

THE HERPETHOFAUNA OF THE NORTH-WESTERN REGION OF SĂLAJ COUNTY, ROMANIA

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INTRODUCTION

Romania's herpetofauna is until now insufficiently known, with very little data referring to its composition and geographical spreading in comparison with the western Europe countries (Gasc et al 1997). Sălaj County was not an exception, existing little information about its herpetofauna. Few characteristics of the county's herpetofauna are mentioned in the volumes referring to the herpetofauna of the P. R. of Romania (Fuhn 1960, Fuhn & Vancea 1961). Later on, data about the amphibians of the region are included in the Amphibians of Romania monograph (Cogalniceanu et al 2000). However, in the specialty literature there is one work dedicated entirely to the herpetofauna of Sălaj County (Ghira & Ghile 1999). Afterwards, this data was included in a much wider work dedicated to the herpetofauna of Transylvania (Ghira et al 2002). Yet the herpetofauna of Sălaj County remains uncertain, not being as investigated as other regions from the western part of Romania, regions like Bihor (Covaciu - Marcov et al 2000, 2002, 2003 a, b, c) or Satu - Mare Counties (Covaciu - Marcov et al 2004 a, 2005). All that said, we set off to analyze the composition and the geographical spreading of Sălaj County's herpetofauna, this work containing the results of the studies made in the north - western part of this region.

MATERIAL AND METHOD

The studied region is situated in the north - western part of Sălaj County (Fig. 1), at its borderline with Bihor and Satu - Mare Counties (Tufescu 1987). The north - western part of Sălaj County is a hilly area, limited to the north by Crasna River and to the south by Barcău River (Bassa et al 1995). Near these rivers segments of meadows with the shape of some plain gulfs are drawing out among the hills, their altitude not surpassing 200 m. The biggest height in the region is of 500 m and it occurs in the Șimleu Knoll.

The study took place between 2004 and 2005. For the charting of the herpetofauna we used the transects method (Cogalniceanu 1997), making many trips in each investigated locality. Most of the species were determined directly, without capturing them,

using the direct observation method (Brown 1997). Only when it was necessary, the animals were captured but mostly by hand. In their aquatic period, the amphibians were captured with a square drag or using a round net mounted on a long metallic pole. After identification, the animals were set free in their habitat of origin. In the establishing of the composition and the geographical spreading of the herpetofauna from the region for study we also took into consideration the dead animals that we came across, killed either by cars or by locals. For every species that we encountered we made a list with all the localities where we observed it. The final list contains the new identified localities, in one locality from the territory meeting more species of amphibians and reptiles.

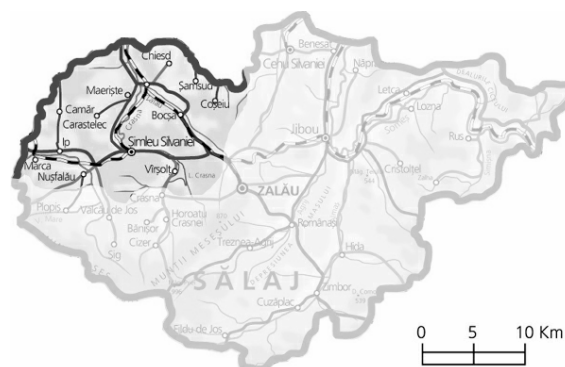


Fig. 1. The studied region in the NW part of Sălaj county

RESULTS AND DISCUSSIONS

In the region for study we came across 15 species from the herpetofauna. Among these, 10 species belong to amphibians and 5 to reptiles. The identified amphibian species are: *Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Bombina bombina*, *Bombina variegata*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana ridibunda* and *Rana dalmatina*. In the region there are also natural hybrids between two species of amphibians: *Bombina bombina* and *Bombina variegata*. The 5 reptile species found by us in the north - western part of Sălaj County are: *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Natrix natrix* and *Coronella austriaca*.

