

SOME NOTES ON THE HERPETOFAUNA FROM VÂLSAN RIVER NATURAL PROTECTED AREA, ROMANIA

Severus-D. COVACIU-MARCOV^{1*}, Alfred-Ş. CICORT-LUCACIU¹, Ilie C. TELCEAN¹,
Adrian PAL¹ & Istvan SAS-KOVÁCS¹

¹University of Oradea, Faculty of Sciences, Department of Biology; 1, Universităţii, Oradea 410087,
Romania. * Corresponding author – E-mail address: scovaciu@uoradea.ro

Abstract: In Vâlsan River natural protected area we identified 11 amphibian species (*Salamandra salamandra*, *Triturus cristatus*, *Ichthyosaura (Mesotriton) alpestris*, *Lissotriton vulgaris*, *Bombina variegata*, *Hyla arborea*, *Bufo bufo*, *Rana dalmatina*, *R. temporaria*, *Pelophylax ridibundus*, *P. lessonae*), the hybrid *Pelophylax kl. esculentus* and seven reptile species (*Lacerta agilis*, *L. viridis*, *Podarcis muralis*, *Zootoca vivipara*, *Anguis fragilis*, *Natrix natrix*, *Zamenis longissimus*). The green frogs are present here at higher altitudes than was usually recorded in Romania. They reach altitudes of 900 m a.s.l., in areas with coniferous forests. *P. lessonae* and *P. kl. esculentus* was encountered only in high areas. Despite its statute as a protected area, the amphibians and reptiles from the region are under a strong anthropogenic pressure, being affected by deforestation, road and direct mortality, road works.

Key words: amphibians, reptiles, distribution, conservation, Vâlsan River, Southern Carpathians

1. INTRODUCTION

In Romania the herpetofauna benefited of a good legal protection (O.U.G. 57/2007), most of the species being included in various protected areas (Ioja et al., 2010). However, the protection of the herpetofauna is far from efficient, the protected areas network from Romania being less effective (Ioja et al., 2010). One of the possible explanations of this situation can be given by the low accessibility of scientific data, which represents a major limitation in establishing the conservation priorities (Cogălniceanu & Cogălniceanu, 2010). One area of Romania where data is very scarce is the Vâlsan River Natural Protected Area. This area is known in the scientific literature mostly through one emblematic fish species, *Romanichthys valsanicola* (Telcean et al., 2011). The situation is a consequence of the great importance of this species, but also because of the rarity of studies regarding other groups of animals. Even if in Romania studies upon amphibians` and reptiles` distribution were generally made in protected areas (Cogălniceanu et al., 2013a,b), this is not the case of Vâlsan River. As such, the goal of our study was to analyze the herpetofauna from Vâlsan River hydrographic basin.

2. MATERIAL AND METHODS

The fieldwork was realized in the years 2010, 2011, 2012 and 2013, the 14 field days allowing us to form a preliminary image of the region's herpetofauna. The Vâlsan River, tributary to the Argeş River (Ujvári 1972), is situated to the south of the Făgăraş Mountains, passing some mountains and hilly areas. Most of its inferior and middle course passes through localities, its basin being bordered by hills which grow in height as we go farther north. Upstream from Brădetu locality, the Vâlsan River enters its mountain sector, an area without human settlements. After this point the river passes through a gorge section (Vâlsan Gorges), farther reaching a wider area known by the local people as the Vâlsan's glades, an area intensively used by tourists. Upstream from the glades there's a dam and a lake and it is here that the river receives an important tributary – the Dobroneag. We investigated a large part of the Vâlsan River basin, from its junction with the Argeş River all the way to over 1200 m altitude. Alongside the direct observation of live animals, we also determined the victims of road traffic. We investigated 29 locations, some represented by localities, some by important and easily identifiable

areas from the sector without human settlements (Table 1).

