SPECIES AND SUBSPECIES OF FISH AND LAMPREYS ENDEMIC OR ALMOST ENDEMIC TO THE DRAINAGE AREA OF THE TISA RIVER

Petru M. Bănărescu

Abstract

Endemic to a small thermal pond in the Tisa basin is *Scardinius racovitzai*, probably a recent offshoot of *S. erythrophtalmus*; almost endemic is the predatory resident lamprey *Eudontomyzon danfordi*, of a genus displaying a disjunct European-Eastern Asian range. The subspecies *Sabanejewia balcanica radnensis* is endemic to the upper sector of the tributary river Mureş; the populations of the middle and lower reach of this river, which are morphologically closer to the subspecies *balcanica* are genetically closer to *radnensis*.

Keywords: fish, lampreys, endemics, Tisa River basin

The Tisa river is the largest tributary of the Danube. Two species of lampreys and eight of bony fish, or ten, if we consider the Macedonian subspecies *Gobio uranoscopus elimeius* and *Zingel streber balcanicus* as specifically distinct from their Danubian relatives, are endemic to the catchment area of the Danube, but only three of these twelve species are widely distributed throughout the entire Danube basin, including the Tisa River and its tributaries: *Gobio uranoscopus, Gymnocephalus schraetser* and *Zingel streber*. The lamprey *Eudontomyzon vladykovi* and the fish species *Rutilus pigus* and *Sabanejewia romanica* are present in a small area of the Tisa drainage, but the largest part of their range includes sectors of the Danube outside the Tisa River system. Four other Danube basin endemics do not live in the Tisa River system. Finally, one fish, *Scardinius racovitzai* is endemic, and the lamprey *Eudontomyzon danfordi* is almost endemic to the Tisa system, while the subspecies *Sabanejewia balcanica radnensis* is endemic to the system of the river Mureş, the largest tributary of the Tisa.

The rudd *Scardinius racovitzai* has been described by Müller (1958) from a small thermal pond at Băile Episcopeşti (formerly Püspök-Fürdő, Bischofsbad) on the rivulet Peţea, tributary of the Crişul Repede River, Tisa drainage area. Bănărescu (1964) considered it only a subspecies of the widely ranging, Central European *S. erythrophtalmus*. New studies demonstrated that there are not only slight morphological and stronger physiological differences between the two species, but

also behavioral ones (Crăciun, unpublished PhD dissertation). *S. racovitzai* deserves therefore a specific rank (see also Kottelat, 1997).

Müller (1958) considers, in the original description of the *S. racovitzai*, that this species may have an old, possibly a Miocen origin, deriving from the fauna which inhabited Europe when the continent enjoyed a subtropical climate. I personally believe that this species is a recent derivative of the Central European common rudd, *S. erythrophtalmus*. A thorough comparison, using also molecular techniques, of both species and of the three other members of the genus (an Italian and two Greek species - Kottelat, 1997) is necessary for clarifying the problem.

Eudontomyzon danfordi is a predatory species of lampreys present in the upper stretches of the Tisa and of all its tributaries which have a montane sector, except the southernmost one, the Bega in the Banat (fig. 1 - note that the species inhabits all tributaries of the Tisa in Slovakia, but is absent from all direct tributaries of the Middle Danube). Outside the drainage area of the Tisa, *E. danfordi* is present also in one or two rivers in the Banat: the Timiş (with its subtributaries) and, according to information which need verification, the Cerna (fig. 1).

It is worth mentioning that *E. danfordi* is, besides *E. morii* and the three species of *Ichthyomyzon*, one of the few predator lampreys sedentary in rivers; most of the other predatory lampreys are migratory (anadromous) and all other sedentary species are non predatory (contributors in Lee et al., eds, 1980; Hardisty in Holcik, ed., 1986).

