

The fish fauna of the Criş/Körös¹ river basin

*Petru M. Bănărescu, Ilie Telcean, Petru Bacalu,
Ákos Harka & Sándor Wilhelm*

Abstract

The fish fauna of the Criş/Körös rivers comprises 49 native species (and an additional subspecies) and 12 exotic ones. Three of the native species are occasional inhabitants and six are found exclusively in standing waters. The river Crişul Repede/Sebes-Körös is the only river in Romania where *Leuciscus leuciscus* is known to have survived and the Crişul Alb/Fehér-Körös one of the two rivers in Romania where *Zingel streber* has retained its former abundance. Human impact has negatively affected mainly the fish fauna of the tributary Barcău/Berettyó.

***Key words:* fish fauna; Criş/Körös river basin; human impact**

Herman (1877) seems to have been the first scientist to contribute to the knowledge of the fish fauna of the Criş/Körös river. He listed six species, without specifying the localities. Other data has been added by Vutskits (1918), Pauca and Vasiliu (1933) who mention the occurrence of four fish species in the rivulet Petea, a tributary of the river Crişul Repede/Sebes-Körös. Futó (1942) made a thorough investigation of the fish fauna of the rivers Sebes-Körös and Berettyó near their confluence in the vicinity of Szeghalom, Hungary. He listed 31 species, most of which are present in both rivers. Muller (1958) described the new species *Scardinius racovitzae* from the thermal pond "Baile Episcopesti" (formerly "Püspök Fürdő", Baile 1 Mai) in the drainage area of the river Crişul Repede, România. Several contributions to the distribution of the fish species in the Romanian stretches of the four rivers have been published by Bănărescu (1954, 1961, 1981) and Bănărescu et al. (1960), later Harka (1996—1997) in the Hungarian stretches, too.

1 The first name is Romanian, and the second Hungarian.

In the 1981 publication, Bănărescu lists 44 species of bony fishes and three additional subspecies. In addition to the lamprey *Eudontomyzon danfordi* as native in the catchment area of the Criș/Körös rivers, seven new species are introduced.

The strong modifications of the aquatic habitats in the catchment area of the Criș/Körös rivers (dams and lakes, diminution of the amount of water, pollution and eutrophication of flowing and standing water bodies, etc.) as well as the introduction of exotic fish species has negatively affected the native fish fauna. Thus, it was necessary to make new field investigations in order to establish which species became extinct or numerically declined in certain river sections and, on the contrary, which species extended their range of distribution and became more abundant.

Materials and methods

The data included in this study represent in large measure the results of field investigations of the co-authors of the paper: Bănărescu collected fish specimens from the Romanian sections of the four rivers between 1949 and 1988, Harka from the Hungarian stretches between 1986 and 1994 and Wilhelm from the river Barcău/Berettyó and its tributary, the rivulet Ier in the area of Săcuieni Bihor in western Romania. During the research expeditions organized by the Liga Pro Europa and Tisza Klub in 1994 and 1995 on the Criș/Körös and Barcău/Berettyó rivers in both Romania and Hungary, fish specimens were collected by Bănărescu, Bacalu and Telcean, assisted by a few students and László Váradi from the Fish Culture Research Institute in Szarvas, Hungary

Most fish specimens were collected with various types of nets, while some were angled. Electrofishing were used in the Hungarian stretches of the Fekete-Körös and Fehér-Körös rivers. All specimens collected have been counted several times. A great number have been preserved and have been included in the scientific collections of the Institute of Biology in Bucharest, of the "Grigore Antipa" Museum in Bucharest and of the Department of Ecology, University of Cluj.

Information from knowledgeable local people (educated anglers, forest engineers and guards, etc) has also been considered. Ichthyological literature gave information about the former occurrence and abundance of species.

Fish have been collected almost exclusively from rivers and brooks; the data on rheophilic species are therefore more complete than those on inhabitants of standing waters.

Results

The following species of lampreys and fish are currently present or were present earlier in the drainage areas of the Criș/Körös river.

Fam. Petromyzonidae

Eudontomyzon danfordi Regan, 1911

Cicar; tiszai ingola; Carpathian lamprey.

A predatory species of lamprey, inhabiting mountain brooks and rivers, confined to the drainage area of Tisza river and of a few rivers in the Banat. Recorded earlier from the Crișul Repede and its tributaries Valea Drăganului and Valea Iadului (Chappuis, 1939); collected in 1995 from the lower reach of Valea Drăganului. Never recorded from the river Barcău where it is currently absent. There are earlier records from the river Crișul Negru at Vașcău and its tributaries Vida and Toplita upstream from Lunca Sprie and from Valea Monesei, tributary of the Crișul Alb (Bănărescu, 1951, 1964). Found in 1994 in the Crișul Negru upstream from Poiana and downstream from Ștei and in the Crișul Alb upstream from the village Criș.

Fam. Acipenseridae

Acipenser ruthenus Linnaeus, 1758

Cega; kecsege; sterlet; Sterlet.

Inhabitant of large lowland rivers.

Ascends from the Tisza into the Körös rivers in Hungary. Collected by Harka between 1986 and 1994 in the lower reach of the river Sebes-Körös and in Hármas-and Kettős-Körös rivers. Not reported from the Berettyó river. Does not ascend in the Romanian stretches of the rivers.

Fam. Anguillidae

Anguilla anguilla (Linnaeus, 1758)

Anghila; sikos angolna; European eel; Aal.

Ascend occasionally from the river Tisza into the lower reach of the Körös in Hungary; also once found in Romania (Gyurkó, 1960).

Fam. Salmonidae

Salmo trutta fario Linnaeus, 1758

Pastrav; sebes pisztráng; brown trout; Bachforelle.

Earlier records from the upper reaches of the Crișul Negru, Crișul Alb (upstream from Brad), Barcău (downstream to Subcetate) and from the Crișul Repede between the confluence with the river Drăgan to Ciucea (absent from the uppermost stretch which lacks a montane character). Also in the tributaries of the Crișul Repede (Călata, Drăgan, Iad), of

the Crișul Negru (Vida), and Crișul Alb (Valea Monesei) (Bănărescu, 1964). Found in 1955 in the Drăgan Creek from the head waters to its confluence and in the dam lake on the same river and from the upper reaches of the Barcău; in 1994 in the Crișul Alb upstream from the village Criș and in the Crișul Negru upstream from Poiana.

This species is absent from the Hungarian section of the Körös rivers. The population from the upper Barcău consisted, in 1962 and earlier in normal specimens, of specimens with red and black spots as well as those having exclusively black spots; specimens of both forms were present in about equal proportion. Only specimens of the “normal” form were found in 1995; according to information from local forest guards, specimens having only black spots still exist, but in small numbers.

Oncorhynchus mykiss (Walbaum, 1782 = *Salmo gairdneri* Richardson, 1836)
Păstrăv curcubeu; szivárványos pisztráng; rainbow trout; Regenbogen forelle.

An introduced species of North American origin. Cultivated in salmon fishery farms; not present in natural waters.

Salvelinus fontinalis (Mitchill, 1815)

Fântânel, păstrăv fântânel; pataki szaibling; brook trout; Baschsaibling.

Another North American introduced species, cultivated in fishery farms.

Thymallus thymallus (Linnaeus, 1758)

Lipan; pézses pér; grayling; Aesche.

A typical inhabitant of rather large mountain rivers; not in brooks. Native only in the river Crișul Repede (reported between Huedin and Ciucea (Bănărescu, 1964) and in greater quantities in the tributaries Drăgan and Iad. Introduced in the Crișul Negru. Not found during the 1994/1995 expeditions: according to current information, it survives in the Drăgan Creek and Iad, but in much smaller quantities than before.

