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The herpetofauna from the Bistriţa river basin (Romania): geographical distribution

Iulian GHERGHEL[1,*], Alexandru STRUGARIU[2], Daniel GHIURCĂ[3] and Alfred-Ştefan CICORT-LUCACIU[4]

1. Piatra Neamţ Technical College, Stefan cel Mare Str. Nr. 67, 610101, Piatra Neamţ, Romania
2. "Alexandru Ioan Cuza" University, Faculty of Biology, Carol I Blvd. Nr. 20 A, 700506, Iaşi, Romania
3. "Ion Borcea" Natural Science Museum, Bacău, Romania.
4. ""Babes-Bolyai" University, Faculty of Biology and Geology, Department of Biology; Cluj-Napoca, Romania.
* Corresponding author: I. Gherghel, E-mail: iuliangherghel@gmail.com

Abstract. The present paper contains the results of a 7 year faunistical study upon the amphibian and reptile species from the Bistriţa river basin. We recorded 14 species of amphibians (*Salamandra salamandra*, *Triturus cristatus*, *Lissotriton vulgaris*, *Lissotriton montandoni*, *Mesotriton alpestris*, *Bombina bombina*, *Bombina variegata*, *Hyla arborea, Rana dalmatina, Rana temporaria, Pelophylax ridibundus, Bufo bufo*, *Bufo viridis*, *Pelobates fuscus*), 3 types of hybrids between amphibians (*L. vulgaris* X *L. montandoni, Pelophylax kl. esculentus* and *B. bombina* X *B. variegata*) and 10 species of reptiles (*Anguis fragilis*, *Podarcis muralis*, *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Emys orbicularis*, *Coronella austriaca*, *Natrix natrix*, *Zamenis longissimus*, *Vipera berus*).

Key words: Geographical distribution, habitats, reptiles, amphibians, Bistriţa river basin, Romania.

Introduction

The Bistriţa River Basin was not the object of study of many herpetological investigations. The first of them led to the discovery of a new amphibian species, *Lissotriton montandoni* (Boulenger 1880). Next were the monographs from the "Fauna R.P.R." volumes: "Amphibia" (Fuhn 1960) and "Reptilia" (Fuhn & Vancea 1961). In 1968, Ionescu et al. published a paper on the distribution of the vertebrate fauna from the Bistriţa Mountain River Basin, bringing new data, but only for the mountain region of the basin. Şova (1972) then published his Ph.D. thesis regarding the distribution of the *Triturus* (s. l.) genus in the Siret river basin. Except for these publications, which are the foundation of herpetofaunistical research in the area, numerous authors published notes regarding the distribution of amphibians and reptiles in different areas of our study region: Vancea (1958), Stugren & Popovici (1961), Şova & Tărăbuţă (1963), Stugren (1966), Stugren & Vancea (1968), Şova (1969, 1970a, b, 1971, 1972, 1973a, b), Şova & Cruce (1969), Ifrim (1972), Georgmaneanu (1975), Borcea & Vancea (1981), Ion & Valenciuc (1986).

Still, in spite of numerous more recent studies (Zamfirescu 1999, Cogălni-

cenu et al. 2000, Ghira et al. 2002, Ghiurcă 2004, 2005, Ghiurcă & Roşu 2004, Ghiurcă et.al. 2005, 2006a, b, Ion et. al. 2005, Iftime 2005, Gherghel & Ile 2006, Strugariu et. al. 2006a, b and Ghiurcă & Gherghel 2007) no complete, detailed studies have been performed on the distribution and preferred habitats of the herpetofauna in the area. Taking the above stated facts into consideration, we decided to map the herpetofauna from the entire Bistriţa river basin and study the preferred habitat of each species of amphibian and reptile identified in the area.

