UNUSUAL ALTITUDE AND HABITAT FOR THE INVASIVE FISH *Pseudorasbora parva* IN THE VÂLSAN RIVER BASIN, ROMANIA

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Abstract. In June 2014 we encountered the non-native invasive fish *Pseudorasbora parva* at 870 m altitude in the Romanian Southern Carpathians. It occupies a pond surrounded by coniferous forest, in the upper basin of the Vâlsan River, where it was probably introduced directly by people.

Keywords: altitude, barriers, habitats, introduction, danger.

Rezumat. Altitudine și habitat neobișnuit pentru specia de pește invaziv *Pseudorasbora parva* în bazinul râului Vâlsan, România. În iunie 2014 am întâlnit peștele non-nativ invaziv *Pseudorasbora parva* la 870 m altitudine în Carpații Meridionali. Acesta a ocupat o baltă înconjurată de pădure de conifere, în bazinul superior al râului Vâlsan, unde probabil a fost introdus direct de oameni.

Cuvinte cheie: altitudine, bariere, habitate, introducere, pericol.

Pseudorasbora parva (Temminck & Schlegel, 1846) is a non-native fish in Europe, which in the last years invaded large areas on the continent (see in: COPP et al., 2005; GOZLAN et al., 2010). It seems that Romania is one of the first countries where this species was recorded, being accidentally introduced alongside economically important fish (BĂNĂRESCU, 1964). Afterwards, *P. parva* spread rapidly in the country, a lot of studies being realised upon it (see in: GAVRILOAIE et al., 2008). In Romania, it populates stagnant or low flowing waters from plain and hilly areas (e.g. BĂNĂRESCU, 1964; OȚEL, 2007). Such preferences were recorded in other regions too (e.g. COPP et al., 2005), including its native area (e.g. FUKUDA et al., 2013). Nevertheless, in Romania, *P. parva* was sometimes encountered in higher areas, but situated in large, flat, intermountain depressions, where it was introduced in fishponds (IMECS et al., 2014). On the contrary, in June 2014, we accidentally found a *P. parva* population at 870 m altitude, in the upper hydrographical basin of the Vâlsan River (Fig. 1), in southern Făgăraș Mountains. The topmouth gudgeons occupied a pond with a surface of approximately 10 m², the water depth of maximum 1 m, with rocky substratum and reeds on the shores, situated in the Vâlsan Glades. Between the pond and the Vâlsan River there are only 30 m of wet, flooded areas, filled by small springs. The shores of the pond and the banks of the river are covered by spruce forests (Fig. 2). Alongside *P. parva*, *Phoxinus phoxinus* (Linnaeus, 1758) was also present in the pond. Between Vâlsan Glades and the nearest downstream locality, there is an approximately 10 km long and narrow gorge, the Vâlsan Gorge, covered with dense beech and spruce forests. The Glades are used by tourists, being a small, flat area, situated near the river.

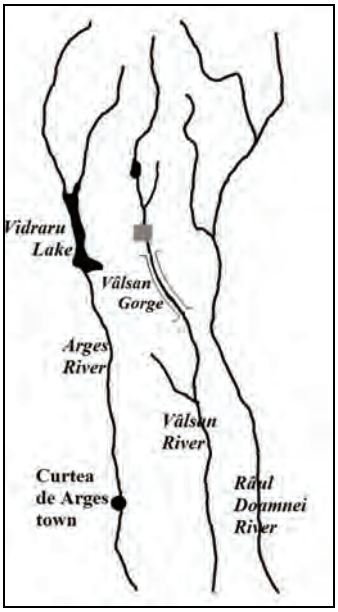

Figure 1. *P. parva* distribution locality in the Vâlsan River basin (■).

P. parva individuals were captured with a net used for frog capture, our objective being the green frogs, which present particularities in the region (COVACIU-MARCOV et al., 2014). Initially, we captured by chance a fish alongside a green frog. After that, we managed to capture other individuals. Even if beside the captured specimens we observed other individuals in areas unreachable with our net, *P. parva* was clearly less numerous than the native species.

Figure 2. *P. parva*`s habitat in Vâlsan Glades.