Fam. Umbridae

Umbra krameri Walbaum, 1782

Țiganuș; lápi póc; European mudminnow; Hundfisch.

Inhabits shallow standing waters and lowland muddy rivulets. In the Romanian part of the Criș drainage area it is present only in the river Ier (tributary of the Barcău) and in neighboring canals and ponds at Secuieni in the western most area of Romania, some in great number (collected by A. Wilhelm). Not reported by Futó (1942) and Harka (1996, 1997) in the Hungarian section of the Körös rivers and Berettyó.

Fam. Esocidae

Esox lucius Linnaeus, 1758

Știuca; csuka; pike; Hecht.

This species lives mainly in standing waters, but also in lowlands rivers. Reported from the rivers Sebes-Körös and Berettyó at Szeghalom, Hungary (Futó, 1942) and from the lower reaches of the three Criș rivers and the Barcău in Romania (Bănărescu, 1964). Collected by Harka between 1986 and 1990 in the Berettyó, Sebes-Körös and the Hármas-Körös rivers in Hungary while Wilhelm found numerous specimens in the rivers Ier and neighboring pools and canals near Săcuieni. During the 1994 and 1995 expeditions the pike was found in Hungary (Fekete and Fehér-Körös rivers) only, by electrofishing. However, we were informed that it is present in the Romanian stretches of the three Criș rivers and especially in natural ponds.

Fam. Cyprinidae

Rutilus rutilus (Linnaeus, 1758)

Babușca; bodorka; roach; Plötze.

This species is present in lowland rivers as well as standing waters. There are early reports from Berettyó river at Szeghalom (Futó, 1942) and from the lower stretches of the three Criș and Barcău rivers in Romania (Bănărescu, 1964). Harka found specimens on the whole length of all four rivers in Hungary and Wilhelm in the river Ier and neighboring rivulets canals and ponds at Săcuieni. During the 1994/1995 expeditions it was collected from the Crișul Repede from the dam lake Aleșd downstream to its confluence with the Barcău in Hungary, in the Crișul Negru at Tămașda and Zerind (lowermost section of the river in Romania) and in the Hungarian section of the Fehér and Fekete-Körös, also downstream of their confluence (Kettős-Körös). It has not been found in the river Barcău where it formerly lived.

Scardinius erythrophthalmus erythrophthalmus (Linnaeus, 1758)

Roșioara; vörösszárnyú keszeg; rudd; Rotfeder.

A species living mainly in stagnant waters, also found in lowland rivers. There are earlier reports of it from the rivers Sebes-Körös and Berettyó at Szeghalom, Hungary (Futó, 1942), as well as from the canal connecting the three Criș rivers and from the ponds in the drainage area of Barcău and Ier rivers in Romania (Bănărescu, 1964). Collected by Harka during the years 1986 to 1992 from the Hungarian stretches of the rivers Berettyó and Sebes-Körös in Hungary and by Wilhelm in the river Ier, many canals and ponds near Săcuieni, Romania. Specimens were collected during 1994 in the Hungarian stretches of the rivers Fekete-Körös, Fehér-Körös and Kettős-Körös (resulting from the confluence of the above named rivers). In Romania it is present mainly in ponds, in the canal connecting the three Criș rivers and in fishery farms.

Scardinius erythrophthalmus racovitzai Muller, 1958

Endemic to the thermal pond Băile Episcopesti on the rivulet Petea, tributary of the Crișul Repede. Described initially as species, considered subspecies by Bănărescu (1964). Recent unpublished studies on its ecology by N. Crăciun confirms its taxonomic validity, either as subspecies or as species.

Leuciscus cephalus (Linnaeus, 1758)

Clean; fejes domolykó; chub; Dobel.

An inhabitant of rivers and brooks, from the feet of mountain to the lowlands. There are earlier records from the rivers Sebes-Körös and Berettyó near Szeghalom (Futó, 1942), from the middle and lower reach of Barcău and of the three Criș rivers in Romania (Bănărescu, 1953, 1964; Bănărescu et al., 1960). Collected by Wilhelm in the river Ier and some canals at Săcuieni and by Harka in Berettyó river at Berettyóujfalu (not farther downstreams), and in the Hungarian stretches of the three Körös rivers. During the 1994/1995 expeditions, the species has been collected in the river Barcău from Tusa (near the headwaters) almost to the Hungarian border, in the Crișul Repede from the headwaters to Cheresig (Hungarian border); in the Crișul Negru between Ștei and Tămașda (not found at Zerind, Hungarian border); in the Crișul Alb from the dam lake Mihăileni to Chișineu Criș but here in smaller number. The species has also been collected in the Hungarian stretches of the rivers Fekete and Fehér-Körös, where only few specimens were present.

Leuciscus leuciscus (Linnaeus, 1758)

Clean mic; nyúldomolykó; dace; Hasel.

A typical inhabitant of rivers in the hilly areas; very rare in the drainage area of the middle and lower Danube. Found in 1953 in the river Crișul Repede at Oradea and upstreams, later in the Barcău at Sîniob and Rosiori Bihor and in the Crișul Negru at Tinca (Bănărescu, 1954, 1964). It has been believed to be extinct in Romania; however, three specimens have been collected in the Crișul Repede, downstreams from the dam lake Tileagd by Bănărescu, Bacalu and Telcean in August, 1994; this is the only locality in Romania where the species is known to have survived. It may also survive in the Crișul Negru but became surely extinct in the river Barcău. It has also been found in the Sebes-Körös at Körösszakál and Fekete-Körös at Sarkad in Hungary.

Leuciscus idus (Linnaeus, 1758)

Văduvița; jász; orfe; Aland.

A typical inhabitant of lowland rivers, only rarely found in lakes. Three are earlier records in the rivers Sebes-Körös and Berettyó at Szeghalom in Hungary (Futó, 1942) and in the lower Crișul Negru and the canal connecting the rivers Criș in Romania (Bănărescu, 1964). It has not been found during the 1994/1995 trips in Romania, but a few specimens were collected in the lower reach of the Körös in Hungary. It has also been found in the Kettős-Körös river in Hungary by Harka.

Leucaspius delineatus (Heckel, 1845)

Fufa; kurta baing; Moderlieschen.

A small sized fish, inhabiting mainly standing waters, sometimes also found in lowland rivers. Recorded, as *Leucaspius abruptus*, in the rivers Criş/Körös by Hermann (1887) in the Sebes-Körös at Seghalom by Futó (1942) and in fishponds and the pool Râtu at Ineu, drainage area of the Crişul Alb by Bănărescu et al. (1960). Also collected in the lower reaches of the rivers Sebes-Körös and Berettyó in Hungary by Harka and in the river Ier and adjacent ponds at Săcuieni in Romania by Wilhelm. Not found during the 1994 and 1995 trips.

Aspius aspius (Linnaeus, 1758)

Avat; balin; Rapfen.

Inhabitant in lowland rivers and lakes. Recorded in the rivers Sebes-Körös and Berettyó at Szeghalom (Futó, 1942) and in the Crişul Repede at Oradea and downstreams (Bănărescu et al., 1960); collected in the Hungarian reach of the river Sebes-Körös by Harka. During the 1994 trip the species was collected only in Hungary (rivers Fekete-Körös, Fehér-Körös and Kettős-Körös). In 1995 it has been seen in the Crişul Repede at Cheresig.

Chondrostoma nasus (Linnaeus, 1758)

Scobar, paduc.

An exclusive inhabitant of rivers, from the feet of the mountains to the lowlands. Reported in the rivers Szebes Körös and Berettyó at Szeghalom in Hungary (Futó, 1942); in Romania in the three Criş rivers; in the Romanian stretch of the river Barcău it was present only in some years. Collected by Harka in the three rivers in Hungary, but not from the Berettyó. Collected during the 1994/1995 trips in the river Crişul Repede downstreams from Ciucea, in the Crişul Negru from Ştei to Borz (but not in the lower stretch) and in the Crişul Alb from Aciuţa to Ineu (not found at Chişineu/Criş); in the Hungarian stretches it is rare.

