

Contribution to knowledge of the distribution of herpetofauna in Tarcău Mountains (Romania)

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Abstract. In the researched area we identified 12 amphibian species: *Salamandra salamandra*, *Lissotriton vulgaris*, *Triturus cristatus*, *Mesotriton alpestris*, *Lissotriton montandoni*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *Rana dalmatina* and *Rana temporaria* and 9 reptile species: *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Podarcis muralis*, *Anguis fragilis*, *Natrix natrix*, *Zamenis longissimus*, *Coronella austriaca* and *Vipera berus*. Within the region we identified species quoted (Cogălniceanu et al. 2000, Ghiurcă et al. 2005, Gherghel et al. 2008, Iftime et al. 2008) to have the lowest altitudinal limit of their spreading area at much higher altitudes. Most of the amphibian and reptilian species are not endangered in the researched area.

Key Words: amphibians, reptiles, spreading area, new records.

Rezumat. În zona studiată de noi am identificat 12 specii de amfibieni: *Salamandra salamandra*, *Lissotriton vulgaris*, *Triturus cristatus*, *Mesotriton alpestris*, *Lissotriton montandoni*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *Rana dalmatina* și *Rana temporaria* și nouă specii de reptile: *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Podarcis muralis*, *Anguis fragilis*, *Natrix natrix*, *Zamenis longissimus*, *Coronella austriaca* și *Vipera berus*. În regiunea studiată de noi am identificat specii citate anterior (Cogălniceanu et al. 2000, Ghiurcă et al. 2005, Gherghel et al. 2008, Iftime et al. 2008) însă la altitudini mai mici sau mai mari decât cele date anterior de literatura de specialitate. Majoritatea speciilor de amfibieni și reptile un sunt amenințate în zona studiată.

Cuvinte cheie: amfibieni, reptile, zonă de distribuție, semnalări noi.

Introduction. The data regarding the Romanian herpetofauna are very scarce. The most comprehensive studies in this field are included in the volumes Fauna R.P.R. Amfibibia (Fuhn 1960) and Reptilia (Fuhn & Vancea 1961). However the researches didn't satisfactory cover the surface of Romania so the herpetofauna of Tarcău Mountains was relatively less studied until 2005 (Șova 1968, 1972). Concerning these issues we aimed to realize a synthesis of the knowledge regarding the herpetofauna from Tarcău Mountains, based both on the previous studies and our field researches.

The herpetofauna of Tarcău Mountains was studied in a number of works dealing with the distribution (Fuhn 1960; Fuhn & Vancea 1961; Cogălniceanu et al 2000; Ghiurcă 2006; Ghiurcă et al 2005, 2006; Gherghel et al 2008ab; Iftime et al 2008), morphometric characteristics (Șova 1968; 1969; 1973) or biological and ecological traits of amphibians and reptiles in this area (Șova 1972, 1973; Ghiurcă 2006).

Most of these works deal with amphibians, Fuhn & Vancea (1961) giving a limited number of reptile records, upon which Ghiurcă et al (2006), Gherghel et al (2008ab), Iftime et al (2008) build with a larger number. Our study adds new distribution records and some data of ecological and conservation significance to this already substantial body of data.

Material and Method. Our studies were carried out based on transects method (Cogălniceanu 1997). Most of the specimens were captured by hand and newts were collected during the reproduction period using landing net. All the captured specimens were released after identification.

The mountain region known in literature under the name of Tarcău Mountains is part of eastern side of Oriental Carpathians Mountains.

The Tarcău Mountains are delimited at north by Bicaz and Bistrița Valleys, at south by Trotuș Valley, at west also by two valleys – Dămuc and Valea Rece and at east by Carpathians Hills.

The studied area is expanded onto the territory of two Counties: at north-east Neamț County and at south-west Bacău County.

The surface of this region is 1810 km², and has the maximum length in the axial zone along Tarcău and Asău Valley by 65 km and a medium width by 40 km.

Results and Discussions. During our preliminary researches in Tarcău Mountains were identified a number of 12 amphibian species: *Salamandra salamandra*, *Lissotriton vulgaris*, *Triturus cristatus*, *Mesotriton alpestris*, *Lissotriton montandoni*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *Rana dalmatina* and *Rana temporaria* and 9 reptile species: *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Podarcis muralis*, *Anguis fragilis*, *Natrix natrix*, *Zamenis longissimus*, *Coronella austriaca* and *Vipera berus*.

