

## FISH SPECIES WITH RESTRICTED RANGES IN THE TISA RIVER DRAINAGE AREA

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### Abstract

Among the native fish species from the Tisa River drainage area some are restricted to a certain part, or have a disjunct range. The most obvious patterns and histories of such distributions are discussed in the present paper.

**Keywords:** zoogeography, ranges, phyletic relations.

### Discussion

The Tisa river is the largest tributary of the Danube. Two species of lampreys, five of sturgeons - three of which are migratory / and 53 of bony fish - gobies of brackish water with Ponto-Caspian origin, even if fully adapted to freshwater, being not included in this figure, are native to the drainage area of this river.

None of these species occurs throughout the entire drainage area of the Tisa. Montane species - *Salmo trutta*, *Thymallus thymmalus*, *Cottus gobio* etc. are present only in the upper sectors of the Tisa and its tributaries; many others - *Abramis ballerus*, *A. sapa*, *Gymnocephalus schraetser*, *G. baloni* etc. are confined to the Tisa River and to the lower sectors of its tributaries. The restricted distribution of these species has ecological bases, being not significant in genetical or historical biogeography.

Significant are the species restricted to a part of the Tisa basin, although they have adequate life conditions also in other parts.

Two species, the eastern sculpin, *Cottus poecilopus*, and a dace, *Telestes souffia*, occur only in the upper Tisa and the upper stretches of its tributaries, northern (Ukrainian) and southern (Romanian) as well. Their ranges in the Tisa basin are the same, but their general ranges, i.e. their biogeographical positions are quite different. *C. poecilopus* is a northern, cold-adapted species, ranging from the Scandinavian Peninsula and north-eastern European Russia to the northern and eastern Carpathians in the drainage areas of the Danube, Nistru and Vistula. Its range in the Danube basin encompasses the upper sectors of the tributaries of the middle Danube in Slovakia, the

upper Tisa River and its tributaries and the northern tributaries of the rivers Siret and Prut (Fig. 1) (Antipa, 1909; Vladykov, 1931; Bănărescu, 1964; Harka, 1997; Holcsik, personal information), the populations from the southern tributaries of the Tisa and from the tributaries of the Siret being the southernmost ones. This species obviously has a northern origin and probably entered the Carpathian rivers during the Ice Age.

Contrary to *C. poecilopus*, *Telestes souffia* has a rather southern distribution; it inhabits the drainage area of the Rhone and of other rivers in southern France, that of the upper Rhine, the river Soca or Isonzo in the Istria Peninsula, possibly also other rivers on the western Balkan watershed, as well as the south-western tributaries of the Danube, from Germany to Croatia and Bosnia; a distinct subspecies or closely related species: *T. muticellus* lives in northern and central Italy (Berg, 1932; Vladykov, 1931; Bianco, 1979; Leiner and Popovic, 1981; Allardi and Keith, eds., 1991). The range of the species is hence widely disjunct, the population from the upper Tisa being quite distant from the main range of the species (fig. 2). These populations are also the northern-most ones, contrary to those of *Cottus poecilopus*, which are the southern-most ones of their species.

It is worth mentioning that the two other species of the genus have southern ranges, too: *T. polylepis* is confined to a few small tributaries of the river Sava, the south-western area of the Danube drainage and *T. turskyi* is endemic to the river Cikola on the western Balkan watershed (Bănărescu and Herzig-Straschill, 1998).

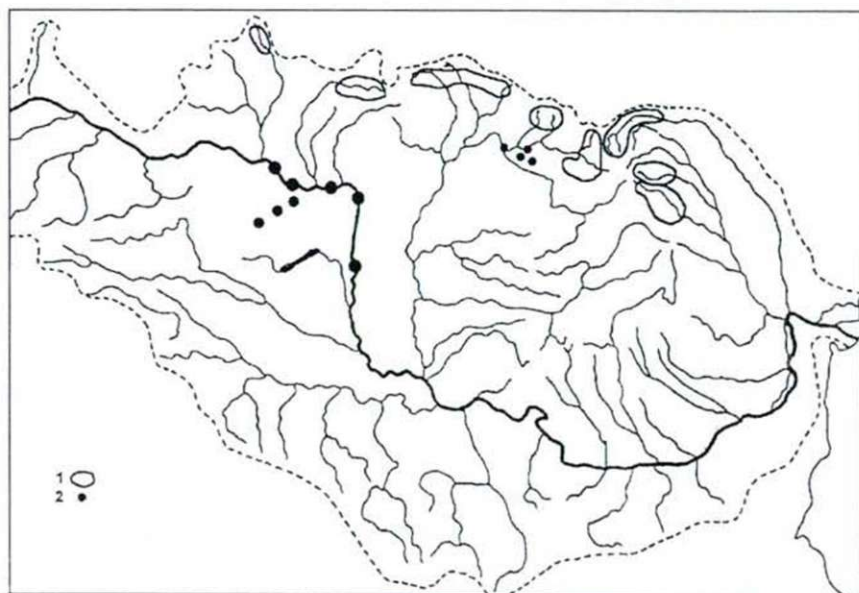


Fig. 1. Distribution of *Cottus poecilopus* (1) and *Rutilus pigus* (2) in the basin of the middle and lower Danube