3. RESULTS

In Vâlsan River basin we identified 18 herpetofauna species. Out of these, amphibians are represented by 11 species: *Salamandra salamandra*, *Triturus cristatus*, *Ichthyosaura (Mesotriton) alpestris*, *Lissotriton vulgaris*, *Bombina variegata*, *Hyla arborea*, *Bufo bufo*, *Rana dalmatina*, *R. temporaria*, *Pelophylax ridibundus*, *P. lessonae*; and reptiles by seven species: *Lacerta agilis*, *L. viridis*, *Podarcis muralis*, *Zootoca vivipara*, *Anguis fragilis*, *Natrix natrix*, *Zamenis longissimus*. In addition, we also identified *P. kl. esculentus* in the region. The species are distributed unevenly in the 29 locations. We managed to indicate 156 distribution points for the herpetofauna (Table 1).

In the studied region the green frogs (*P. lessonae*, *P. ridibundus*, *P. esculentus*) are present at higher altitude than they were generally mentioned in Romania. With the exception of the green frogs, the herpetofauna of the investigated region is one typical for high altitudes in Romania, the identified species being either typical for hill or mountain areas or being widespread in the country. Moreover, most of the species identified in the region are tied, directly or indirectly, to woodland areas.

4. DISCUSSIONS

The most important particularity of the herpetofauna from the Vâlsan River basin is conferred by the green frogs. In the area, all three forms that live in Romania were identified: *P. ridibundus*, *P. lessonae* and the hybrid between them, *P. kl. esculentus*. Areas in Romania where all three forms appear together are quite few (Covaciu-Marcov et al., 2007, Sas, 2010, Sas et al., 2010). Also the green frogs are present at higher altitudes than they were usually encountered in Romania. Normally for Romania, the green frogs are distributed in lower, hilly or plain regions (Covaciu-Marcov et al., 2007, 2009a, Sas 2010). In the past, *P. ridibundus* was identified up to 600m altitude (Cogălniceanu et al., 2000). However, in the country the *P. kl. esculentus* complex was recorded even at higher altitudes, although even in the most recent review from Romania *P. ridibundus* and *P. kl. esculentus* were not presented separately (Cogălniceanu et al., 2013a). In the Vâlsan River basin we identified the species up to 900 m altitude. The habitats populated by the green frogs in the Vâlsan glades are vast, represented by wide, interconnected pond areas formed around

streams that flow into the Vâlsan River. These have a rocky substrate and are situated mostly in coniferous forests, despite the fact that the green frogs seem typical to afforested, wet plains (Covaciu-Marcov et al., 2007, 2008, Strugariu et al., 2008, Sas, 2010). Right on the ridge between the hydrograph basins of the Argeş and Vâlsan Rivers, the green frogs use large, permanent pools, supplied by sulphurous springs and surrounded by reeds. Here, large populations were found.

P. lessonae and *P. kl. esculentus* seem to have a distribution limited to higher areas. *P. ridibundus* is on the other hand distributed throughout the whole basin, having larger populations in the inferior sector. It appears to be absent from the Vâlsan Gorge, but reappears again, in the Vâlsan glades. The absence of *P. lessonae* and *P. kl. esculentus* from the inferior and middle sectors of the Vâlsan River is difficult to explain, especially since they are characteristic for wet habitats from low altitude regions (Covaciu-Marcov et al., 2007, Sas, 2010). The distribution of the two species is probably a consequence of their past in the region. *P. lessonae* and *P. kl. esculentus* don't inhabit the lower sectors, because they probably did not pass through there after the last glacial maximum. Thus, it is possible that the *P. lessonae* and *P. kl. esculentus* populations from the upper region of the Vâlsan River have survived here in the last glacial maximum. This fact is suggested by their relationship with altitude different than other populations from Romania. This supposition is supported by the recent discovery of a group of *P. lessonae* from high altitude (not that high as this one) in the neighboring basin of the river Râul Doamnei (Covaciu-Marcov et al., 2010). The fact that the populations south of the Făgăraş Mountains and those identified in Olt River area (Vancea et al., 1989, Iftime & Iftime, 2007) form a distinct group, probably isolated from other populations from Romania, was previously suggested (Covaciu-Marcov et al., 2010). Identifying the group from Vâlsan River Basin seems to confirm those presumptions. In opposition, *P. ridibundus*, widespread in the region, most likely ascended from the south once the climate got warmer. These suppositions are supported by the data regarding the Carpathian Mountains as a glacial refuge (Babik et al., 2005, Ursenbacher et al., 2006, Feurdean et al., 2007, Fijarczyk et al., 2011).