Matherial and Methods

Study Methods

Our study was conducted between the years 2001 – 2007. In the majority of cases, the animals were directly observed, with some specimens being hand captured and subsequently released. Identifying animals killed by local people or by traffic played a crucial role in our research also and all species mentioned in this study have been personally identified. With the aim of mapping the herpetofauna, the method of transects (Cogălniceanu 1997) was used. The hybrids were identified by their morphological and chromatic characteristics, the identification being done using the main features and measurements indicated in the scientific literature (Berger 1966, 1973, Cogălniceanu et al. 2000, Csata 1998, Fuhn 1960, Ghira & Mara 2000, Stugren 1980, Szymura 1993). Some amphibian species were identified by examining their observed larvae. The distribution maps were done using the UTM technique (Lehrer & Lehrer 1990) with a 5X5 km quadrate.

Study Area

The Bistriţa river basin occupies a surface of over 7200 km², being the largest tributary from the Siret river basin (Fig. 1). Important hydrotechnical installations (Izvorul Muntelui Lake –Şerbeşti Lake) can be found in the middle and lower course of the Bistriţa river, and the river branches also gave birth to two of the largest natural dam lakes in Romania (Cuiejdel Lake and Red Lake).

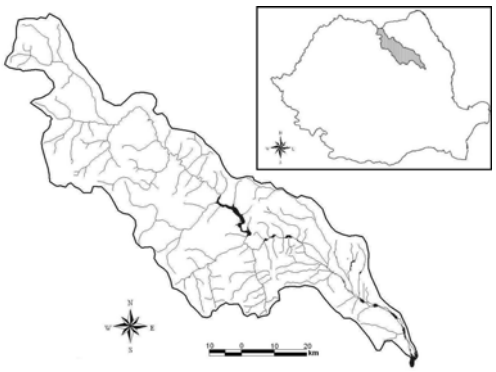

Figure 1. The location of the study area

The minimum altitude in the area is 140 m ASL the Siret river meadow and the maximum altitude is 2100 m in the Călimani Mountains.

Results and Discussions

14 amphibian species (*Salamandra salamandra*, *Triturus cristatus*, *Lissotriton vulgaris*, *Lissotriton montandoni*, *Mesotriton alpestris*, *Bombina bombina*, *Bombina variegata*, *Hyla arborea, Rana dalmatina, Rana temporaria, Pelophylax ridibundus, Bufo bufo*, *Bufo viridis*, *Pelobates fuscus*) and 10 reptile species (*Anguis fragilis*, *Podarcis muralis*, *Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Emys orbicularis*, *Coronella austriaca*, *Zamenis longissimus, Natrix natrix*, *Vipera berus*) were recorded in the Bistriţa river basin (Appendix 1 and Figs 2-3).

Three types of amphibian hybrids were identified in the research area: *Lissotriton vulgaris* X *Lissotriton montandoni, Bombina bombina* X *Bombina variegata* and *Pelophylax* kl. *esculentus*. The *Bombina* hybrids have been recorded at altitudes of 430 m ASL (Appendix 2); these being the highest known hybrid areas in Romania. *Pelophylax ridibundus* was also recorded by us at its highest altitudinal limit in Romania, at 750 m ASL *Bombina variegata* was found at an alti-tude of 1750 m ASL (Appendix 2). Therefore, this is also the highest known altitude for this species in Romania.

Lissotriton montandoni and *Mesotriton alpestris* were recorded in the contact area between the Carpathian Mountains and the Cracău-Bistriţa Depression and are thus present in the area at much lower altitudes than previously stated. *M. alpestris* was found at 320 m and 340 m ASL, while *L. montandoni* was found at 290 m ASL at Piatra Neamţ (Appendix 2). The latter record represents one of the lowest altitudes for *L. montandoni* in Romania.

The presence of *Podarcis muralis* is reconfirmed in the studied area and several new records are made for its distribution (Appendix 1).

A total of 1004 new localities for the distribution of the herpetofauna in Romania were identified in the 151 studied geographic localities (Figs 2-3 and Appendix 1).