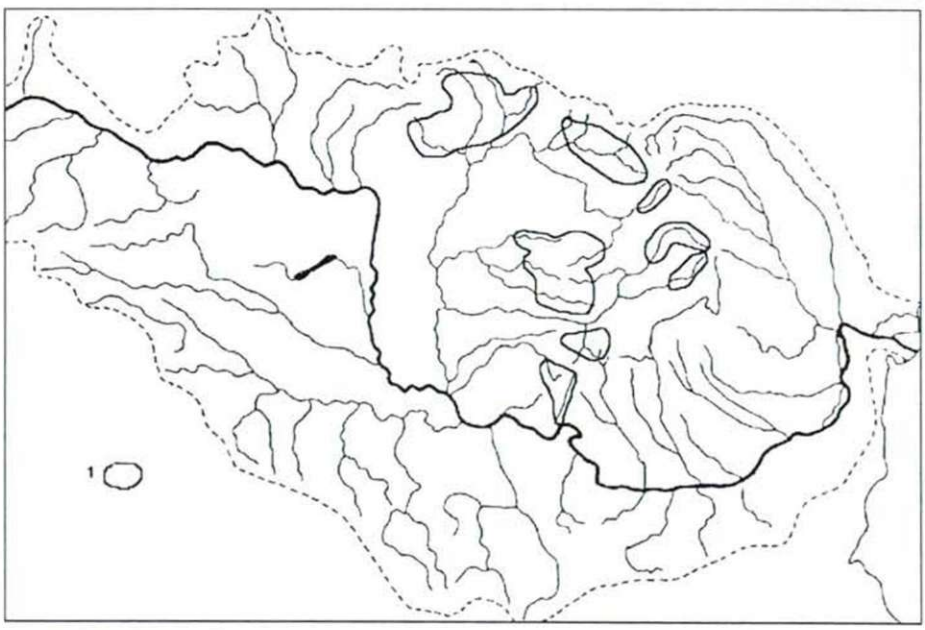

Fig. 1. Distribution of the predatory lamprey *Eudontomyzon danfordi*

The genus *Eudontomyzon* comprises four other species:

1. the non-predatory *E. vladykovi* in the drainage area of the upper and middle Danube (sympatric with *E. danfordi* in Timiş River and its tributaries) (Bănărescu, 1969);

2. the non-predatory *E. mariae* in the drainage area of the lower Danube, in the more eastern rivers on the northern watershed of the Black Sea (Dnjestr or Nistru, Dnjepr or Nipru etc.), in the river Vistula (Baltic Sea watershed), possibly also in the Vardar (Aegean Sea watershed) and the Drin River (Adriatic Sea Watershed);