The disjunct distribution of any species or monophyletic superspecific taxon - excepting some species with strong dispersal abilities derives from a wider and continuous range followed by extinction in a part of this range. It is therefore obvious that *T. souffia* had once a wide and continuous range throughout the drainage area of the middle Danube, or even throughout the entire basin of the Danube later, perhaps during the Ice Age, becoming extinct from the area between the upper Tisa and the River Sava, a south-western tributary of the Danube.

Restricted to a small area of the Tisa drainage is also the loach *Sabanejewia romanica*, present only in six of the seven south-western tributaries of the Mureş River: Sebeş, Cugir, Beriu, Strei, Cerna Hunedoreană and Dobra (Bănărescu, 1953, 1964 and recent field investigations; fig. 3). The species is absent from the seventh south-western tributary of the Mureş, the river Pian that flows between Sebeş and Cugir, as well as from the south-eastern and northern ones. Besides the tributaries of the lower Danube: Topolniţa, Jiu, Olt (both in Transylvania and south of the Carpathians), Vedeia and their subtributaries, being absent in the more eastern ones (fig. 4).

Hence, the range of this species is disjunct, too, since there is no direct contact between the southern tributaries of the Mureş and those of the lower Danube.

For explaining this disjunction, and the zoogeographic position of *S. romanica*, it is necessary to determine its phyletic affinities. Two alternative options have been proposed in this problem:

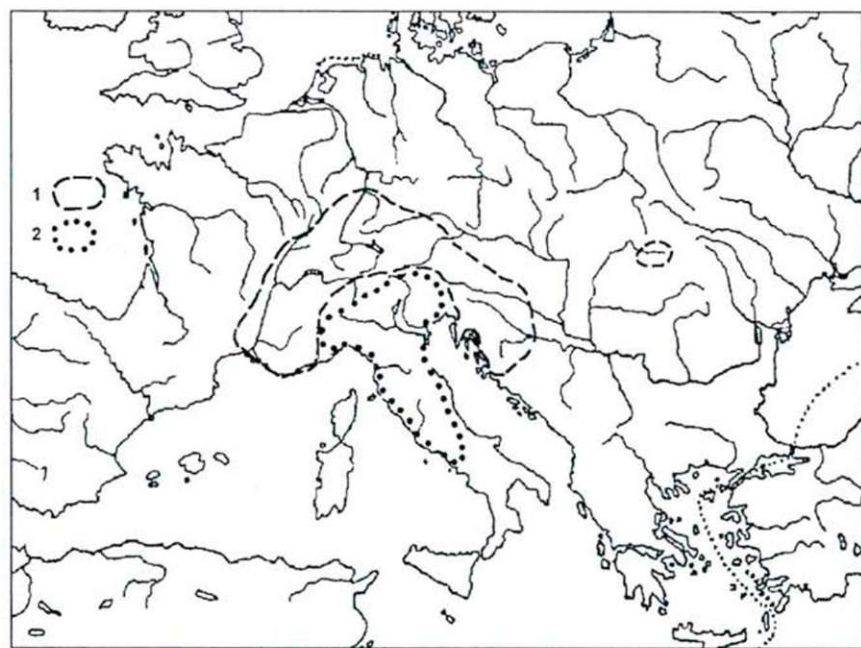


Fig. 2. Range of *Telestes souffia* (1) and its closest relative, *T. muticellus* (2), according to the data of Vladykov, 1931, Berg, 1932 and Bianco, 1979