Salamandra salamandra (Linnaeus, 1758). The fire salamander was recorded in forested and mountain regions, under moss, rocks or logs. The maximum altitude at which we found this species is 1556 m ASL in Ceahlău Mountain, while the minimum altitude is 240 m ASL at Blăgeşti. We have identified the salamander in 58 localities.

Triturus cristatus (Laurentus, 1768). The crested newt was found in temporary or permanent ponds during the reproductive period and near ponds, under logs, moss or wood piles during its terrestrial phase. The maximum altitude at which we have identified this species is 751 m ASL at Satu Mare while the minimum altitude is 229 m ASL at Buhuşi. In total, the crested newt was recorded in 88 localities.

Lissotriton vulgaris (Linnaeus, 1758). The smooth newt was found in most of the studied regions, in similar biotopes as the crested newt. The maximum altitude at which we have identified this species is 690 m ASL at the Cuiejdel lake while the minimum altitude is 229 m ASL at Buhuşi. We found the smoth newt in 88 localities.

Lissotriton montandoni (Boulenger, 1880). Montandon's newt (Fig. A) was recorded in temporary ponds and puddles situated at forest margins during the reproductive period and under moss, logs or rocks during its terrestrial phase. The minimum altitude at which this species was observed is 290 m ASL at Piatra Neamţ. This species was also identified at lower altitudes (210 m ASL at Baia Mare - Micluta 1970), 202 m ASL at Tarna Mare, 249 m ASL at Turţ, 225 m ASL at Seini, 247 m ASL at Handalu Ilbei and 251 m ASL at Cicărlău (Covaciu-Marcov et al. 2007). This species was recorded in 86 localities.