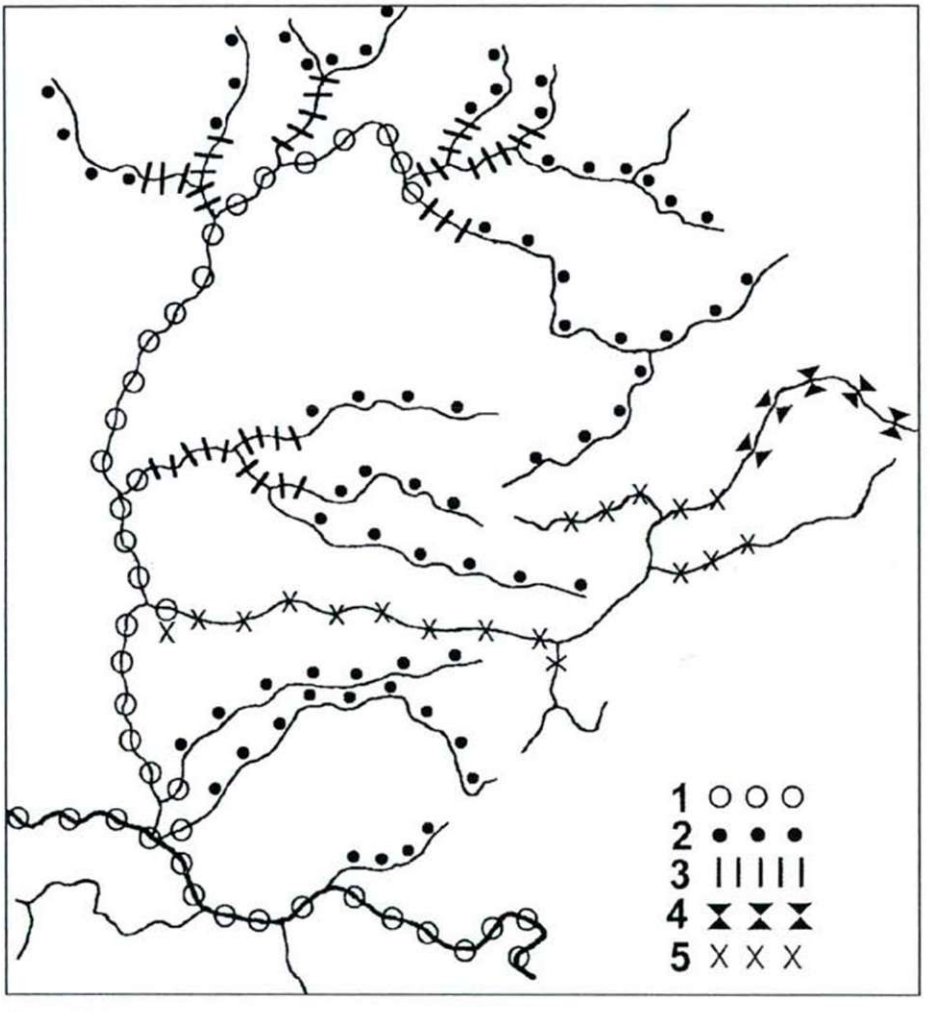

Fig. 2. Distribution of the subspecies of *Sabanejewia Balcanica* in the drainage area of the Tisa River and in the rivers from the Banat. 1 - *S. balcanica bulgarica*; 2 - *S. balcanica balcanica*; 3 - intergrades between the subspecies *balcanica* and *bulgarica*; 4 - *S. balcanica radnensis*; 5 - populations morphologically closer to *S. balcanica balcanica* but genetically closer to *S. balcanica radnensis*.

3. the non-predatory *E. hellenicus* in the rivers Strymon or Struma (Aegean Sea watershed) and Louros (Ionnian Sea watershed) (Renaud, in Holcik, 1986);

4. the little-known, probablly predatory *E. morii* in the river Yalu, Korea (Holcik, in Holcik, 1986).

The zoogeographic position of *E. danfordi*, and of the genus *Eudontomyzon* cannot be established until the relations between the Eastern Asian *E. morii* and the four European species are clarified.

The subspecies *Sabanejewia balcanica radnensis* is endemic to the upper sector of the river Mureş, between the headwaters and the town Reghin. The populations from the middle and lower Mureş, downstream Reghin and the tributaries are morphologically more similar to the subspecies *S. balcanica balcanica*, which lives in the other tributaries of the Tisa, Tur, Someş, Criş and in the rivers from the Banat (Bega, Timiş) than to *radnensis* and are therefore reported in the literature as *balcanica* (Bănărescu, 1964; Bănărescu et al., 1973).

There is, however, an important difference between the presumed *balcanica* from the middle and lower sectors of the Mureş and the true *balcanica* from the rivers Someş, Timiş etc. In the lower sectors of the latter rivers a gradual and continuoaus intergradation takes place between the "typical" *balcanica* from the upper and middle sectors and the subspecies *S. balcanica bulgarica*, which lives in the Danube and Tisa, the specimens from the lowermost stretches of these rivers being almost typical *bulgarica* (fig 2).

No such intergradation takes place in the lower sector of the river Mureş. The populations remain morphologically unchanged from the middle sector to the confluence of the river with the Tisa. At the confluence they meet on a length of about 70 km with specimens of *bulgarica*, living sympatrically with these, without any intergradation or hybridization, like "good" species. This proves that the presumed balcanica inhabiting the other tributaries of the Tisa is genetically closer to *S. balcanica radnensis*. The complex "true *radnensis*" and "middle-lower Mureş *balcanica*-like form" build a monophyletic taxon, endemic to the entire Mureş River system, i.e. to a part of the Tisa River drainage area.

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P. M. BĂNĂRESCU
Research Institute of Biology
Department of Biosistematics
Splaiul Independenţei 296
79651 Bucureşti
România