Alburnus alburnus (Linnaeus, 1758)

Obleţ; küsz; bleak; Ukelei.

Inhabitant of lowland rivers and of standing waters. Reported by Futó (1942) in the rivers Sebes-Körös and Berettyó at Szeghalom and by Bănărescu (1953, 1964) in Crişul Repede (downstreams of Vadul Crişului), Barcău (downstreams of Nuşfalau), Crişul Negru (downstreams of Beius) and Crişul Alb (downstreams of Dezna) and in ponds and fish farms. Found by Wilhelm in the river Ier and adjacent ponds and canals at Săcuieni by Harka in the Hungarian stretches of all four rivers. Collected during the 1994/1995 trips in the Crişul Repede from Bologa, in the Crişul Negru from Ştei, in the Crişul Alb from Brad downstreams to their confluences in Hungary and in the Hármas-Körös river in Hungary.

Alburnoides bipunctatus (Bloch, 1782)

Latița; sujtásos kűsz, Schneider.

Exclusive inhabitant of running waters: rivers and brooks, from the feet of mountains to lowlands, but not very far downwards. There are earlier records only in Romania: river Crișul Repede from Ciucea, Barcău from Nușfalău, Crișul Negru from Vașcău, Crișul Alb from Brad downstreams to almost to the Hungarian border; also in the river Iad, tributary of the Crișul Repede and in the Vida, tributary of the Crișul Negru. During the 1994/1995 trips it has been found throughout its former known range and even beyond it: in Crișul Repede from Bologa to Fughiu (not present at Cheresig), Crișul Negru from Ștei to Borz (not reaching to Tinca and Tămașda where formerly present), Crișul Alb from the village Criș to Ineu, not to Chișineu-Criș; Barcău from Nușfalău to Sântimreu (Hungarian border). The species was also found in the rivers Drăgan, Iad (tributaries of the Crișul Repede) and Tăcășele (tributary of the Crișul Alb). In some localities it was extremely numerous. Remarkable is its survival in the river Barcău in which the life conditions have strongly deteriorated.

Blicca bjoerkna (Linnaeus, 1758)

Batca; karika keszeg; white bream; Guster.

The species is an inhabitant of lowland rivers and of ponds and lakes. Reported in the rivers Sebes-Kőrös and Berettyó at Szeghalom (Futó, 1942) from the lower reaches of the rivers Barcău and Crișul Negru in Romania and the canal connecting the three Criș rivers ("canalul colector") (Bănărescu, 1964). It was found in the rivers Ier near Săcuieni by Wilhelm and in the Hungarian stretch of the three Kőrös rivers and in the Berettyó by Harka. It has not been collected during the 1994/1995 trips.

Abramis brama (Linnaeus, 1758)

Plătica; dévér keszeg; bream; Brachsen.

Inhabitant of large lowland rivers, of lakes and ponds. Reported in the rivers Sebes-Kőrös and Berettyó at Szeghalom (Futó, 1942) in the rivers Crișul Repede at Toboliu, Barcău at Sâniob, Crișul Negru from Tinca, Crișul Alb from Ineu downstreams and from the canal connecting the three Criș rivers (Bănărescu, 1964). Collected by Harka throughout the Hungarian sections of the four rivers by Wilhelm in the river Ier at Săcuieni and during the 1994/1995 trips in the Crișul Negru at Tămașda and Zerind and in the lower Fekete and Fehér-Kőrös rivers and the Hármás-Kőrös river in Hungary.

Abramis sapa (Pallas, 1811)

Cosac cårn; bagoly keszeg; white eyed bream; Zobel.

A species inhabiting mainly large lowland rivers. Reported in the rivers Sebes-Kőrös and Berettyó at Szeghalom (Futó, 1942); collected by Harka in the lower Kőrös river in

Hungary and during the 1955 trip in the Crişul Alb at Chişineu Criş, this being the first record of the species in the system of the Criş rivers in Romania.

Abramis ballerus (Linnaeus, 1758)

Cosac cu bot ascuţit; lapos keszeg; Zope.

Reported in the rivers Sebes-Körös and Berettyó at Szeghalom (Futó, 1942). Found by Harka in the lower reaches of the rivers Sebes-Körös, Berettyó and Fekete-Körös in Hungary and the Hármas-Körös and by Bănărescu in the lower Crişul Negru at Tămaşda in Romania, where it is present only in some years, being possibly a temporary visitor. Not collected in 1994 and 1995 in either Romania or Hungary.

Vimba vimba (Linnaeus, 1758)

Morunaş; éva keszeg; vimba bream; Zahrte.

This species is recent intruder in the Criş/Körös riverine system as well as in other rivers in the drainage area of the middle and lower Danube; it lived initially only in the Danube proper and in the Tisza; it has not been recorded in the tributaries of the Lower Danube (Antipa, 1909), in the rivers of Transylvania (Bielz, 1888) even by Futó (1940) who collected fishes in the lower Sebes-Körös river during the late 30 ties, early 40 ties. Probably the species ascended the rivers from the middle and lower Danube drainage area during or shortly after the Second World War. It has been reported in the Criş/Körös river system first by Bănărescu (1953 c) who found the species in the Crişul Alb at Gurahonţ (1951 June), in the Crişul Negru at Tinca (1951 August) and the Crişul Repede at Oradea (1953 October). During the 1993/1994 trips the species was found in the Crişul Repede from Ciucea to Cheresig, in the Crişul Negru from Ştei to Tinca and the Crişul Alb from Brad to Ineu; in the latter two rivers the vimba bream was not found near the Hungarian border; it has not been found in Barcău river. In the Hungarian area of the Körös river basin it has been found by Harka only in Fekete-Körös river at Sarkad. All these data suggest that the species is confined to the middle reach of rivers. It has not been found in the Barcău river.

Pelecus cultratus (Linnaeus, 1758)

Sabiţa; garda; sabre carp; Sichling, Ziege

Reported in the Sebes-Körös and Berettyó rivers at Szeghalom (Futó, 1942); isolated specimens collected from the lower stretch of the Hármas-Körös rivers by Harka. These are only occasional visitors from the Tisza, not autochthonous.

Phoxinus phoxinus (Linnaeus, 1758)

Boiştean, craiet; fürge cselle; minnow; Elritze.

Recorded from the upper and partially middle reaches of the four rivers in Romania (Bănărescu, 1964); absent in Hungary. Collected during the 1994/1995 trips in the Crişul Repede from the headwaters to Stâna de Vale and in the tributaries Valea Drăganului (here

abundant both in the river and in the recently built dam lake), and Valea Iadului; in the Crișul Negru at Ștei (absent in the headwaters proper and downstream of Borz) in the Crișul Alb from the headwaters to downstream of Brad; it seems to have become extinct in Barcău river, where it has formerly been collected from the headwater to Nușfalau.

Rhodeus sericeus amarus (Bloch, 1782)

Boarța; szivárványos ökle; bitterling; Bitterling.

Reported from the lower reaches of Crișul Repede and Barcău rivers, from the middle and lower ones of Crișul Negru and Crișul Alb and from the brook Risculița, tributary of the Crișul Alb; also from the channel connecting the Criș rivers (“Canalul colector”) and from the fisheries farm of Cefa and Ineu (Bănărescu, 1964); apparently absent from Szeghalom area in the Sebes-Körös drainage area in Hungary (Futó, 1942). Collected during the 1994/1995 trips in the Crișul Repede river from Ciucea to Cheserig, in Crișul Negru from Borz (here being abundant) to Zerind and in Crișul Alb from Aciuța to Ineu (being probably present also at Chișineu Criș); not found in Barcău river: however the species is abundant in Ier river (tributary of the Barcău) and adjacent waters near Săcuieni Bihor (A. Wilhelm, field remarks). Collected, in great quantities throughout the Hungarian stretches of the three Körös and of Berettyó rivers by A. Harka.