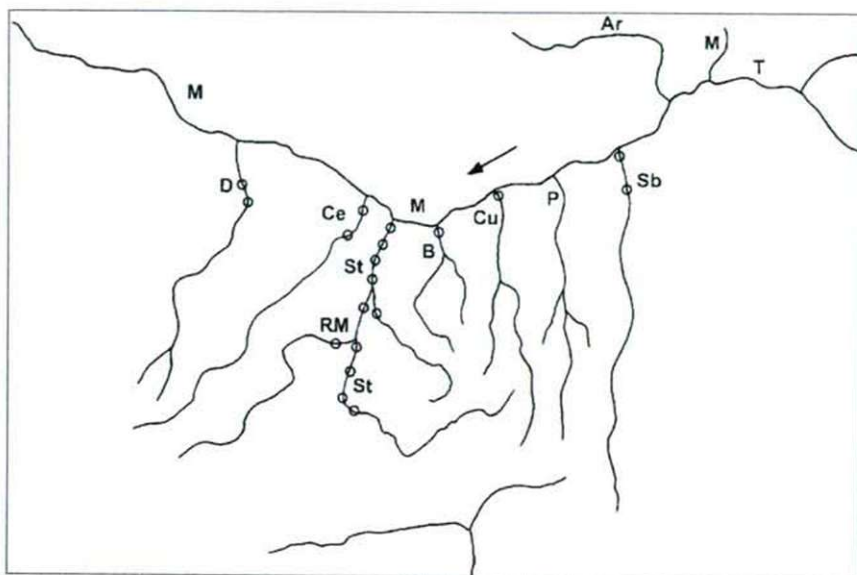


Fig. 3. Distribution of *Sabanejewia romanica* in the tributarie of the Mureș River. M - Mureș; T - Târnava; Ar - Arieș; Sb - Sebeș; P - Pian; Cu - Cugir; B - Beriu; St - Strei; RM - Râul Mare; Ce - Cerna Hunedoreana; D - Dobra (according to own field investigations)

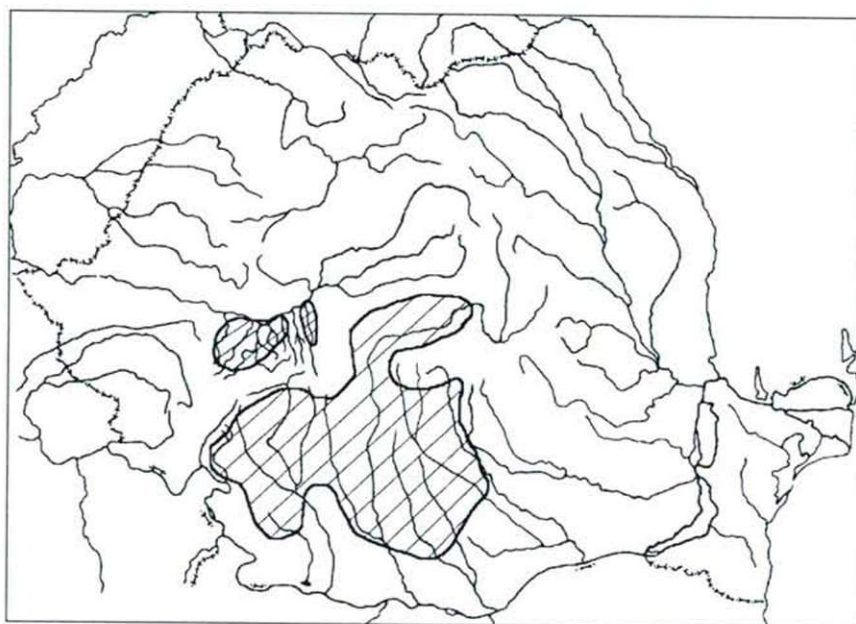


Fig. 4. General range of *Sabanejewia romanica* (according to own field investigations)

1. This species is morphologically very similar to the widely distributed *S. aurata*, a species subject to a strong geographical variability, especially in the Danube basin. The *S. aurata* subspecies is more similar to *S. romanica* is *S. aurata vallachica* from the southern and south-eastern tributaries of the Danube in Romania, the populations most similar to *S. romanica* being those from the rivers east of the range of the later species. Based on this similarity, Bănărescu et al. (1972) concluded that the ancestor of *S. romanica* was a subspecies of *S. aurata*, closest to *S. a. vallachica*. Preliminary, unpublished electrophoretic studies of C. Tesio confirm the phyletic affinities between *S. romanica* and *S. a. vallachica*. In the light of this opinion, *S. romanica* originated south of the Carpathians and reached the tributaries of the Mureş by means of a river capture either between the headwaters of the Jiu and those of the Strei, tributary of the Mureş, or between some Transylvanian tributary of the Olt and the Sebeş, another tributary of the Mureş.

2. Perdices et al. (in press) consider, using mitochondrial DNA techniques concluded that *S. romanica* and *S. balcanica* (which includes the subspecies formerly in *S. aurata*) are not very closely related, the closest relative of the former species being the Italian *S. larvata*. The group *larvata-romanica* is believed to have an older age than the *balcanica-vallachica* complex. Accepting this opinion, it means that the restricted and disjunct range of *S. romanica* is a relictar, having resulted from the reduction of a formerly much wider one.

Two other species, both endemic to the upper-middle Danube drainage area have restricted ranges in the Tisa Basin: *Rutilus pigus*, recorded only from the lower sectors of the Tur and Someş-Szamos rivers in Hungary and Romania (Bănărescu, 1964; Harka, 1997; fig. 1) and the lamprey *Eudontomyzon vladykovi*, present only in the headwaters of the river Bega, the southernmost tributary of the Tisa (Bănărescu, 1969).

Finally, a species of rudd, *Scardinius racovitzai* is endemic to a small thermal pond in the system of Crişul Repede River, tributary of Tisa. This species is discussed in another paper.

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