

The herpetofauna from the Teuz River hydrographic basin (Arad County, Romania)

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Abstract. In the Teuz River hydrographic basin from the western part of Romania we encountered 15 species of amphibians (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Triturus dobrogicus*, *Triturus alpestris*, *Bombina bombina*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Pelobates fuscus*, *Rana ridibunda*, *Rana lessonae*, *Rana dalmatina*, *Rana temporaria*), 8 species of reptiles (*Emys orbicularis*, *Lacerta agilis*, *Lacerta viridis*, *Podarcis muralis*, *Anguis fragilis*, *Natrix natrix*, *Coronella austriaca*, *Vipera berus*) and hybrids between *Triturus cristatus* and *Triturus dobrogicus*, *Bombina bombina* and *Bombina variegata* plus some *Rana kl. esculenta*. *Rana lessonae* is signaled for the first time ever in Arad County, the Igneşti area representing hence forth the farthest southern limit of the species' spreading in the western Romania. *Vipera berus* comes down to 200 m in altitude in the wetlands from Igneşti. Around the Hills of Mărăuş and Teuz, *Triturus alpestris* comes down to 200 m as well, reaching in the Craiva – Şiad region the lowest altitude that it has ever been identified at in Romania: 150m.

Key words: herpetofauna, Teuz river, *Triturus dobrogicus*, *Rana lessonae*, *Vipera berus*

Introduction

The aim on our study was to establish the composition and the geographic distribution of the herpetofauna of the Teuz River hydrographic basin region from the northern part of the Arad County. Prior to this, there were no studies upon the herpetofauna of this area, in the literature existing very scarce data, included in wider ranged manuscripts (Ghira et al. 2002). In the volumes of the Fauna of R. F. R., referring to amphibians and reptiles (Fuhn 1960, Fuhn & Vancea 1961) there is absolutely no information about the

herpetofauna of this region. Even in the book about amphibians of Romania (Cogălniceanu 2000) there aren't any indicated localities from the Teuz River hydrographic basin, underlining the lack of information about the herpetofauna of this area. Establishing the geographic spreading of Romania's herpetofauna is a major necessity in order to realize an effective protection for it (Ghira et al. 2002). The herpetofauna of Arad County, and of Romania in general, was very little studied in the past. Until the year 2000, *Rana temporaria*, one of the most common species of amphibians in Europe (Meyer et al. 1998), widely spread

in the highlands of Romania, has not been pointed in any locality from Arad County (Cogălniceanu et al. 2000). The lack of information about the herpethofauna of Romania is in complete opposition with the entire Western Europe, where the spreading of the herpethofauna is almost completely known (Gasc et al. 1997). Thus, we set of to eliminate a white spot from the map of the geographical spreading of Romania's herpethofauna by approaching the herpethofauna of the Teuz River hydrographic basin region from Arad County.

Material and Methods

The hydrographic basin of the Teuz River is situated in the northern part of Arad County, at the borderline with the Bihor County, in the western part of Romania (Fey et al. 2001). The Teuz River is a left side tributary of the Crișul Negru River (Tufescu 1986). The altitude of the investigated region grows from the west to the east. In the eastern part of the area there is a plain sector belonging to the Crișurilor Low Plain and the Cermei Plain, while in the west there are the Codru - Moma Mountains, separated from the plain by the Mărăuș and Teuz Hills (Posea & Badea 1984). The maximum altitude is that of

Pleșu Peak from the Codru - Moma Mountains: 1112 m.

Our study took place between 2001 and 2005. We used the transects method (Cogălniceanu 1997), making numerous surveys, in all the five years of our study, in each investigated locality. The animals were determined mostly directly, without the necessity of capturing them. When the capture of some specimens was compulsory, it was usually made by hand. Amphibians in their aquatic period were captured with the help of rectangle drags or using round nets mounted on long metallic poles. After determining the captured species, they were set free in their habitats of origin.

The hybrids were determined after their the morphological and chromatic characteristics, the determination being made after main features and measurements indicated in the specialty literature (Fuhn 1960, Berger 1966, 1973, Stugren 1980, Szymura 1993, Csata 1998, Cogălniceanu et al. 2000, Ghira & Mara 2000). An important role in the charting of the herpethofauna of the investigated region was played by the dead animals that we found, killed either by local people or by cars. For each determined species we made a list with all the localities where the species have been encountered. The final list contains the newly investigated localities, because in a certain locality from the territory we came across more species of amphibians and reptiles.