Class AMPHIBIA Linnaeus 1758

Salamandra salamandra Linnaeus 1758

The spotted salamander, which prefers forest habitat (Fuhn 1969; Cogălniceanu et al 2000), is quite spread in the researched areas due to the extensive forest surfaces. This species is frequent in most of the studied locations.

Lissotriton vulgaris Linnaeus 1758

The common newt is the most spread triton species in our country, both in plane and mountain region (Fuhn 1969), previously quoted for this region (Șova 1968; Ionescu et al 1968; Cogălniceanu et al 2000; Ghiurcă et al 2005, 2006; Gherghel et al 2008ab; Iftime et al 2008).

Triturus cristatus Laurentus 1768

This is a relatively common species in the studied area, identified in many localities from which we collected data regarding herpetofauna. A greater abundance was recorded in higher regions. This species breeds in almost all aquatic habitats within the area, and especially in bigger pools with abundant vegetation and silt substratum thick of 20-30 cm in forest.

Mesotriton alpestris Laurentus 1768

The alpine newt is a mountain species, quoted in Romania at altitudes above 500 m (Cogălniceanu et al 2000). For the researched area, we identified this species in mountain regions, being recorded at altitudes lower than in other parts of the country – quite often at 300 m. The species was registered in areas with altitudes of 320 m in the localities Agârcia and Doamna (Gherghel & Ile 2006; Gherghel et al 2008ab). In other regions the species was identified in the altitude limits quoted for Romania (Cogălniceanu et al 2000). The presence of this species at lower altitudes is, probably, due to the forest vegetation, which covers almost all the area with the general features of a mountain region represented by a colder and moist climate, conditions favorable for *Mesotriton alpestris*. Occasionally was recorded in temporal small pools, alone or along with the other newt species (*Lissotriton vulgaris*, *Triturus cristatus*, *Lissotriton montandoni*).

Lissotriton montandoni Boulenger 1880

The species is endemic for Eastern Carpathians and was often recorded in the studied area. The lowest altitude for Montandons newt is 200 m in northern part (Covaciu-Marcov et al 2007) and 500 m for the other areas (Cogălniceanu et al 2000). We identified the species in localities at low altitude (300-400 m) for its spreading area, in small or temporal ponds or in springs. This species was often identified alone, but sometimes

along with the other newt species within the area (*Lissotriton vulgaris*, *Triturus cristatus*, *Mesotriton alpestris*).

Bombina variegata Linnaeus 1758

The yellow-bellied toad is wide spread in all localities from studied area in ponds along the road side, temporary and permanent ponds in the forest. Is not a very selective species, being permanent aquatic beside wintering period (Fuhn 1969).

Bufo bufo Linnaeus 1758

The common toad is wide spread in the studied region, which we recorded in almost all of the sampled localities (with the exception of one).

Bufo viridis Laurentus 1768

The green toad is less spread than the previous species and was identified in a small number of localities in the sampled area. Most of the populations are localized at lower altitude and their absence from higher areas is explained through thermophilic preference of this toad (Stugren 1957).

Hyla arborea Linnaeus 1758

The tree-frog is not quit common in the researched area, being present in only 10 of the sample localities.

Pelophylax ridibundus Pallas 1771

The edible frog is relatively wide spread in studied area with large populations in almost all the sample localities. Most of the populations are localized in low altitude regions, along water streams; this frog is classified as a plain species in Romania, rare in hill region, spread up to 750 m altitude (Gherghel et al 2008a). *Pelophylax ridibundus* populate both the water stream and the ponds and swamps along their course.

Rana dalmatina Bonaparte 1839

This is a wide recorded species, in the researched area being identified in 28 localities out of a total studied number of 48.

Rana temporaria Linnaeus 1758

The common frog was identified in all of the sample localities.

Class REPTILIA Blainville 1816

Lacerta agilis Linnaeus 1758

The sandlizard is the most common lizard in the studied region and was recorded in all of the sample localities, from low altitudes up to highs of almost 1400 m.