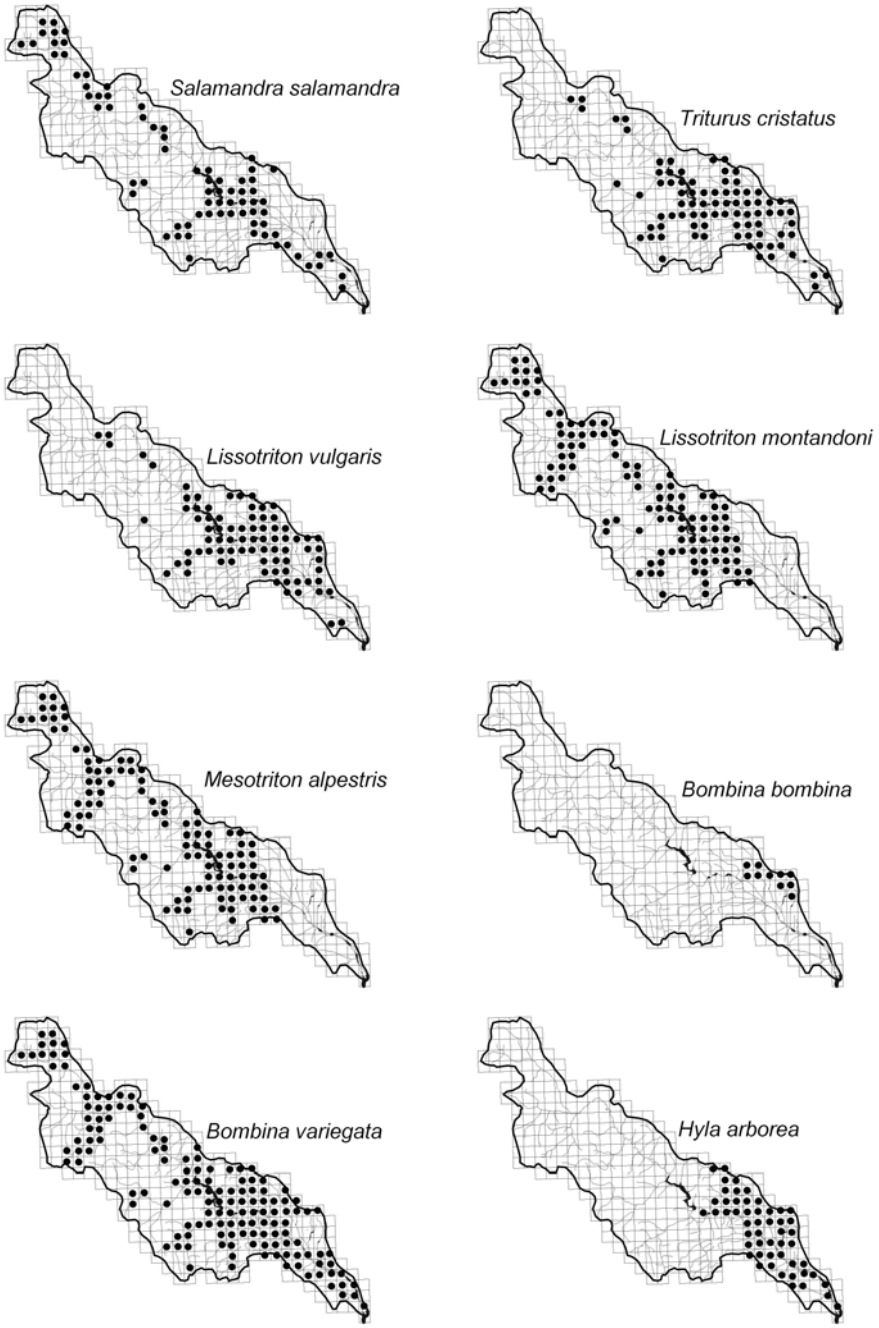

Figure 2/A. Geographical distribution of the amphibians in the Bistrita river basin