The altitude of *P. parva* population from Vâlsan Glades is unusual compared with the previous data from Romania (OȚEL, 2007). Nevertheless, not only the altitude is surprising, but in the first place the aspect of the habitats and of the surrounding areas. Thus, *P. parva* was recorded in Romania at a slightly lower altitude, but in fishponds from depression areas, where it was introduced (IMECS et al., 2014). Also, it was encountered at high altitudes in other areas in Europe (e.g. CIUTTI et al., 2014). Thus, in Vâlsan Glade alongside the altitude, the habitat characteristics, typical for mountain areas and its isolation upstream Vâlsan Gorge, which acts as an ecological barrier, is surprising. In the gorge the river has a very fast flow, steep slope, thus we can rule out *P. parva* natural distribution in Vâlsan Glades, as this species is negatively correlated with the current velocity (ONIKURA & NAKAJIMA, 2013). However, this species was recorded in Romania also in the Timiş River Gorge (BĂNĂDUC et al., 2013), but those gorges are much wider, much shorter and situated at only 300 m altitude. To our best knowledge, *P. parva* was previously registered in the Vâlsan only once, approximately 15 km downstream the gorges and the mountain sector (PERRIN et al., 1993). More recent studies mentioned the species only in the Argeş River, downstream its confluence with the Vâlsan River (URECHE et al., 2007). Moreover, even in 2011, when we searched for *Romanichthys valsanicola* Dumitrescu, Bănărescu & Stoica, 1957 downstream the gorges (TELCEAN et al., 2011), we did not encounter *P. parva*. In the mountain sector, the Vâlsan River is not favourable for this species.

The natural spreading of *P. parva* in Vâlsan Glades through the hydrographical network is practically impossible, the Vâlsan Gorge being an ecological barrier for this species. Thus, the only possible explanation for the presence of this apparently isolated population seems to be the direct introduction by people. This is plausible, *P. parva* being frequently unintentionally introduced (see in: GOZLAN et al., 2010), being recorded in areas where it seems difficult to spread naturally (e.g. WILDEKAMP et al., 1997). Nevertheless, if usually *P. parva* was accidentally introduced together with economically important fish-(e.g. BĂNĂRESCU, 1964; GRABOWSKA et al., 2010), here this fact is ruled out, because in the area there are not fishponds. Thus, in Vâlsan Glades, *P. parva* was intentionally introduced, probably by tourists, from amusement, ornamental reasons, because even its use as living bait (OTEL, 2007) is less plausible. We cannot exclude its introduction by the local people, because on the ridge between the Vâlsan and Argeş River basins there are some isolated ponds populated with *Carassius carassius*. Nevertheless, if *C. carassius* is consumed by the local people, *P. parva* cannot have the same importance. However, once introduced in Vâlsan Glades, *P. parva* seems to survive because it has remarkable plasticity and ecological flexibility (e.g. BEYER et al., 2007; ZÁHORSKÁ & KOVÁČ, 2009; JARIĆ et al., 2014).

The Vâlsan River fish fauna is known in the first place due to the endemic species *Romanichthys valsanicola*, which is present now only here (e.g. PERRIN et al., 1993; BĂNĂRESCU et al., 1995; TELCEAN et al., 2011). This species is present downstream Vâlsan Gorge, its last recording date being May 2011 (TELCEAN et al., 2011). Even if *P. parva* was encountered in the lower sectors of the Vâlsan River (PERRIN et al., 1993), in the last years in the river only native species were observed (URECHE et al., 2007; TELCEAN, unpublished data). This fact indicates the absence of appropriate studies upon the fish fauna from the Vâlsan River, and also the problem of the impact of invasive fish species upon the native biodiversity. Even if that danger cannot be ignored, *P. parva* from Vâlsan Glade seems to be isolated upstream the river sector populated by *R. valsanicola* and, it cannot reach that region because of the river gorge. Nevertheless, once *P. parva* was introduced even in an isolated location, this fact can be repeated with negative consequences for the native fauna, even if because of its ecological demands (e.g. OTEL, 2007) *P. parva* does not seem capable to use the habitat of *R. valsanicola*. Much concerning seems to be the presence of *P. parva* in the areas downstream the sector populated by *R. valsanicola* (PERRIN et al., 1993). Estimating the impact of *P. parva* upon *P. phoxinus* is difficult, but once *P. parva* was eliminated from a region, the native fish evolve better (BRITTON et al., 2009). The invasive potential of *P. parva* in the Vâlsan River can be accentuated if the river will be affected in the

future by hydro-ameliorative works. Especially, levelling and realising bottom sills can open huge opportunity for this and other non-native species to colonize the river.

In conclusion, the presence of *P. parva* in Vâlsan Glades is probably a consequence of human introduction. Nevertheless, the fact that it can survive at high altitudes in an unusual habitat indicates that the species can be capable to colonize other sectors from the hydrographical basin.

ACKNOWLEDGEMENT

Our study was made with the support of Freies Europa Weltanschauung Foundation, the custodian of the Vâlsan River natural protected area, which we want to thank in this way.

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Received: March 24, 2015
Accepted: May 5, 2015