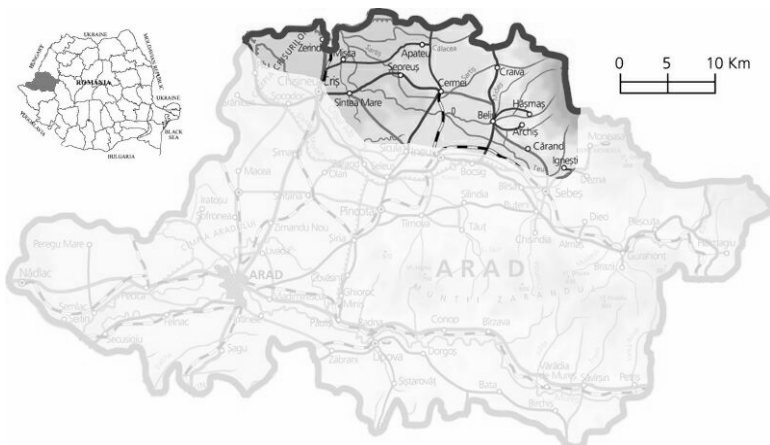


Figure 1.
The studied region
in Arad County
(Romania)



Figure 2. Aspect of The Teuz Hills

Results

In the Teuz River hydrographic basin we identified 15 species of amphibians, 8 species of reptiles and 3 hybrids between the species of amphibians. We analyzed the distribution of the 23 species and the three hybrid form in all the 50 localities from the Teuz River hydrographic basin region. We identified 470 localities for the species that we found in the 50 localities from the region (Table 1). Among these, 438 are new localities for the herpetofauna of Romania.

Some species of amphibians and reptiles are indicated as a premiere for the investigated area, one of them, *Rana lessonae*, being signaled for the first time in Arad County. Amongst the amphibians, the species that are indicated in premiere for the Teuz River hydrographic basin are: *Triturus dobrogicus*, *Triturus alpestris*, *Rana lessonae* and *Rana temporaria*. Amongst the reptiles, we identified for the first time the following species: *Podarcis muralis* and *Coronella austriaca*. Neither one of the three types

of amphibian hybrids were signaled before in the Teuz River hydrographic basin.

Salamandra salamandra (Linnaeus 1758) is well represented in the afforested hills and mountains sectors. It is present at altitudes of over 200 m.

Triturus vulgaris (Linnaeus 1758) is the most common species of newt from the examined region.

Triturus cristatus (Laurenti 1768) is well represented in the hill and mountain sectors of the inspected area. It is extended at heights of over 150 m.

Triturus dobrogicus (Kiritzescu 1903) is widely spread in the plain sectors of the Teuz River hydrographic basin. It is present exclusively at altitudes under 150 m, in areas with a flat relief. Prior to our study, its presence was hinted in all the West Plain, but only based on zoogeographic reasons (Arntzen et al. 1997). The populations are usually small numbered due to human activities. It is mostly present in the drains alongside roads. An exception is the Cermei area where, in the northern part of the locality, there is a vast swamp.



Figure 2. *Triturus dobrogicus* male from Apatcu

Triturus cristatus X *Triturus drobgicus*. Populations with intermediate attributes between the two species of crested newts are rare. We encountered hybrids in two regions, both in the area of formation for the lowest hills, at about 150 m.

Triturus alpestris (Laurentus 1768) is quite common in the Codru – Moma Mountain area. It comes down to the Măraș and Teuz Hills, where it reaches a surprisingly low altitude: 150 m. This is, until now, the lowest altitude ever recorded for *Triturus alpestris* in Romania.



Figure 3. *Triturus alpestris* male from Cărand

Bombina bombina (Linnaeus 1761) is common for the plain sectors, ascending to 150 m in altitude. In most of the times it is present in the ditches alongside the roads.

Bombina variegata (Linnaeus 1758) is familiar in the hills and the mountains, presenting an opposite areal with that of *Bombina bombina*. It comes down to 140 m.