Gobio gobio (Linnaeus, 1758)

Porcușor, porcușor comun; fenékjárom küllő; gudgeon, common gudgeon;

Grundling, gemeiner Grundling.

An ubiquitous fish species, present in most categories of rivers and brooks from montane areas to lowlands; it is more frequent in the upper and middle reaches, but in sections with slowly flowing water; it becomes rare in the lower reaches of large rivers. Reported in the Criș/Körös drainage area by Hermann (1887) and Vutskits (1918), in the rivers Sebes-Körös and Berettyó by Futó (1942) who probably misidentified under this name also *G. albipinnatus*. Reported in Romania by Bănărescu (1964) in the rivers Barcău (between Nușfalău and Roșiori Bihor), Crișul Repede (from Ciucea downstreams), Crișul Negru (from Vașcau downstreams), Crișul Alb (from Vața de Sus downstreams) and tributaries Risculița and Moneasa.

During the 1994/1995 trips it has been found in the Crișul Repede from the head waters to the Hungarian border, in the Barcău only at Nușfalău, in the Crișul Negru only at Ștei and Borz and not in the lower reach, in the Crișul Alb from the Mihăileni dam lake to Ineu (being more abundant downstream of Brad) and not at the Hungarian border. As in most other rivers of Romania, the species is more abundant in the middle than in the upper and especially in the lower reach. The species is present, but not numerous in Ier river and tributaries at Săcuieni Bihor (A. Wilhelm, field observations). A. Harka collected specimens in Sebes-Körös river at Körösszakál, a single one in Berettyó river at Szeghalom and a few ones in the Hármas-Körös rivers.

Gobio uranoscopus frici Vladykov, 1925

Porcușor de vad; felpillantó küllő; stone gudgeon; Steingressling.

A rheofilic species, typical inhabitant of the stretches with rapidly flowing water of rivers, without however ascending far upstreams. Reported in the Criș/Körös drainage area first by Bănărescu (1953 b) who mentions later (1964) its occurrence in the Crișul Repede between Bratca and a short distance upstream of Oradea and in the Crișul Negru from Vașcău to Batar. Found during the 1994/1995 trips in the former river at Stâna de Vale and Vadul Crișului, in the latter river downstreams of Ștei and at Borz. Not yet found in the Crișul Alb; it probably never lived in the Barcău and is absent from the Hungarian section of the rivers.

Gobio albipinnatus vladykovi Fang, 1943

Porcușor de șes; halványfoltú küllő; whitefin gudgeon; Weissflossen Grundling.

A typical inhabitant of lowland rivers. Recorded in the Criș/Körös drainage area first by Bănărescu (1952); in the Crișul Repede at Toboliu, in the Barcău from Nușfalău to Rosiori Bihor, in the Crișul Negru between Tinca and Tâmașda, in the Crișul Alb at Chisinau Criș (Bănărescu, 1964). Present, in small number, in the river Ier at Săcuieni (Wilhelm, field notes). A high number of specimens have been collected by Harka in the Hungarian section of the four rivers and the Hármas-Körös rivers. During the 1994/1995 trips it has been found in the river Barcău only at Sântimreu, in the Crișul Repede at Fughiu and Cheresig, in the Crișul Negru/Fekete-Körös from Borz to Zerind in Romania and in the Hungarian section, in the Crișul Alb/Fehér-Körös from Aciuța in Romania to the confluence with the Fekete-Körös in Hungary.

Gobio kessleri Dybowski, 1862

Porcușor de nisip; homoki küllő; Sand gudgeon; Sangressling.

The most character species to the rivers or sections of rivers with sandy or partially gravelly bottom and rapidly flowing waters in lowlands and hilly areas. Recorded in the drainage area of the Criș/Körös river first by Bănărescu (1953 a). It was present in all four rivers of this drainage area: in the Barcău from Nușfalău, in the Crișul Repede from Oradea, in the Crișul Negru from Beiuș, in the Crișul Alb from Ineu downstreams to the Hungarian border. In many localities the species was represented by large populations. It is more rare in Hungary: Harka found only two specimens in the Fekete-Körös at Sarkad and none in the three other rivers. The populations from the Barcău has presently disappeared. During the 1994/1995 trip the species was found in the Crișul Repede from Aleșd to Cheresig, in the Crișul Negru from Borz to Zerind, in the Crișul Alb from Aciuța to Chișineu-Criș. No specimens have been collected in the Hungarian stretches of the rivers.

The species is subject to a marked geographical variation: the specimens in the river Barcău (which are not extinct) were almost identical to those in the tributaries of the rivers Mureș and Olt and to those from the section of Someș river in Transylvania proper, while

those in the rivers Crișul Negru and Crișul Alb bear some similarity to the subspecies in Timiș river in the Banat.

Pseudorasbora parva (Temminck et Schlegel, 1846)

Murgoi balțat; gyöngyös razbóra; Pseudokeilfleckbarbe.

A small sized fish of East Asian origin, introduced in Europe with fry of valuable Chinese carps. The species has been introduced, as very young specimens in the fishery farm at Cefa, in the drainage area of the river Criș/Körös in 1962. A few years later it was present in natural waters rivers and ponds as well. It is now widely distributed through the drainage area of the Criș/Körös rivers in Romania and Hungary, except the headwaters in mountains. Most specimens live in ponds, canals etc., mainly in the vicinity of fishery farms; only few have been found in rivers: in the Crișul Negru at Tămașda in 1987. Wilhelm found specimens in the river Ier and several pools at Săcuieni (after 1970) and in the pond and farm at Olosig and Harka collected few specimens in the Hungarian stretches of the rivers Berettyó, Fehér-Körös and Fekete-Körös and a higher number in the Sebes-Körös and its backwaters. During the 1994/1995 trips specimens have been found only in the river Crișul Repede downstreams the dam lake of Tileagd and at Cheresig (Hungarian border), in the Crișul Negru at Tinca and Tămașda and in the Crișul Alb at Almaș and Ineu.

Barbus barbus (Linnaeus, 1758)

Mreana: rózsás márna; Barbel; Barbe.

A typical inhabitant of lowland rivers, never found in standing waters and ascending to the mountain zone only during the spawning migration. Earlier records by Vutskits (1913) and Futó (1942) in Hungary, by Bănărescu (1964) in Romania (the three Criș rivers and the Barcău). Found during the 1994/1995 trips in the Crișul Repede/Sebes-Körös from the dam lake Tileagd to the confluence with the Kettős-Körös river in Hungary, in the Crișul Negru/Fekete-Körös from Borz to Hungary, in the Crișul Alb/Fehér-Körös from downstream of Brad to the confluence with the Fekete-Körös in Hungary.

Barbus peloponnesius petenyi Heckel, 1847

Moioaga, mreana vânată; Petényi márna; Balkan barbel; Semling.

Inhabitant in mountainous rivers. Earlier records the three Criș rivers in Romania and their tributaries Vida (of the Crișul Negru) and Moneasa (of the Crișul Alb). Found during the 1994/1995 trips in the Crișul Repede from Bologa to downstreams of Aleșd and in the tributary Drăgan; in the Crișul Negru downstreams of Ștei and at Borz; in the Crișul Alb from upstreams the village Criș to Aciuța and in the tributary Tăcășele. The species seems never to have lived in the river Barcău.