The newts are generally represented by large populations, but the species were found in three levels in terms of altitude and the area's characteristics. *I. alpestris* is located strictly in the superior sectors, being absent at altitudes of under 800 m.

Table 1. The distribution of amphibian and reptile species in the Valsan River hydrographic basin

Ss=*S. salamandra*, **Tc**=*T. cristatus*, **Lv**=*L. vulgaris*, **Ia**=*I. alpestris*, **Bv**=*B. variegata*, **Ha**=*H. arborea*, **Bu**=*B. bufo*, **Pr**=*P. ridibundus*, **Pl**=*P. lessonae*, **Pe**=*P. kl. esculentus*, **Rd**=*R. dalmatina*, **Rt**=*R. temporaria*, **La**=*L. agilis*, **Lv**=*L. viridis*, **Pm**=*P. muralis*, **Zv**=*Z. vivipara*, **Af**=*A. fragilis*, **Nn**=*N. natrix*, **Zl**=*Z. longissimus*,

Locality	Ss	Tc	Lv	Ia	Bv	Ha	Bu	Pr	Pl	Pe	Rd	Rt	La	Lv	Pm	Zv	Af	Nn	Zl
Brădetu	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-
Upstream Brădetu towards the gorge	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
Upstream Brădetu towards Nucșoara	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	X	X
Vâlsan Gorge, abandoned mines	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-	-
Valsan glades	-	-	X	X	X	X	X	X	-	X	-	X	X	-	-	X	-	-	-
End of the gorge towards Valsan glades	-	-	-	-	X	X	X	-	-	-	-	X	X	-	-	X	-	-	-
Valsan glades, stream near a motel	-	-	-	-	X	-	X	-	-	-	-	X	X	-	X	X	-	-	-
Valsan glades, upper limit	-	-	-	X	X	-	X	X	-	X	-	X	X	-	-	X	X	-	-
Dobroneag confluence with Valsan	-	-	X	X	X	-	X	-	-	-	-	X	X	-	-	X	-	-	-
Chalet at Dobroneag	X	-	X	X	X	-	X	-	-	-	-	X	X	-	-	X	-	-	-
Dobroneag affluent	X	-	-	X	X	-	X	-	-	-	-	X	-	-	-	X	-	-	-
Military base, near Dobroneag	X	-	X	X	X	-	X	-	-	-	-	X	X	-	-	X	-	-	-
Vâlsan dam	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-
Upstream end of the dam	X	-	-	-	X	-	-	-	-	-	-	X	X	-	-	X	-	X	-
Mușătești	X	-	X	-	X	-	X	-	-	-	X	X	-	-	X	-	-	X	X
Mușătești towards Vâlsânești	X	-	X	-	-	X	-	X	-	-	X	-	-	-	-	-	-	-	-
Robaia monastery	X	-	X	-	X	-	X	-	-	-	-	X	-	-	X	-	-	-	-
Vâlsânești near the road	-	X	X	-	-	-	-	X	-	-	X	-	X	-	-	-	-	-	-
Vâlsânești near Vâlsan	-	-	-	-	X	-	-	X	-	-	-	-	-	X	-	-	-	-	-
Toplița	X	X	X	-	-	X	X	X	-	-	X	-	-	X	-	-	-	-	-
Road ramification to Toplita	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Bunești	-	X	X	-	X	X	-	X	-	-	X	-	-	-	-	-	-	-	-
Vâlsan confluence with Argeș	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Zănești	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	-
Upstream Mălureni	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Stroiști	-	-	-	-	X	-	-	X	-	-	-	-	-	X	-	-	-	-	-
Galeșu	-	-	-	-	X	-	X	-	-	-	X	-	-	-	-	-	-	-	X
The limit of the hydrographic basin, road to Curtea de Argeș	-	-	-	-	X	X	X	-	-	-	X	-	-	-	-	-	-	-	-
Peak between Vâlsan – Argeș basins	-	X	X	-	X	-	-	X	X	X	X	-	X	-	-	X	X	-	-
The total no. of the identified points / species	8	4	11	6	19	6	15	10	1	3	8	15	11	5	5	11	2	3	3