Analyzing the presence of the 15 species and the hybrids between the amphibian species in the 34 investigated localities (Table 1), it is easy to see that we identified 261 localities for the herpetofauna. 204 of these are new localities for Romania's herpetofauna. To establish the statute of the identified localities (new localities, localities in which the species has been cited before, being found again or not by us) we used as reference point the most recent article about the geographical distribution of Transylvania's herpetofauna (Ghira et al 2002).

Among the 10 amphibian species, one was encountered as a premiere for the investigated region.

We are talking about the common newt, *Triturus vulgaris*, a widespread species in all Romania (Cogalniceanu et al 2000). This fact underlines the very little previous information about the herpetofauna of the studied region. Hybrids between *Bombina bombina* and *Bombina variegata* are identified for the first time in this region, too, their presence representing a novelty for the county. Among the reptiles, two species haven't been documented in the region prior to our study: *Zootoca vivipara* and *Coronella austriaca*. *Zootoca vivipara* is identified for the first time in Sălaj County, too.

Table 1. The identified amphibian and reptilian species in the studied region

	<i>Ss</i>	<i>Tv</i>	<i>Tc</i>	<i>Bb</i>	<i>Bv</i>	<i>BX</i>	<i>Pf</i>	<i>Buf</i>	<i>Buv</i>	<i>Ha</i>	<i>Rr</i>	<i>Rd</i>	<i>La</i>	<i>Lv</i>	<i>Zv</i>	<i>Ca</i>	<i>Nn</i>
Bădăcin	X	X	X	-	X	-	-	X	-	-	X	X	-	X	-	-	X
Bîlghez	-	X	-	-	X	-	X	X	-	-	X	X	X	-	-	-	-
Bobota	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X
Bocșa	O	-	S	X	O	-	-	S	O	-	S	S	S	-	-	-	-
Camăr	-	-	-	-	X	-	-	X	-	-	X	-	X	X	-	-	-
Carastelec	-	-	X	-	-	X	X	-	-	-	X	X	X	X	-	-	X
Câmpia	-	X	X	X	-	X	-	-	-	-	X	-	X	-	-	-	X
Cehei	X	-	X	-	X	-	-	X	-	-	X	X	-	X	-	-	X
Chieșd	-	X	-	-	X	-	-	X	-	-	X	X	-	X	-	-	-
Criștelec	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
Derșida	O	X	S	X	O	-	S	S	X	X	S	S	S	-	-	-	S
Doh	-	-	-	-	X	-	-	-	-	-	X	-	X	X	-	-	-
Dumslău	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Giurtelecu Șimleului	-	X	X	X	-	-	-	X	-	-	X	X	X	-	-	-	-
Ilișua	X	X	X	-	X	-	-	-	-	-	-	X	-	X	-	X	X
Ip	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
Leșmir	-	-	X	X	-	X	-	X	-	-	X	X	X	X	-	-	X
Lompirt	-	X	X	X	-	X	-	-	-	-	X	X	X	-	-	-	X
Mălădia	-	-	-	X	X	-	-	X	-	X	X	X	X	X	-	-	X
Măeriște	-	X	X	X	X	X	X	X	-	X	S	X	X	X	X	-	-
Moiad	-	X	X	X	-	X	X	X	X	-	X	X	X	-	X	-	-
Nușfalău	S	X	S	X	S	X	X	S	O	O	S	S	S	O	-	-	S
Porț	-	X	X	-	-	-	-	-	-	-	X	X	X	-	-	-	-
Sălăjeni	O	X	S	X	O	X	-	-	-	-	S	S	S	-	-	-	X
Sărmășag	O	X	S	X	S	X	X	S	S	-	S	S	S	O	X	-	X
Sighetu Silvaniei	-	X	X	-	X	-	-	X	-	-	X	X	-	-	-	-	-
Șamșud	-	-	-	O	X	-	-	-	-	-	-	S	-	X	-	-	-
Șimleu Silvaniei	S	X	S	-	S	-	-	S	O	S	S	S	S	S	-	-	S
Șumal	-	-	X	X	-	X	-	X	X	X	-	X	X	X	-	-	X
Uileacu Șimleului	-	-	-	X	-	-	-	X	-	-	X	X	X	-	-	-	-
Valea Pomilor	-	-	X	X	X	X	-	-	-	-	-	X	-	X	-	-	-
Zalnoc	-	-	-	-	X	-	-	-	-	-	X	X	X	-	-	-	-
Zăuan	-	-	X	X	-	-	X	X	-	-	X	-	-	X	-	-	-
Zăuan Băi	-	-	-	-	X	-	-	X	-	-	X	-	X	X	-	-	-
Σ X	3	17	16	17	15	12	8	18	4	5	20	19	17	16	4	1	12
Σ S	2	-	6	-	3	-	1	5	3	1	7	7	6	1	-	-	3
Σ O	4	-	-	1	3	-	-	-	1	1	-	-	-	2	-	-	-