Cyprinus carpio (Linnaeus, 1758)

Crap; ponty; carp; Karpfen.

The carp lives mainly in standing water (lakes, ponds) being also present in the sections with slowly flowing water of lowland rivers. It is also intensively raised in the numerous fishery farms in the Criş/Körös basin, in Romania and Hungary as well. The specimens in fishery farms belong almost exclusively to culture forms these escape sometimes in natural waters, where they can hybridize with the wild form. There are earlier records of the occurrence of the carp in the Criş/Körös drainage area (Vutskits, 1918; Futó, 1942; Bănărescu, 1964); these refer mainly to ponds and shallow lakes, but the latter authors mentions the occurrence of the carp also in the lower reaches of the three Criş rivers in Romania, in the cannal connecting them and in the tributaries Petea and Holod. Harka found a few specimens in the Hungarian sections of the Sebes-Körös, Berettyó and in the Hármas-Körös rivers. Wilhelm found only specimens of the culture form in the river Ier. The species was found during the 1994/1995 trip only in the Hungarian section of the rivers Fekete and Fehér-Körös.

Carassius carassius (Linnaeus, 1758)

Caracuda; kárász; crucian carp; Karausche.

The species lives exclusively in standing waters, including small pools. It was until recently distributed and abundant in all lakes, ponds etc. even in fisheries farms through the Criş/Körös basin; the earlier records (Vutskits, 1913; Futó, 1942; Bănărescu, 1964) actually refer to standing waters, inclusively oxbows and backwaters of rivers. The species became during the last two or three decades almost totally extinct from the Criş/Körös drainage area (and from the entire basin of the middle and lower Danube). Harka found only single specimens in a few sites in the lower Hungarian reach of the Hármas-Körös and Wilhelm in a pond at Cherechiu, near Săcuieni, Romania. No specimen has been collected during the 1994/1995 trips.

Carassius auratus gibelio (Bloch, 1783)

Caras, caras argintiu; ezüst kárász; goldfish; Giebel.

A recent intruder in the fish fauna of the Criş/Körös river, introduced after 1950. It is now widely distributed in all ponds, lakes, fishery farms etc. in the Criş/Körös drainage area. Found by Harka through the Hungarian sections of the three rivers and in the Hármas-Körös rivers; by Wilhelm in the river Ier and neighbouring ponds and during the 1994/1995 trips in the Crişul Repede at Tileagd and Fughiu, in the Crişul Negru at Tâmaşda and in the Hungarian sections of the Fekete- and Fehér-Körös.

Tinca tinca (Linnaeus, 1758)

Lin; compó; tench; Schleie.

The species inhabits only standing waters, including backwaters of rivers and oxbows. The earlier records (Vutskits, 1918; Futó, 1942) evidently refer to such habitats; Bănărescu

(1964) records the species only in ponds and the canal connecting the three Criş rivers: Harka found the species only in the basin of the Sebes-Körös in Hungary, Wilhelm in ponds near Săcuieni. No specimen has been found during the 1994/1995 trips.

Ctenopharyngodon idella (Valenciennes, 1844)

Hypophthalmichthys molitrix Valenciennes 1844)

Hypophthalmichthys (*Aristichthys*) *nobilis* (Richardson, 1845)

These three species are cultivated in fishery farm, being also occasionally met with in natural waters, mainly in the Hungarian sections of the three Körös rivers.

Fam. Cobitidae

Orthrias barbatulus (Linnaeus, 1758) (= *Neomacheilus barbatulus*)

Molan, grindel; kövi csík; Stone loach; Schmerle, Bachschmerle.

A species confined to rivers and brooks in montane and partially in hilly areas; present only in Romania. Earlier records from the rivers Barcău downstreams to Sâniob, Crişul Repede downstreams to Toboliu and the tributary Iad, Crişul Negru between Vascau and Beius and the tributary Vida Crişul Alb at Vaţa de Sus and the tributaries Risculiţa and Moneasa (Bănărescu, 1964). Collected during the 1994/1995 trips in the Crişul Repede from the headwaters to Aleşd and in the tributary Iad from Remeţi to its confluence; in the Crişul Negru between Stei and Borz, in the Crişul Alb from the village Criş to Almaş and in the tributary Tăcăşeale. Not found in the river Barcău in which it may have become extinct.

Misgurnus fossilis (Linnaeus, 1758)

Țipar; réti csík; Schlammbeisser.

A typical inhabitant of standing waters, also present in the lower reaches of muddy lowland rivers. It has been recorded in the river Berettyó at Szeghalom, Hungary (Futó, 1942), in the rivers Petea near Oradea, the canal connecting the three Criş rivers and in pools in Romania (Bănărescu, 1964); no specimens from these localities are preserved in collections. It was collected recently by Harka in the river Berettyó at Szeghalom, the lower Sebes-Körös and the Hármas-Körös rivers in Hungary and by Wilhelm in the river Ier and in ponds near Săcuieni, Romania. It has not been found during the 1994/1995 trips.

Cobitis taenia danubialis Băcescu, 1993

Zvârluga; vágó csík; spined loach, spiny loach; Steinbeisser.

The spiny loach from the drainage area of the middle and lower Danube, considered until recently as identical to the western European *C. taenia taenia*, has been ascribed by Nalbant (1993) to a new subspecies, *C. taenia danubialis* Băcescu (new name for *C. taenia* var. "elongatoides" Băcescu, 1962, which is nomenclatorially invalid. It differs from *C. taenia taenia* mainly in colour pattern. Its range is restricted to the rivers and standing waters of the lower and middle Danube, except the Danube Delta where it is replaced by

another species. It inhabits lowland rivers and standing waters and has earlier been recorded in the rivers Sebes-Körös and Berettyó at Szeghalom (Futó, 1842) and in the lower reaches of the four rivers, Barcău, Crişul Repede, Crişul Negru, Crişul Alb, the canal connecting these rivers, the tributaries Petea, Holod, Risculiţa and the ponds in the valley of the same rivers. Wilhelm found it in the river Ier and nearby ponds at Săcuieni (but in smaller number than many year ago). Harka throught the Hungarian stretches of the four rivers and in the Hármas-Körös rivers and Berettyó. During the 1994/1995 trips it has been collected in the Crişul Repede from Vadul Crişului to downstreams of Aleşd, in the Crişul Negru between Tinca and Zerind, in the Crişul Alb at Chişineu-Criş.

Sabanejewia aurata balcanica (Karaman, 1922)

Câra; balkáni törpe csík; Balkan spined loach; Balkan Speitzger.

A exclusive inhabitant of running water, distributed from the feet of mountains far downstreams in lowlands (to the mouth of the Danube). It was recorded in the Criş /Körös drainage area first by Bănărescu (1954) who found it later in the river Barcău from Nuşfalău, in the Crişul Repede from Ciucea (and in the tributaries Valea Iadului and Petea, in the Crişul Negru from Şuştiu (and in the tributary Vida at Lunca), in the Crişul Alb from Vaţa de Sus downstreams to the Hungarian border. It was found in Hungary by Harka only in the rivers Sebes-Körös in 1986 and in the Fekete-Körös at Sarkad in 1994. Collected during the 1994/1995 trips in the Crişul Repede between Bologa and Aleşd (being very abundant downstreams of Ciucea) and at Cheresig, in the Crişul Negru from Ştei to Zerind, in the Crişul Alb from Mihăileni to Chişineu-Criş.