In the highlands of the Vâlsan River, the alpine newt inhabits all the water bodies, due to the abundance of the breeding habitats, unlike the situation in the neighboring areas of the Argeş River where the species is rare (Iftime, 2005). *T. cristatus* is probably missing from the area upstream the gorge not because of the altitude, but most likely due to the steepness of the slopes and the lack of breeding habitats. The same reasons have been invoked for the absence of the species from the Danube's Gorge (Covaciu-Marcov et al., 2009b). This fact is proven by the presence of the crested newt at identical altitudes, on the plateau from the edge between the basins of Argeş and Vâlsan Rivers, where it finds suitable habitats. Furthermore, in Romania *T. cristatus* was identified at higher altitudes (Cogălniceanu et al., 2013a).

Z. vivipara occupies a similar territory to *I. alpestris*, being abundant in the area upstream from the gorge section. Around the superior limit of the gorge and also in the Vâlsan glades, it cohabits with *P. muralis*. This last species reaches high altitudes taking advantage of this narrow gorge which provides favorable habitats. Thus, the two species overlap for about 2 km, a situation documented for only a few other places in Romania (Ghira et al., 2002, Gherghel et al., 2008).

Although the investigated area mostly overlaps the Vâlsan River natural protected area, the anthropogenic impact on the herpetofauna is relatively strong. Two main activities have the worst impact on the herpetofauna: forest clearings and road works. Aside from their direct effect, forest clearings have another indirect outcome: as they drag logs out of the forests, the trucks and other equipment they use run through the amphibians' breeding habitats, damaging or destroying them. Furthermore, forest clearings affect the herpetofauna also by increasing the frequency of road killings. Road killings are a general threat for herpetofauna's species in Romania (e.g. Hartel et al., 2009, Cicort-Lucaciu et al., 2012, Covaciu-Marcov et al., 2012, Sas & Cicort-Lucaciu 2012, Bogdan et al., 2013). Among the amphibians, the most affected species are: *B. bufo*, *S. salamandra*, *B. variegata*, *H. arborea* and also the brown frogs, while among the reptiles *A. fragilis* and all the snakes fall into the same category. An important impact is represented by the changes brought to the small aquatic habitats from alongside the roads as a result of road works upstream from the gorge section. One of the most affected species *B. variegata* has a high conservation value (O.U.G. 57 / 2007), yet its habitats are still being destroyed. In addition, these habitats are also used by the green frogs, whose presence has a great

zoogeographic importance. An indirect impact is that of the tourists which in some areas, mostly the Vâlsan glades, affect the herpetofauna with the wastes that they leave behind. Similar human interventions lead in other regions to the decline of amphibian populations (Bonk & Pabijan 2010).

Although this type of faunistic studies don't usually bring spectacular results, they represent an essential step in understanding the biodiversity of a certain region, the usage of such scientific data in conservation and management becoming more and more important (Seavy & Howell, 2010). Thus, such researches represent important work tools for the custodians of protected areas and in the end for the protection of a group with such a high conservational value as the herpetofauna. Even if recently in Romania numerous studies upon the distribution of amphibians and reptiles were realized, there are still improperly investigated regions, like the southern parts of the country where new studies are needed (Cogălniceanu et al., 2013a,b). Probably, all due to the conservative importance of the group, studies upon the distribution of amphibians and reptiles were also made recently in other areas of south-eastern Europe (e.g. Jablonski et al., 2012, Sterijovski et al., 2014).

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