Legend:

S.s.- *Salamandra salamandra*, *T.v.*- *Triturus vulgaris*, *T.c.*- *Tr. cristatus*, *B.b.*- *Bombina bombina*, *B.v.*- *Bombina variegata*, *B.x.*- *Bombina bombina* X *Bombina variegata*, *P.f.*- *Pelobates fuscus*, *Buf.*- *Bufo bufo*, *Bu.v.*- *B. viridis*, *H.a.*- *Hyla arborea*, *R.r.*- *Rana ridibunda*, *R.d.*- *Rana dalmatina*, *L.a.*- *Lacerta agilis*, *L.v.*- *Lacerta viridis*, *Z.v.*- *Zootoca vivipara*, *N.n.*- *Natrix natrix*, *C.a.*- *Coronella austriaca*)

Σ X – the sum of new localities for Romanian herpetofauna

Σ S – the sum localities in which was signalized the species and was founded by us too

Σ O – the sum localities in which was signalized the species and wasn't founded by us too

Salamandra salamandra (Linnaeus 1758) is present exclusively in the afforested hilly areas, at altitudes of over 200 m, similar to other regions of the country (Cogalniceanu et al 2000). We came across few samples even in Șimleu Knoll, which is mostly covered by forests. This fact is probably

caused by the knoll's characteristics, with steep slopes that don't allow water accumulations, compulsory aspect for the evolution of the Salamander's larvae. The fact that the streams have very reduced flow is a consequence of the steep slopes and the small surface of the knoll, as well.

Thus, in the very rare springs or in the permanent swampy areas from the knoll numerous larvae can be found, larvae that are consumed by the domestic birds (ducks and geese) if the ponds are near localities. In many hill sectors, the species is extinct due to massive woodcutting.

Triturus vulgaris (Linnaeus 1758) is well represented in the north – western part of Sălaj County. It reproduces in almost all still water biotopes from the investigated region. In the depressions it can be found in different types of pools and channels, but in the hilly areas, and especially in the Șimleu Knoll, it occurs in small temporary ponds.

Triturus cristatus (Laurenti 1768) is common in the area of study. Generally it populates large habitats, rich in vegetation. In some cases it breeds in the drains alongside the roads. In the Șimleu Knoll the species is rare because of the lack of breeding biotopes. At Bădăcin, for example, we found the species breeding in temporary ponds from alongside a forest road, together with *Triturus vulgaris*, although the crested newt prefers large habitats (Cogalniceanu et al 2000). These last mentioned ponds have a diameter not bigger than 1 m and a depth of not more than 30 cm.

Bombina bombina (Linnaeus 1761) is frequent in this region, occupying a disjunctive areal. It populates on one side the Barcău Depression and on the other side the Crasna Depression. It is missing from Piemontul Șimleului, a high sector lying between the hydrographic basins of the Barcău and Crasna Rivers, and from the hills, too, being a characteristic species for the lowlands from the Central and Eastern Europe (Arntzen 1978). It is spread at altitudes of fewer than 200 m. It exclusively populates the flat relief sectors, situated in the immediate vicinity of water flows, ascending alongside these deep into the hills, just like in the northern part of Bihor County (Covaci – Marcov et al 2003 d, 2004 b).