Lacerta viridis Laurentus 1768

The green lizard is a mesophyll big size species (Fuhn & Vancea 1961). Due to the unfavorable environment condition, this species was rarely identified in the studied region where we established 14 localities for its spreading area in this region.

Zootoca vivipara Jacquin 1787

The viviparous lizard is scarce spread in the researched area. We identified this species only in 14 sample localities in Tarcău Mountains. It appears in beechspruce forests, their skirts, clearings, meadows, and rocky places, but also wet meadows, marshes and bogs.

Podarcis muralis Laurentus 1768

The wall lizard was recorded by us at Bicaz Chei (Gherghel et al 2008a; Gherghel et al 2009), where it occurs on rocky outcrops which are a particularity of this area.

Anguis fragilis Linnaeus 1758

The slow worm is a species wide spread in hill and mountain region covered with forest vegetation. It can reach relatively high densities in hay meadows but it is also killed in numbers by locals when these are mowed.

Natrix natrix Linnaeus 1758

The grass snake is a common species for Romania fauna, usually spread closely to the water (Fuhn & Vancea 1961). In the studied region we identified this snake in all the localities, with the exception of one. The great number of identified specimens shows that the species is not endangered in the area.

Zamenis longissimus Laurentus 1768

This is a quite rarely spread species and was identified in 2 sample localities, as following: Agârcia and Doamna (Gherghel et al 2008a). The species was recorded only in forest ecosystems.

Coronella austriaca Laurentus 1768

The smooth snake is a rare species, being identified in only 2 localities from studied area (Bicaz Chei and Doamna) (Gherghel et al 2008a).

Vipera berus Linnaeus 1758

The viper was recorded in half localities out the total number of samples – 48, in the bushes, slopes and forest skirts. The melanic morph was also found. This species is apparently declining; it is killed by locals, and also afflicted by habitat destruction.

Table 1

Data concerning the spreading of reptilian and amphibian species in studied localities from Tarcău Mountains

Species/ Locality	S	Tv	Tc	Ta	Tm	Bv	Bfb	Bfv	Ha	Rr	Rd	Rt	La	Lv	Zv	Pm	Af	Nn	Zl	Ca	Vb
Agârcia (NT)	X	X	X	X	X	X	X	-	X	X	-	X	X	-	X	-	X	X	X	-	X
Agăș (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Apa Asău (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Ardeleuța (NT)	X	X	X	X	X	X	X	-	-	X	-	X	X	-	X	-	X	X	-	-	X
Asău (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Beleghet (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Bicaz Chei (NT)	X	X	X	X	X	X	X	X	-	X	-	X	X	X	-	X	X	X	-	X	X
Bolătău (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	X
Borlești (NT)	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-
Brateș (NT)	X	X	X	X	X	X	X	X	-	X	-	X	X	-	X	-	X	X	-	-	-
Brusturoasa (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Burienișu de Sus (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Camenca (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Capșa (NT)	X	X	X	X	X	X	X	-	-	-	-	X	X	-	X	-	X	X	-	-	-
Cazaci (NT)	X	X	X	X	X	X	X	-	-	-	-	X	X	-	X	-	-	X	-	-	-
Comănești (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	-
Cuchiniș (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Dămuc (NT)	X	X	X	X	X	X	X	-	-	-	-	X	X	-	X	-	X	-	-	-	-
Doamna (NT)	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	-	X	X	X	X	X
Ghimeș (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	X
Ghimeș-Făget (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	X