Bombina bombina X *Bombina variegata*. Hybrids between the two species from the *Bombina* genus are rare. We encountered them at the borderline

between the plain and the Teuz Hills. Hybrid populations are situated at altitudes of about 150 m. The hybrid zone is at about the same height as other from the north-western part of Romania (Covaciu-Marcov et al. 2000, 2002, 2003 a, b, 2004, 2005 a). *Bombina variegata* comes down to low altitudes while *Bombina bombina* climbs up to less that it does in other region of the country, like in the Transylvanian Plateau (Ghira & Mara 2000, Ghira et al. 2003).

Pelobates fuscus (Laurenti 1768) is a frequent species in the plain sectors. The populations aren't usually high-numbered due to the reduction of their breeding habitats with the exception of the swamp from Cermei where in the spring we found tens of specimens.

Bufo bufo (Linnaeus 1758) is widespread both in the plains and the mountains. In the plain sectors it is more uncommon mostly because of the reduction of afforested areas.

Bufo viridis (Laurenti 1768) is rarer than *Bufo bufo*, being met in fewer localities. It occurs in the plains and the highlands as well.

Hyla arborea (Linnaeus 1758) is widespread in the hills and the mountains, being much rarer in the plains where forest areas are hard to find.

Rana ridibunda (Pallas 1771) is one of the most common species of amphibians in the studied area. It populates almost every aquatic biotope.

Rana lessonae (Camerano 1878) is more of an exceptional species for this part of the country, being identified for the first time ever in two localities from the upper course of the Teuz River area, near the Teuz Hills. It is present in swampy areas.

Table no.1 – Continued

	S	T	T	T	T	T	T	T	T	B	B	B	P	B	B	H	R	R	R	R	E	L	L	V	C	A	N
	s	v	c	d	X	a	b	v	X	f	u	u	f	u	u	a	r	e	d	t	o	a	v	a	n	a	n
Nădălbăști	X	X	-	-	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	X
Nermeiș	X	X	-	-	X	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	X
Prunișor	X	X	X	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	X
Rogoz de Beliu	-	X	-	-	-	-	-	X	-	-	-	-	-	X	-	X	-	X	-	X	-	X	-	-	-	-	X
Satu Nou	-	X	-	X	-	-	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Secaci	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-	X	-	X	-	X	-	X	-	-	-	X	-
Seliște	-	X	X	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	X	-
Stoinești	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	X
Sintea Mare	-	X	-	X	-	-	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Susag	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Susani	X	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Șiad	-	X	X	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	X
Șepreuș	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Șomoșcheș	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	X
Tăgădău	-	X	X	-	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	X
Tâlmaci	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Țișar	-	X	-	X	-	-	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Urvișu de Beliu	-	-	-	-	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	X
Vânători	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Zerind	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Zerindu Mic	-	X	-	X	-	-	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	-	-	-	-
Total no. of localitys	1	4	1	1	2	6	2	2	3	1	3	1	2	3	1	2	4	2	7	3	5	9	3	2	2	6	5
	2	3	5	5		8	6		7	1	2	0	1		2	0	1	7		8	3					1	

Legend:

Ss=Salamandra salamandra, Tv=Triturus vulgaris, Te=Triturus cristatus, Td=Triturus dobrogicus, Tx=Triturus cristatus x Triturus dobrogicus, Bb=Bombina bombina, Bv=Bombina variegata, Bx=Bombina bombina X Bombina variegata, Bu=Bufo bufo, Buv=Bufo viridis, Ha=Hyla arborea, Pf=Pelobates fuscus, Rr=Rana ridibunda, Rl=Rana lessonae, Rq=Rana dalmatina, R=Raana temporaria, Eo=Emys orbicularis, La=Lacerta agilis, Lv=Lacerta viridis, Pm=Podarcis muralis, Af=Anguis fragilis, Ca=Coronella austriaca, Nn=Natrix natrix, Vb=Vipera berus

Rana kl esculenta (Linnaeus 1758) is recognized in more localities than the previous species. It populates plain and hill areas, too, ascending alongside the water flows. It is present both in swamps and the ditches along side the roads.

Rana dalmatina (Bonaparte 1839) is widespread in the investigated area, being common in the hill and mountain sectors. In the plain it is infrequent due to woodcutting.

Rana temporaria (Linnaeus 1758) is rarer than the above mentioned species, occurring only in the forests from the hills and mountains. It comes down to about 170 m in altitude.