Bombina variegata (Linnaeus 1758) is well represented in the north – western part of Sălaj County. It inhabits only the hilly areas, descending until 200 m. Its areal is larger than the one of the above mentioned species' due to the wider surface of the hill sectors. It populates different aquatic biotopes, the most typical ones being the large temporary pools from the afforested areas. These don't have any aquatic vegetation, although it is considered that the presence of the vegetation is favorable to the species (Di Cerbo 2001). It is absent from vast habitats, being one of the few amphibian species present in the cleared areas and the ones degraded by grazing.

Bombina bombina X *Bombina variegata*. In the investigated region we identified many hybrid populations between the two species. This fact is caused by the great length of the contact area between the areal of the two species, as consequence of the mosaic shape of the relief, which is composed by high areas populated by *Bombina variegata* and low, depressionary areas populated by *Bombina bombina*. The two species hibernate in all the contact

areas of their areals, similar to other regions of Europe (Szymura 1993). The hibernating area is situated at the borderline between the hills and the depressions, corresponding to the plain relief's upper limit, at altitudes of about 200 m, comparable with other regions from western Romania (Covaci – Marcov et al 2000, 2002, 2003 a, b, 2004 a, 2005, Vesea et al 2004). In the studied region, the hybrids mostly occur in mixed populations, next to individuals with more characteristics of one of the parental species. As a result, it appears that in the north – western part of Sălaj County there is a mosaic type hybridizing area.

Pelobates fuscus (Laurenti 1768) is relatively rare in the studied region, mostly because of its relief, which is dominated by hills. In many cases, the substratum is made of hard rocks, presenting a crystalline foundation (Oncescu 1959) that doesn't allow the existence of a digging species attached to the plain areas (Fuhn 1960). It is spread entirely in the depressionary areas. In the spring we stumbled upon some road killed samples near the village of Nusfalau.

Bufo bufo (Linnaeus 1758) is a common species, widespread in the investigated region. The species is bonded to the afforested areas, but it can be found in clear sectors, too, if these have a high level of humidity. This is why it is present in the swamps or the wetlands from near water flows. In the spring, it is the species most affected by traffic, hundreds of specimens being found dead on the roads.

Bufo viridis (Laurenti 1768) is much rarer than *Bufo bufo*. We came across the species only in the low depressionary areas. This fact is probably caused by the species ecological needs. *Bufo viridis* is a thermophile postglacial immigrant, which reaches Romania from steppe areas coterminous to the Caspian Sea in a warmer period of the postglacial (Stugren 1957). Just like the previous species, we encountered many dead samples killed on the roads.

Hyla arborea (Linnaeus 1758) is relatively infrequent in the north – western part of Sălaj County. This fact is probably a consequence of the hidden arboreal life of the common tree frog, the species being encountered on the ground only in the beginning of the spring and in October (Kovács & Török 1997). The species is present both in the hill sectors and the depressionary areas coterminous to the Barcău and Crasna Rivers. The identified populations live in the vicinities of some afforested areas.

Rana ridibunda (Pallas 1771) is widespread in this area as well as in other north-western regions of Romania (Covaci – Marcov et al 2000, 2002, 2003 a, b, c, 2004, 2005 a). It is present both in depressionary sectors, where we found the most numerous populations and also in the hilly ones, where a reduced number of specimens ascend along the valleys. It populates various habitats, being present in marshes, rivers, channels, plashes, and also in the temporary puddles and brooks with reduced flow capacity and stony substratum from Șimleu Knoll.

Rana dalmatina (Bonaparte 1839) is common in the studied region of Salaj County. It is present not only in the depressionary sectors but also in the hilly ones, becoming rare or being absent from the cleared-land hilly zones. In the depressionary areas it inhabits marshes and wetlands while in the hill sectors it can be found in forests.