Goioasa (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Huisurez (NT)	X	X	-	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	-	-	-
Ivaneş (NT)	X	X	X	X	X	X	X	-	-	-	-	X	X	-	-	-	X	X	-	-	X
Moineşti (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	-
Nechit (NT)	X	X	X	X	X	X	X	X	-	X	X	X	X	-	X	-	X	X	-	-	X
Neguleşti (NT)	X	X	X	-	-	X	X	-	-	X	-	X	X	-	-	-	X	X	-	-	-
Oanţu (NT)	X	X	X	X	X	X	X	X	-	X	-	X	X	-	X	-	X	X	-	-	-
Palanca (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Păltiniş (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	X
Piatra Şoimului (NT)	X	X	X	X	X	X	X	-	X	X	X	X	X	-	-	-	X	X	-	-	-
Preluca (NT)	X	X	X	X	X	X	X	-	X	X	-	X	X	-	-	-	X	X	-	-	-
Poiana Fagului (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	-	X	-	-	X
Poieni (NT)	X	X	X	X	X	X	X	X	X	X	-	X	X	-	-	-	X	X	-	-	-
Preluci (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Puntea Lupului (NT)	X	X	X	X	X	X	X	-	-	X	-	X	X	-	-	-	X	X	-	-	-
Răchitiş (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	-	X	-	-	X
Săvineşti (NT)	-	X	X	-	-	X	X	X	X	X	-	-	X	-	-	-	-	X	-	-	-
Schitu Frumoasa (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	-	-	-	-	X	-	-	-
Straja (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	X	-	-	X	X	-	-	X
Tarcău (NT)	X	X	X	X	X	X	X	-	X	X	-	X	X	-	X	-	X	X	-	-	-
Taşca (NT)	X	X	X	X	X	X	X	-	X	X	-	X	X	-	X	-	X	X	-	-	-
Tărhăuşii (BC)	-	-	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	X
Ticoş (NT)	X	X	X	X	X	X	X	-	-	-	-	X	X	-	X	-	-	X	-	-	-
Vaduri (NT)	X	X	X	X	X	X	-	-	-	-	-	X	X	-	X	-	X	X	-	-	-
Valea Rece (BC)	-	-	-	-	-	X	X	-	-	-	-	X	X	-	-	-	-	X	-	-	-
Văleni (NT)	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
Zemeş (BC)	X	X	-	X	-	X	X	-	-	-	X	X	X	-	-	-	X	X	-	-	X
Total number of localities = 48	38	39	23	45	22	48	47	9	10	18	28	47	48	14	14	1	40	47	2	2	26

Legend:

Ss - *Salamandra salamandra*, Tv - *Lissotriton vulgaris*, Tc - *Triturus cristatus*, Ta - *Mesotriton alpestris*, Tm - *Lissotriton montandoni*, Bv - *Bombina variegata*, Bfb - *Bufo bufo*, Bfv - *Bufo viridis*, Ha - *Hyla arborea*, Rr - *Pelophylax ridibundus*, Rd - *Rana dalmatina*, Rt - *Rana temporaria*, La - *Lacerta agilis*, Lv - *Lacerta viridis*, Zv - *Zootoca vivipara*, Pm - *Podarcis muralis*, Af - *Anguis fragilis*, Nn - *Natrix natrix*, Zl - *Zamenis longissimus*, Ca - *Coronella austriaca*, Vb - *Vipera berus*

Conclusions. Along our study we identified 12 amphibian species: *Salamandra salamandra*, *Lissotriton vulgaris*, *Triturus cristatus*, *Mesotriton alpestris*, *Lissotriton montandoni*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *Rana dalmatina* and *Rana temporaria* and 9 reptile species: *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Podarcis muralis*, *Anguis fragilis*, *Natrix natrix*, *Zamenis longissimus*, *Coronella austriaca* and *Vipera berus*.

It is remarkable the presence of some species at lower altitudes than usual in the researched area. Thus, the following species: *Salamandra salamandra*, *Mesotriton alpestris*, *Lissotriton montandoni*, *Rana temporaria* and *Vipera berus* are spread down to a low limit of almost 300 m.

The amphibian species identified in the region are generally spread in many localities in numerous populations thus we consider them not endangered in the area.

As literature shows in the Tarcău Mountains the amphibian species *Lissotriton montandoni* are very abundant but in recent years the deforestation from northern

part of the area have a negative impact (Gherghel et al 2008b) who made this amphibian species to be more endangered year by year.

Due to their request towards the environment conditions the reptilian species are spread in a fewer localities. The species *Zamenis longissimus* and *Coronella austriaca* seem to be threatened, being identified only a few specimens.

Acknowledgements. The authors would to tank to Pricop Emilian and Alexandru Strugariu for some suggestions about the earlier version of the manuscript. We thank to two anonymous referees for useful comments of the manuscript.

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Received: 24 September 2009. Accepted: 28 December 2009. Published online: 31 December 2009.

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How to cite this article:

Ghiurcă D., Gherghel I., Roșu G., 2009. Contribution to knowledge of the distribution of herpetofauna in Tarcău Mountains (Romania). *AES Bioflux* **1**(2):73-79.

