         | 1.27          |
| <i>Acerina schraetzer</i> L.          | 4                | 10                | —        | 14         | 0.32          |
| <i>Stizostedion lucioperca</i> L.     | 258              | 13                | 2        | 273        | 6.20          |
| <i>Stizostedion volgense</i> GM.      | —                | 2                 | —        | 2          | 0.04          |
| <i>Aspro streber</i> SIEB.            | —                | 9                 | —        | 9          | 0.20          |
| <i>Aspro zingel</i> L.                | 49               | 13                | —        | 62         | 1.41          |
| Total:                                | 3590             | 529               | 282      | 4401       | 100.00        |
|                                       |                  | e x e m p l a r s |          |            | per cent      |

wing are, in order, the most considerable ones: *Silurus glanis* L., *Stizostedion lucioperca* L., *Barbus barbus* L., *Esox lucius* L.

The population of *Acipenser ruthenus* L. are showing, according to the fishing statistics, a declining tendency. But in our days, they are still not rare in that river region.

In addition to the enumerated ones, the ratio of the species *Cyprinus carpio* L., *Ictalurus melas* RAFINESQUE, and *Carassius auratus gibelio* BLOCH are considerable enough.

### Summary

At comparing our own investigational data with the fishing statistics, it is to be taken into consideration that we took as basis the number of individuals and the statistical statements the total weight, and that in our own data also the exemplars returned into the river take part. We have compared, having regard for these, the data coming from the different sources. As a result of this, we regard the following classification of fish species as characteristic of the present state:

The species present in large masses: *Blicca bjoerkna* L.

Frequent species: *Abramis sapa* PALLAS, *Abramis ballerus* L., *Abramis brama* L., *Silurus glanis* L., *Stizostedion lucioperca* L.

Common species: *Barbus barbus* L., *Esox lucius* L., *Acipenser ruthenus* L., *Cyprinus carpio* L., *Ictalurus melas* RAFINESQUE, *Carassius auratus gibelio* BLOCH, *Pelecus cultratus* L., *Aspro zingel* L., *Leuciscus idus* L., *Leuciscus cephalus* L., *Chondrostoma nasus* L., *Aspius aspius* L., *Rutilus rutilus* L., *Acerina cernus* L., *Perca fluviatilis* L., *Acerina schraetzer* L., *Lota lota* L.

Rare species: *Anguilla anguilla* L., *Ctenopharyngodon idella* VALENCIENNES, *Scardinius erythrophthalmus* L., *Vimba vimba* L., *Stizostedion volgense* GMELIN, *Carassius carassius* L.

The latter species are to be considered as rare although they were found in a higher number in our collections because every individual was caught in the year 1970 after a long inundation period as the intermingling of the fish populations of the water of river and backwaters became possible.

In the enumeration *Aspro streber* SIEBOLD, *Gobio gobio* L., and *Alburnus alburnus* L. are not included. These species have been omitted as the selectivity of our collecting instruments did not allow us of drawing a real conclusion concerning their population.

As to this division into groups, it is to be noticed that there are no sharp borders between the single categories and that further investigations, even under the present conditions, may result in changes, still before damming up the water. The picture outlined — although it may be valid in its main lines for the following few years, too — is first of all fixing the present situation.

We think and hope that our data, compared with the results of another investigation to be carried out in the future in a similar way, will be suitable to render possible for us to appraise the result of the damming of the river water in such a degree upon the species important from the point of view of practical fishing.

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