This species is subject to a strong geographical variation in the rivers flowing from Romania to Hungary and Serbia; the populations from the upper and middle reaches are typical *S. a. balcanica*, while a gradual transition (intergradation) between this subspecies and *S. a. bulgarica* (that inhabits the rivers Tisza and Danube takes place in the lower sections). This transition is complete in the rivers Someş and Timiş (the specimens present at the Romanian/Hungarian and Romanian/Serbian borders are closer to *S. a. bulgarica*). Only a slight indication of a similar transition has been noted in the lower part of the Romanian reaches of the three Criş rivers; the transition was more evident in the river Barcău, the population from Roşiori Bihor consisted of typical intermediary individuals, but no specimens have been found in the Hungarian stretch of the river. The Roşiori Bihor populations became in the meantime extinct.

Fam. Siluridae

Silurus glanis Linnaeus, 1758

Somn; harcsa; wels; Waler, Wels.

A species mainly living in large lowland rivers. Recorded in the rivers Sebes-Körös, Berettyó and Holt-Körös at Szeghalom in Hungary (Futó, 1942), in the lower reaches of the rivers Crişul Repede, Barcău, Crişul Negru and in the canal connecting the three Criş rivers in Romania (Bănărescu, 1964). Found by Harka throught in Hungarian stretches of

the three Körös rivers and in the Hármas-Körös. Found earlier in the river Ier near Săcuieni Bihor by Wilhelm, now extinct. Not found during the 1994/1995 trips, but according to local, anglers present in the three Criș/Körös rivers.

Fam. Ictaluridae

Ictalurus nebulosus (Le Sueur, 1819)

Somn pitic, somn american; törpe harcsa; brown bullhead; Zwergwels.

An introduced North American species, living mainly in standing water. Recorded at Szeghalom, Hungary (Futó, 1942), in the lower reaches of the three Criș rivers, in the Barcău, the canal connecting the Criș rivers and in the ponds and fishery farms through the Criș drainage area (Bănărescu, 1964). Found in great number in the river Ier and in ponds at Săcuieni in Romania by Wilhelm and in the Hármas-Körös rivers in Hungary by Harka. Not collected in 1994/1995.

Ictalurus melas (Rafinesque, 1820)

The black bullhead, *I. melas*, is another North American species introduced in Europe, that has not yet been recorded from the Criș/Körös drainage area and in general in Hungary. One specimen collected in the Hármas-Körös River at Kunszentmárton in 1992 and a few ones collected in the same river at Gyomaendrőd in 1994 have been identified by Harka as *I. melas*. *I. nebulosus* was found in the same river, but in other localities.

Fam. Poeciliidae

Poecilia reticulata Peters, (=Lebistes reticulatus)

Gambusia affinis (Baird and Girard, 1853)

These two exotic species have been introduced by hobbyists in the thermal pond "Baile Episcopesti" on Petea near Oradea, Romania.

Fam. Gadidae

Lota lota (Linnaeus, 1758)

Mihalt; menyhal; burbot; Quappe.

A cold adapted inhabitant of large rivers in hilly areas and lowlands. There are earlier recordings of its occurrence in the river Sebes-Körös and Berettyó at Szeghalom, Hungary (Futó, 1942) and in the former river between Huedin and Oradea, Romania (Bănărescu, 1964, after informations; no specimen seen). It has been collected by Harka in the Hármas-Körös rivers, but not during the 1994/1995 trips.

Cottus gobio Linnaeus, 1758

Zglavoc; botos kölönte; bullhead; Groppe, Koppe.

A typical inhabiting of the montane stretches of rivers and brooks; it is therefore absent from the Hungarian section of the Criș/Körös area. It has been reported in the rivers Barcău (upstreams of Subcetate), Crișul Repede (between Huedin and Vadul Crișului) and its

tributaries Drăgan and Iad (from the headwaters to the confluence), Crișul Negru upstreams of Vascau and its tributary Vida upstreams of Dobresti, Crișul Alb and its tributary Moneasa. It has been collected during the 1994/1995 only in the river Crișul Negru upstreams of the village Poiana, in great number. It survives surely also in the Crișul Repede, but it may have become extinct in the tributaries Drăgan and Iad.

Perca fluviatilis Linnaeus, 1758

Biban; sügér; perch; Barsch.

A fish species living mainly in standing waters, often also, in lowland rivers. It has been reported in the rivers Sebes-Körös, Berettyó and Holt-Körös at Szeghalom, Hungary (Futó, 1942) in the lower stretches of the three Körös rivers, the canal connecting them, the Barcău in Romania and in the ponds and fish farms in their drainage area in Romania (Bănărescu, 1954, 1964), being later found by Wilhelm in the river Ier and in canals near Săcuieni, Romania, by Harka in the lower Sebes-Körös and in the Hármas-Körös rivers in Hungary. During the 1994/1995 it has been collected in the Berettyó in the rivers Crișul Repede from Aleșd downstreams, in the Crișul Negru at Târnașda and Zerind and in the Kettős-Körös.

Gymnocephalus cernuus (Linnaeus, 1758)

Ghiborț; durbincs; ruff; Kaulbarsch.

Another fish species from standing waters and slowly flowing lowland rivers. It has been recorded in the rivers Sebes-Körös, Berettyó and Holt Körös at Szeghalom by Futó, who probably confounded under the same name also *G. baloni* and in the lower part of the Romanian stretches of the Barcău, Crișul Repede and Crișul Negru by Bănărescu (1964). It was later found by Wilhelm in the river Ier and in canals near Săcuieni and by Harka in the Hungarian stretch of the Sebes-Körös and in the Hármas-Körös rivers. It has not been collected during the 1994/1995 trips.

Gymnocephalus baloni Holcik and Hensel, 1974

Ghiborț de râu; Balon durbincs; Balon's ruff; Balon's Kaulbarsch.

A rather recently described species, formerly confounded with *G. cernuus*, to which it is, morphologically very similar. It differs however ecologically from its close relative, being exclusively a riverine species; its habitat (slowly to moderately flowing rivers) is the same as that of *Gobio albipinnatus*, *Gymnocephalus schraetser* and *Zingel zingel*. It has been recorded in the Criș/Körös system (and in Romania) for the first time by Bănărescu (1981) who identified the species in the river Crișul Negru at Târnașda; Harka found it in the same river (Fekete-Körös) at Sarkad, Hungary and in the lower Sebes-Körös at Körösladány. During the 1994/1995 trips it has been collected in the Crișul Negru at Târnașda (but not downstreams, at Zerind) in Romania and in the river Kettős-Körös in Hungary.

Gymnocephalus schraetser (Linnaeus, 1758)

Raspar; selymes durbincs; yellow pope; Schrätzer.

This species is another typical inhabiting of lowland rivers, recorded earlier in the rivers Sebes-Körös and Berettyó at Szeghalom Hungary (Futó, 1942), Crişul Negru downstreams from Oradea, Barcău between Sâniob and Nuşfalău, Crişul Negru at Tămaşda, Crişul Alb between Ineu and Chisineu Criş and the canal connecting the Criş rivers in Romania (Bănărescu, 1954, 1964). It was found by Harka in the Hármas-Körös rivers in Hungary. Few specimens were collected in 1994/1995 in the river Crişul Repede at Cheresig and Crişul Alb at Chişineu-Criş, numerous ones in the Crişul Negru at Tămaşda and Zerind, few in the Kettős-Körös river in Hungary. The species probably became extinct from the Barcău/Berettyó river, at least in Romania.

Stizostedion lucioperca (Linnaeus, 1758)

Salau; fogas süllő; pikeperch; Zander, Schill.

An inhabitant of large lowland rivers and lakes and pond without much vegetation. The species has been recorded earlier in the rivers Sebes-Körös, Berettyó and Holt Körös, at Szeghalom, Hungary (Futó, 1942), in the Crişul Repede near the Hungarian border and in the Crişul Negru from Tinca downstream (Bănărescu, 1964). It was found by Harka in the Hungarian stretches of the rivers Sebes-Körös, Fekete-Körös and the Hármas-Körös rivers in Hungary, a single specimen in the Berettyó at Szeghalom. In 1994 it has been collected in Romania only in the Crişul Alb at Chişineu-Criş but in great quantities in Hungary: rivers Fekete-Körös, Feher Körös, Hármas-Körös rivers.