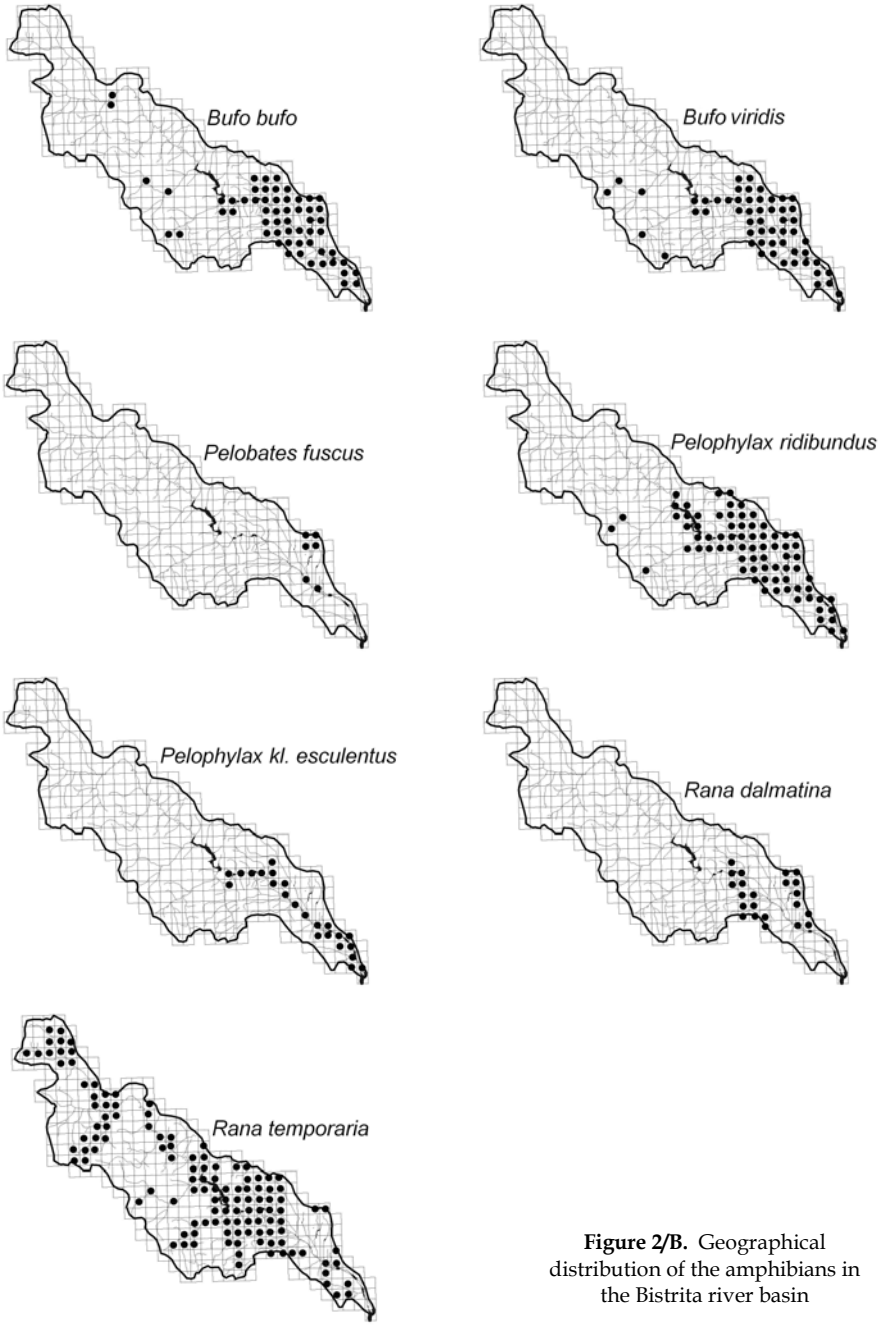

Figure 2/B. Geographical distribution of the amphibians in the Bistrita river basin

Figure A. Typical male *Lissotriton montandoni*, Nechit (photo by I. Gherghel 2007)

Lissotriton vulgaris X Lissotriton montandoni (Fig. B-C). In the mountain basin of the Bistrița river we have identified hybrids between *L. vulgaris* and *L. montandoni*. These two species frequently interbreed where they are sympatric (Fuhn 1960, Cogălniceanu et al. 2000). The areas in which the hybrids were observed were areas in which one of the species was less numerous, the hybriddization probably occurring be-cause finding a partner of the same species was difficult. The maximum altitude at which the hybrids were found is 665 m ASL at Cuiejdel lake and the minimum altitude is 420 m at Nechit. Hybrids were recorded in 6 localities.

Mesotriton alpestris (Laurentus, 1768). The alpine newt was found in similar biotopes as *L. montandoni*. The maximum altitude at which we have identified this species is 320 m ASL at Borlesti and Poieni, the species being previously observed also at Doamna, Agârcia and Bistrița at 320 m ASL (Ghiurcă et. al. 2005a), and at Oanțu and Poieni at 340 m ASL (Gherghel & Ile 2006). The species comes down to lower altitudes in other regions of the country also, at 210 m ASL at Baia Mare (Micluță 1970), in Western Romania in general (Covaciu-Marcov et al. 2003a, b, 2005a, b), and in the Teuz Hills at 150 m ASL (Covaciu-Marcov et. al. 2006a). The alpine newt was recorded in 74 localities.

Figure B. Female hybrid newt (*Lissotriton vulgaris X Lissotriton montandoni*), introgressive with *L. vulgaris*, Lake Cuiejdel: (up) ventral view, (down) lateral view. (photo by I. Gherghel 2007)

Figure C. Female hybrid newt (*Lissotriton vulgaris X Lissotriton montandoni*), introgressive with *L. montandoni*, Bâtca Doamnei (Doamna): (up) ventral view, (down) lateral view. (photo by Al. Strugariu 2007)

Bombina bombina (Linnaeus, 1758). The fire bellied toad was mostly observed in temporary or permanent ponds and in slow flowing streams. The maximum altitude at which the species was recorded is 420 m ASL at Făurei, while the minimum altitude is 300 m ASL at Goşmani. This species was recorded in 13 localities.