Figure 4. Habitat with green frogs, near Ignești



Figure 5. *Rana lessonae* male from Ignești



Figure 6. The calus internus of a *Rana lessonae* male from Ignești

Emys orbicularis (Linnaeus 1758) is relatively well represented at least in the hill areas. In the plain sectors is scarcer because of the shrinking of the habitats, consequence of the human activities. In the hills it is encountered in the flowing waters and the wetlands around them. It also populates very small streams.

Lacerta agilis (Linnaeus 1758) is the most common reptile in this region.

Lacerta viridis (Laurenti 1768) is well represented in the hill and mountain sectors. It populates the hilly mountainsides with bushes, descending only until 150 m in altitude.

Podarcis muralis (Laurenti 1768) is rare in the Teuz River hydrographic basin, living only in the mountain area, near the valleys.

Anguis fragilis (Linnaeus 1758) was encountered only in the afforested hills and the mountains. Numerous individuals were killed by the locals.

Coronella austriaca (Laurenti 1768) is relatively well represented in the hill regions. We met many samples killed by cars.

Natrix natrix (Linnaeus 1758) is widespread both at the plain and in the highlands, where it ascends alongside the rivers.

Vipera berus (Linnaeus 1758) was identified only near the Teuz Hills, in the area of the Teuz River's superior course, where it appears to be well represented. It comes down to about 200 m, populating wet swampy areas near forests.



Figure 7. *Vipera berus* male from Ignești



Figure 8. *Vipera berus* female from Ignești

Discussions

In the Teuz River hydrographic basin region some species from the herpethofauna of Romania that are

traditionally considered mountain related species come down to very low altitudes. This is the case of three amphibian and one reptile species: *Triturus alpestris*, *Salamandra salamandra* and *Rana temporaria*, respectively, *Vipera berus*. They reach altitudes of even below 200 m, being present even at the contact line between the lowest hills and the Crișurilor Plain. Beside the three species, in the upper course of the Teuz River, populations of *Rana lessonae* and *Rana kl. esculenta* can be found. The presence of these species and the fact that some are here at their lowest altitude ever recorded in the country strongly individualizes the herpethofauna of this region.

Triturus alpestris is common in the afforested areas from the Mărăuș and Teuz Hills, living here at altitudes of 150 m and more, all the way to the high sector of the Codru - Moma Mountains. Thus, the lowest altitude for the alpine newt ever recorded in Romania is 150 m and it is encountered in the area of Craiva - Șiad. *Triturus alpestris* is considered an alpine species in our country, spread at altitudes of over 500 m (Cogălniceanu et al. 2000) or even 700 m (Fuhn 1960). In the past it was considered that the species exceptionally comes down to 400 – 500 m (Ghira 1997), in the Baia-Mare region being encountered at 210 m due to the colder and wetter depressionary climate (Micluță 1970). Recently, *Triturus alpestris* has been frequently pointed out at altitudes of about 200 – 300 m in the north – western part of Romania (Covaciu - Marcov et al. 2003 b, c, d, 2005 a, b).

The altitude at which the alpine newt has been found in the Teuz River hydrographic basin has no equivalent in the country. Unlike the situation from

Baia – Mare (Miclucă 1970), the species comes down to 150 m right on the most western hillside, the one in contact with the Panonic Plain. Therefore, in the Mărauş and Teuz Hills, *Triturus alpestris* descends at lower altitudes than in Baia – Mare, in a much drier and warmer region (Stoenescu et al. 1966). At Cărand, the alpine newts are present at appreciatively 100 m from the village, on the first hillside, the one that delimitates to the north the Crişul Alb and Teuz Plains. These results, added to our previous ones (Covaciu-Marcov et al. 2003 b, c, d, 2005 a, b), demonstrate a wide spreading in the Western Hills, at much lower altitudes than in the rest of the country, of this glacial resident's (Stugren 1957). It must be accepted the fact that in the area of the Western Hills the lowest altitude limit of these species' is somewhere between 200 and 300 m, occasionally reaching 150 m. It must also be checked if the situation is characteristic only for the Western Hills or if it is general, in the whole country, because it has recently been encountered at 300 m in Moldova (Ghiurcă et al. 2005). In most of the times the white spots from a species' areal don't indicate the absence of the species from that place, but rather the lack of studies (Tomovic et al. 2001). *Triturus alpestris* is present in higher areas from the Panonic Basin (Dély 1959) while at the northern limit of its areal it reaches the sea level (Miaud & Mierilă 2001).