Lacerta agilis (Linnaeus 1758) is the most common species of lizard from north-western Sălaj. It populates a large variety of habitats (skirts of a forest, sides of roads or railways, areas coterminous to water courses and marshes).

Lacerta viridis (Laurenti 1768) is well represented but rarer than the precedent. It is absent from the low depressionary regions, being prevalent in the hilly zones. This species populates the skirts of forests with bushy vegetation, the edge of the roads neighboring them and also hilly cleared-land slopes, covered by bushes, similar to other north-western regions of Romania (Covaciu – Marcov et al 2000).

Zootoca vivipara (Jacquin, 1787) is a very rare species, being located only in four places from Crasna meadow. Before our study the species was documented neither in the studied region nor in the Sălaj County. In Romania, *Zootoca vivipara* was considered in the past as a mountain species (Fuhn & Vancea 1961) although the plain populations have been known for a long time in the neighbors of our country (Kopany 1950, Lac & Kluch 1968, Dely 1978 a, b). Recently, populations in the lowlands have been pointed out in Romania, too, both in the Western Plain (Ghira et al 2002, Covaciu - Marcov et al 2002, 2004 a, 2005) and in the northern part of the Moldovei Plain (Covaciu – Marcov et al 2003 e). In the studied region the species is not present in the hilly regions only in the lower sectors of the Crasna meadow. In the north - western parts of Sălaj County, *Zootoca vivipara* populates only the habitats with a high level of humidity. It is present in the swamps and the puddles coterminous to the Crasna River and to its channel system.

Coronella austriaca (Laurenti 1768) is rare in the studied region, being found only in one place, in the wooded sector of the Șimeu Knoll. The species is amenable to a strong pressure from the human activities, being killed by the locals because they consider it as being poisonous.

Natrix natrix (Linnaeus, 1758) is a common species in the north-western region of Sălaj County. It populates both depressionary areas and the hill sectors but it prefers the humid wetlands located near water courses.

CONCLUSIONS

In the north – western part of Sălaj County we came across 15 species of the herpetofauna along with hybrid populations between *Bombina bombina* and *Bombina variegata*. We identified for the first time ever for this region one species of amphibians (*Triturus vulgaris*), hybrids between the two species of the *Bombina* genus and two species of reptiles (*Zootoca vivipara* and *Coronella austriaca*). As a

premiere for Sălaj County we identified populations of *Zootoca vivipara*. These occur at altitudes of about 200 m. inhabiting swamps and the wetlands from the Crasna meadow. In the 34 investigated localities we identified 261 spreading localities for the herpetofauna. Among these, 204 are new localities for Romania's herpetofauna. The amphibian species from the north – western part of Sălaj County are well represented, with large populations, being identified in numerous localities. Among the lizards, *Zootoca vivipara* is the only one present in few localities, while among the snakes, *Coronella austriaca*, observed only in one site. The regions with a special herpetofauna are the wetland from the Crasna meadow, here living populations of *Zootoca vivipara*. Under a negative aspect, areas like the numerous completely cleared hills, strongly damaged by overgrazing, unfortunately stand out. In these regions the herpetofauna is strongly affected, in most of the cases the species becoming extinct.

REZUMAT

În anii 2003 și 2004 am studiat compoziția și răspândirea geografică a herpetofaunei nord - vestului județului Sălaj. Am întâlnit 10 de *Amfibieni* (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Bombina bombina*, *Bombina variegata*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana ridibunda*, *Rana dalmatina*) și 5 specii de *Reptile* (*Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Natrix natrix* și *Coronella austriaca*). În regiune sunt prezenți hibrizi între *Bombina bombina* și *Bombina variegata*. În premieră în județul Sălaj am identificat populații de *Zootoca vivipara*. Acestea sunt prezente la altitudini de aproximativ 200 de m, populând mlaștinile și zonele umede din lunca Crasnei

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