Stizosteidon volgensis (Gmelin, 1788)

Salau vargat; kösüllő; Volga pikeperch; Wolga Zandr.

A species living only in large lowland rivers and in the shallow lakes of floodplains. There are no earlier records of this species within the drainage area of the Criş/Körös rivers. A few specimens have been collected by Harka in the rivers Sebes-Körös, Kettős-Körös and the Hármas-Körös rivers in Hungary. Not collected in 1994/1995. In Romania the species has been recorded only in the Danube and the large shallow lakes of the flood plains (now dried up), never in tributaries.

Zingel streber (Siebold, 1863)

Fusar; kis bucó, német bucó; Streber.

A strictly rheophilic fish species, confined to rapidly flowing stretches of the rivers, from the hilly areas to the lowland. There are earlier recording in the Sebes-Körös and Berettyó rivers (Herman, 1887, without mention of localities, Futó, 1942 at Szeghalom), the Crişul Repede at between Vadul Crişului and Oradea, the Crişul Negru between Beiuş and Tămaşda (Bănărescu, 1964), a single specimen has been collected in the river Barcău at Roşiori Bihor. Harka found a single specimen in Hungary in the Sebes-Körös. In the 1994 trip ten specimens have been collected in the Crişul Alb at Aciuţa, Almas, Ineu and

nine in the Crişul Negru at Tinca and Tămaşda, none in the Crişul Repede. The species has undergone a drastic decline in Romania (probably in Hungary and Slovakia, too) being in many rivers rarer than formerly, e.g. in the Mureş and especially in the Timiş. The Crişul Negru and Crişul Alb are, besides the Nera in southern Banat, the rivers in which this species seems to have retained its former abundance.

Zingel zingel (Linnaeus, 1758)

Pietrar, fusar mare; magyar bucó, nagy bucó; Zingel.

A typical inhabitant of large lowland rivers, not extending as far upstreams as the preceding species. There are earlier records in Körös river without mention of localities (Herman, 1887, Vutskits, 1913), in the Sebes-Körös and Berettyó at Szeghalom, Hungary (Futó, 1942), in the Crişul Repede at Toboliu (Müller, in Bănărescu, 1964; there are no specimens from this locality in collections) and in the Crişul Negru at Tămaşda (Bănărescu, 1954, 1964). The species has been seen in the latter locality for the first time in 1949; between 1962 and 198 it has been repeatedly collected there. In no other locality in Romania was it as abundant as at Tămaşda. During the period 1986/1990 it has been collected by Harka in the Hungarian stretches of the rivers Sebes-Körös, Kettős-Körös and Hármas-Körös rivers. It was collected in 1994 in the Crişul Negru at Tinca, but not in the lower reach of the river (Tămaşda and Zerind), where formerly abundant.

Fam. Centrarchidae

Lepomis gibbosus (Linnaeus, 1758)

Biban soare; naphal; pumpkinseed sunfish; Sonnenbarsch.

An introduced North American species, living mainly in standing waters, more rarely in lowland rivers. Recorded in the lower reaches of the river Crişul Repede and Crişul Negru and in the canal connecting the Criş rivers in Romania (Bănărescu, 1964). Collected by Harka in the three Körös rivers, in the Berettyó and in the Hármas-Körös river throughout their entire stretches in Hungary. During the 1994 trip it has been found in only in Hungary (rivers Fekete-Körös, Fehér-Körös, Kettős-Körös); a few specimens were collected in 1995 in the Crişul repede downstreams of the dam lake Tileagd. The species is rather abundant in the ponds throughout the drainage area of the Criş/Körös river.

Fam. Gobiidae

Proterorhinus marmoratus (Pallas, 1811)

A species of marine Ponto-Caspian origin, comprising many strictly freshwater populations inhabiting mainly standing waters and slowly running rivers. It was not reported earlier in the Criş/Körös area. Harka found specimens in two localities on the Hármas-Körös rivers and one locality on the Kettős-Körös river in Hungary, this being the first record of the species in the drainage area of the Körös/Criş river (Harka, 1990).

Ecological zonation of the fish fauna

Five successive "fishery zones" are presently recognized in the large rivers of Romania (Bănărescu, 1964):

(1) The trout zone (*Salmo trutta fario*); (2) The zone of the grayling (*T. thymallus*) and of the Balkan barbel (*Barbus peloponnesius*); (3) The zone of the *Chondrostoma nasus*; (4) The zone of the common barbel (*B. barbus*); (5) The zone of the carp (*Cyprinus carpio*). In small rivers, the characteristic species of the zones (3) and (4) are absent; the middle or also the upper reaches are designed as a "chub (*Leuciscus cephalus*) zone.

The trout zone has a wide extension in the head waters and upper reaches of the rivers Crișul Negru and Crișul Alb and also encompasses most of the large tributaries of the Crișul Repede: Secuieul, Drăgan and Iad. This zone is much shorter in the river Barcău, where the trout and the sculpin are present. There is however no trout zone in the Crișul Repede, the upper reach of which (upstreams of the confluence with the tributary Secuieul) has no mountain character, the trout, the sculpin and the Carpathian lamprey are absent and the most abundant fish species are ubiquitous one: chub, common gudgeon.

The grayling, Balkan barbel zone encompasses the Crișul Repede between the confluence with the tributary Secuieul and Ciucea and the lower sections of the tributaries Drăgan and Iad. The grayling is not native in the Crișul Negru and Crișul Alb, the Balkan barbel is the dominant species in the former river from Vașcău to downstream of Gurahonț. There are no clear limits between the *Chondrostoma* and the common barbel zones, the latter being well delimited from the carp zone in the lower part of the Romanian section of the three Criș rivers; downstream of this limit *Alburnoides bipunctatus*, *Barbus peloponnesius*, *Orthrias barbatulus* are no more present, *Gobio kessleri*, *Chondrostoma nasus*, *Barbus barbus*, even *Leuciscus cephalus* become rare, *Rutilus rutilus*, *Abramis brama*, *Aspius aspius*, *Gymnocephalus schraetzer*, *Gobio albipinnatus* become abundant.

None of the species characteristic the Balkan barbel, *Chondrostoma* and common barbel zones are present in the Barcău, the section of this river, downstream the trout zone, belongs to the chub zone.

Conclusions

The anthropic impact on the aquatic fauna

As almost everywhere in Western Romania-Eastern Hungary-North and Western Serbia, levees have been built during the XVIII th and XIX th centuries, along both sides of the four main rivers of the Criș/Körös system, in order to protect the fields against flood.

While in other areas, e.g. the valley of the river Timiș in the Banat, the levees are distant, allowing the river to maintain its original course, to meander, favoring an alternation of microhabitats, with various depths and water velocities and the existence of small flood plain, the levees along the Criș/Körös rivers are close to each other many former meanders have been cut, the rivers became shorter, almost straight on long stretches, their depth and water velocity are rather uniform, the average velocity is higher than formerly. These modifications have favored some large-sized species, but species adapted to shallow water underwent a numerical decline, the diversity of microhabitats decreased.

A large dam lake has been built on the upper reach of the river Drăgan: the trout and the minnow (*Phoxinus phoxinus*) became quite abundant in the lake, but it seems that the grayling, the sculpin and the Carpathian lamprey underwent a numerical decline, in spite of the fact that the amount of water in the lower section of the river has not diminished, at now. A dam lake has also been built on the river Iad and much of the water from the river Drăgan has been carried into the Iad, the local life conditions having been modified but their influence on the fish fauna has not been determined. Several dam lakes have been built on the Crișul Repede determining local transformations of the lotic habitats into lentic ones, without however having drastically modified the fish fauna downstream. It is worth mentioning that the only place in which *Leuciscus leuciscus* was found lies just downstream of the dam lake Aleșd. The numerical decline of *Chondrostoma nasus* may be correlated with the damming of the river, which prevented the migrations of this species.