Rana temporaria and *Salamandra salamandra* both come down, in many regions of the country, at altitudes as low as 200 m (Cogălniceanu et al. 2000). Their presence alongside that of the alpine newt's underlines the fact that the Mărauş and Teuz Hills, although not very high

and in direct contact with the plain, present a herpetofauna considered to be characteristic to the mountain areas.

Vipera berus comes down to altitudes of about 200 m in the areas of the Teuz River's superior course. Near the streams (Igneşti area) the river passes a micro depression (Posea & Badea 1987) surrounded by afforested hillsides. Here we came across numerous samples, in wet areas coterminous to some water streams or swamps. In Romania, *Vipera berus* is considered to be a typically mountain species (Fuhn & Vancea 1961), rising in altitude towards the southern limit of its areal (Nilson & Andren 1997). However, in the proximity of its southern limit, populations of the common viper are present in the lowlands from Hungary (Dély 1978) or from the north of the Satu-Mare County (Ghira et al. 2002, Covaciu-Marcov et al. 2004). In the area for study, the presence of the common viper is allowed by the existence of its preferred habitats: wet afforested areas.

In the micro depression from Igneşti, beside *Vipera berus*, populations of *Rana lessonae* can also be found. In this region, the species is in the proximity of its areal's south - eastern limit (Günther 1997). *Rana lessonae* lives here alongside *Rana ridibunda* and *Rana kl. esculenta*, consisting the R–E–L system (Tunner & Heppich-Tunner 1991). Even if this system is relative (Heym 1974), it is frequently stumbled upon in Hungary (Gubányi 1990, 1996) and in western Romania (Covaciu-Marcov et al. 2004). The *Rana lessonae* populations from Igneşti are totally isolated from the other populations from the western Romania, spread in the Oaş region (Covaciu-Marcov et al. 2004). The species has

recently been documented in Oaș, those population actually coming in contact with the rest of the species' areal (Günther 1997). Similar to the populations from that region, at Ignești *Rana lessonae* inhabits permanent swampy areas of great dimensions. These areas are closely linked to forests, the species being known to live in forests swamps in other regions (Rybacki & Berger 1994).

In the swamps from the Ignești micro depression *Rana kl. esculenta* is the form with the biggest number of specimens from the green frog complex. *Rana lessonae* and *Rana ridibunda* are much rarer, probably the rarest of these two being the common lake frog. Thus, when we take a look at the bigger picture, the most common and widespread frog in the investigated area is *Rana ridibunda*. In many cases it was the only form from the green frog complex to inhabit certain biotopes. In some situation it appears together with *Rana kl. esculenta* consisting to so-called R-E complex. *Rana kl. esculenta* was identified in more sites than *Rana lessonae*, being present in both plain and hill sectors. The common water frog (green frog) populates diverse aquatic habitats, not being a very selective species (Berger 1973). In the plain sectors we identified it in the ditches alongside the roads, habitats in which it has been documented before (Rybacki & Berger 1994).

In the Teuz River hydrographic basin region from Arad County there are some areas with a very rich, exceptional herpethofauna, including rare species. In the afforested swampy areas from the Ignești micro depression we can find, at very low altitudes, populations of *Vipera*

berus, a glacial relict species in Romania, alongside populations of *Rana lessonae*. This is the only locality from Arad County in which the last mentioned species has ever been identified, being also the most southern point in all the western Romania for it. Beside these two species, the micro depression from Ignești is inhabited by *Triturus cristatus*, *Bombina variegata*, *Hyla arborea* and *Emys orbicularis*, too. The Craiva – Șiad region represents the lowest point ever reported for *Triturus alpestris* in Romania (150 m). Alongside the alpine newt, in this region numerous other species of amphibians and reptiles can be found (Table 1). Other populations of the alpine newt are present, again at altitudes of under 200 m, in the hills north – east from Cărad. In the plain areas, two special sectors for the herpethofauna are noted: the swamps from Cermei and the wetlands from Satu Nou. The swamps from Cermeri are situated to the north of the village, here living numerous populations of *Triturus dobrogicus*, *Pelobates fuscus* and *Bombina bombina*. The channels and ponds from Satu Nou, although affected by human activities, shelter populations of *Triturus dobrogicus*, *Bombina bombina*, *Pelobates fuscus* and *Emys orbicularis*.

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