No dam lake has been built on the Crișul Negru. The dam lake Mihăileni on the Crișul Alb is too young for making possible to estimate its influence.

There are several sources of water pollution in the Criș rivers basin, namely urban and industrial waste water of the town Oradea (river Crișul Repede) waste water from a pig farm at Cheresig (lower reach of the same river), small quantities of wastes of urban and mining industries from the towns Ștei (river Crișul Negru) and Brad (river Crișul Alb). All these waste waters affect only short stretches of the three rivers. The life conditions have been more drastically deteriorated in the river Barcău/Berettyó, by waste waters of oil industry of Suplacu de Barcău and of urban wastes of the town Marghita. Some species became, most probably totally extinct from this river: *Leuciscus leuciscus*, *Gobio kesleri*, and at least in the Romanian section, *Gymnocephalus schraetser*. The extinction of the local populations of the three former species is a regretful loss for the biodiversity, since *L. leuciscus* is one of the most threatened fish species in the drainage area of the middle and lower Danube, while the local populations of both other species had some peculiarities which distinguished them from the other conspecific populations in the Criș/Körös system. Also the fish fauna of the upper Barcău river, that has not been affected by waste water has been impoverished, possibly because of the reduction of the amount of water: the black spotted specimens of trout are much more rare than formerly and the sculpin (*Cottus gobio*) has become, too.

Only the fish fauna of the rivers has been investigated during the 1994/1995 trips: not that of standing waters. 43 fish species were, or are normally present in rivers (some of

them also or even prevailing in standing waters: carp, pike, perch etc.). Three are only occasionally intruders from the Tisza: *Anguilla anguilla*, *Acipenser ruthenus*, *Pelecus cultratus*. The 40 others are listed in Table 1., their occurrence in the rivers and status: common, rare, probably extinct, never present, vulnerable i.e. more rare than formerly is mentioned. The fact that some species have not been collected in 1994/1995 does not mean that they are probably extinct; some of them have always been rare (e.g. *Lota lota*, *Thymallus thymallus*), others can not easily be collected with the nets we had at our disposal (*Silurus glanis*, *Cyprinus carpio*).

Generally speaking, the situation of the fish fauna of the three Criş/Körös rivers is better than that of most other rivers in Romania and Hungary. The Crişul Alb is the only river in Romania where *L. leuciscus* surely survives and the only one, alongside the Nera where *Zingel streber* retains its former abundance. Another percid species, *Gymnocephalus schraetser*, apparently retains its former abundance, too while in the Timiş it became more rare. Following species are rare, or more rare than formerly: *Eudontomyzon danfordi*, *Thymallus thymallus* (native only in the Crişul Repede and tributaries), *L. leuciscus* (probably extinct from the Crişul Negru), *Chondrostoma nasus*, *Gobio uranoscopus*, *Barbus barbus*, *Cotus gobio* (in the Crişul Repede and Crişul Alb), *Lota lota*, *Gymnocephalus baloni* and *Stizostedion volgense* have only recently been found in the Criş/Körös rivers.

The most endangered fish species from standing waters is *Carassius carassius*; endangered is also *Tinca tinca*, while *Scardinius erythrophthalmus* and, in the pools of the Ier river system, *Umbra*, have retained their abundances. The status of *Leucaspis delineatus* is undetermined *Proterorhinus marmoratus* has only recently been recorded in the Criş/Körös river system. The endemic subspecies *S. erythrophthalmus racovitzai* has, according to recent information, retained its abundance in the thermal lake "Baile Episcopesti".

Table 1. Occurrence of the fish species in the Criș/Körös river system

SPECIES	CrR/SK	Dr	B	CrN/FkK	CrA/FhK	HK
<i>Eudontomyzon danfordi</i>	R	R	/	R	R	/
<i>Salmo trutta fario</i>	V	C	V	C	V	/
<i>Thymallus thymallus</i>	E	E	/	/	/	/
<i>Esox lucius</i>	T	/	C	C	C	rC
<i>Rutilus rutilus</i>	C	/	C	C	C	C
<i>Leuciscus cephalus</i>	C	R	C	C	C	rC
<i>Leuciscus leuciscus</i>	R	/	Ex?	R	/	/
<i>Leuciscus idus</i>	C	/	Ex?	C	C	rC
<i>Aspius aspius</i>	R	/	Ex?	C	C	C
<i>Chondrostoma nasus</i>	C	/	Ex?	C	C	C
<i>Alburnus alburnus</i>	C	/	C	C	C	C
<i>Alburnoides bipunctatus</i>	C	V	V	C	C	/
<i>Blicca bjoerkna</i>	?	/	C	C	C	re
<i>Abramis brama</i>	C	?	V	C	C	C
<i>Abramis sapa</i>	/	/	/	?	rC	?
<i>Abramis ballerus</i>	R	/	R	rC	R	?
<i>Vimba vimba</i>	C	/	/	C	C	R
<i>Phoxinus phoxinus</i>	C	C	Ex?	C	C	/
<i>Rhodeus sericeus</i>	C	/	rC	C	C	R
<i>Gobio gobio</i>	C	/	C	C	C	rC
<i>Guramoscopus frici</i>	V	/	/	C	/	/
<i>Galbipinnatus vladykovi</i>	C	/	C	C	C	C
<i>G. kessleri</i>	rC	/	Ex	rC	rC	?
<i>Barbus barbus</i>	C	/	Ex?	rC	rC	rC
<i>B.peloponnesius petenvi</i>	C	R	/	C	C	/
<i>Cyprinus carpio</i>	rC	/	rC	rC	rC	C
<i>Orthrias barbatulus</i>	C	/	C	C	C	C
<i>Cobitis taenia danubialis</i>	rC	/	?	rC	rC	R
<i>Sabanejewia aurata balc</i>	rC	/	Ex?	rC	rC	R
<i>Silurus glanis</i>	R	/	/	R	R	rC
<i>Lota lota</i>	R	/	Ex	R	R	R
<i>Cottus gobio</i>	C	Ex?	Ex?	C	?	/
<i>Perca fluviatilis</i>	rC	/	?	C	C	C
<i>Gymnocephalus cernuus</i>	R	/	R	R	R	rC
<i>G. balonii</i>	?	/	/	rC	rC	rC
<i>G. schreatser</i>	rC	/	Ex?	C	rC	rC
<i>Stizostedion lucioperca</i>	R	/	/	C	C	C
<i>Stizostedion volgense</i>	/	/	/	?	?	R
<i>Zingel streber</i>	Ex?	/	Ex?	rC	C	?
<i>Zingel zingel</i>	Ex?	/	/	R	R	?

Cr.R/SK = Crișul Repede/Sebes-Körös; Dr. = Drăgan; B. = Barcău/Berettyó; Cr.N/FkK = Crișul Negru/Fekete-Körös; Cr.A/FhK = Crișul Alb/Fehér-Körös; HK = Hármas-Körös

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Petru M. Bănărescu
Institutul de Biologie
Laboratorul de Taxonomie
Str. Frumoasă 23.
București, Romania

Ilie Telcean •
University Oradea
Romania

Petru Bacalu
Muzeul de Istorie Naturală "Grigore Antipa"
Șos. Kisseleff 1.
79744 București, Romania

Ákos Harka
5350 Tiszafüred
Táncsics M. út 1.

Sándor Wilhelm
Str. Libertății 24.
3750 Secuieni, Romania