Bombina variegata (Linnaeus, 1758). The yellow bellied toad was found in almost every pond, ditch and stream in the studied area, being very adaptable to many habitat types (Fuhn 1960, Cogălniceanu et. al. 2000). The maximum altitude at which we have identified this species was at 1750 m ASL in Ceahlău Mountain, and the minimum altitude was at 190 m ASL at Bacău. We have identified this species in 139 localities.

Bombina bombina* X *Bombina variegata. Hybrids (Fig.D) between the two native *Bombina* species are present in the North-Western region of the study area, at altitudes between 360 m ASL at Turtureşti and 430 m ASL at Mărgineni and Făurei. The maximum hybridization altitude of the study area is also the highest known hybridization area from Romania, exceeding the ones from the Suceava Plateau, which was previously considered to be the highest (Strugariu et. al. 2006b). Prior to our study, hybrids were mentioned for the study region but for very few localities

Figure D. *Bombina bombina* X *Bombina variegata* from Făurei (photo by I. Gherghel 2007)

Figure E. Adult male *Bombina variegata* in amplexus with a male *Hyla arborea* at Bâtca Doamnei (Doamna) (photo by Al. Strugariu 2007)

(Ghiurcă et. al. 2005, Ghiurcă & Gherghel 2007). Hybrids between *B. bombina* and *B. variegata* were recorded in 12 localities.

Hyla arborea (Linnaeus, 1758). The treefrog was recorded in the vegetation near ponds, in deciduous forests and forest margins. The maximum altitude for this species in the area is 750 m ASL at Mitocu Bălan, and the minimum altitude is 190 m ASL at Bacău. We have identified this species in 64 localities.

Bufo bufo (Linnaeus, 1758). The common toad was found in gardens, parks, agricultural fields and in deciduous forests, at altitudes between 190 m ASL at Bacău and 630 m ASL at Dorna-Arini. We have identified it in 92 localities.

Bufo viridis (Laurentus, 1768). Green toads prefer habitats similar to those of the previously mentioned species. The maximum altitude in the region for this species was 780 m ASL at Borsec, and the minimum altitude was 190 m ASL at Bacău. It was recorded in 65 localities.

Pelobates fuscus (Laurentus, 1768). The common spadefoot toad was found in only two regions: Făurei and Buhuşi. It prefers gardens and agricultural fields. The maximum altitude in the region for this species is 420 m ASL at Făurei, and the minimum altitude is 240 m ASL at Buhuşi. We found this species in 10 localities.

Pelophylax ridibundus (Linnaeus, 1758). The marsh frog is a very widely distributed amphibian species in Romania (Fuhn 1960, Cogălniceanu et al. 2000). It was recorded by us in almost all the surface rivers and streams

and lakes from the Bistrița river basin. The species was recorded up to an altitude of 750 m ASL at Mitocu Bălan, this being the highest altitude at which the species was ever recorded in Romania. Other publications (e.g. Cogălniceanu et al. 2000) cite the highest altitude for this species as being 600 m ASL. The species was recorded in 92 localities for Romanian herpetofauna.

Pelophylax kl. esculentus (Linnaeus, 1758). The edible frog is the result of hybridization between *P. ridibundus* and *P. lessonae* (Berger 1966, 1971). This green frog form was recorded in 27 localities for Romanian herpetofauna.

Rana dalmatina (Bonaparte, 1839). The agile frog was encounterd in the Subcarpathians, isolated in the upper course of the Bistrița river, in deciduous forests or forest margins. The maximum altitude at which the agile frog was found is 650 m ASL at Buhalnița and the minimum altitude is 220 m ASL at Lespezi. The species was identified in 27 localities.

Rana temporaria (Linnaeus, 1758). The common frog is present in the studied region in deciduous and coniferous forests, pastures, urban areas and near all water sources from the middle and upper course of the Bistrița river. The maximum altitude in the region for this species is 1620 m ASL at Ceahlău Mountain, and the minimum altitude was 290 m ASL at Gîrleni. This species was recorded in 90 localities.

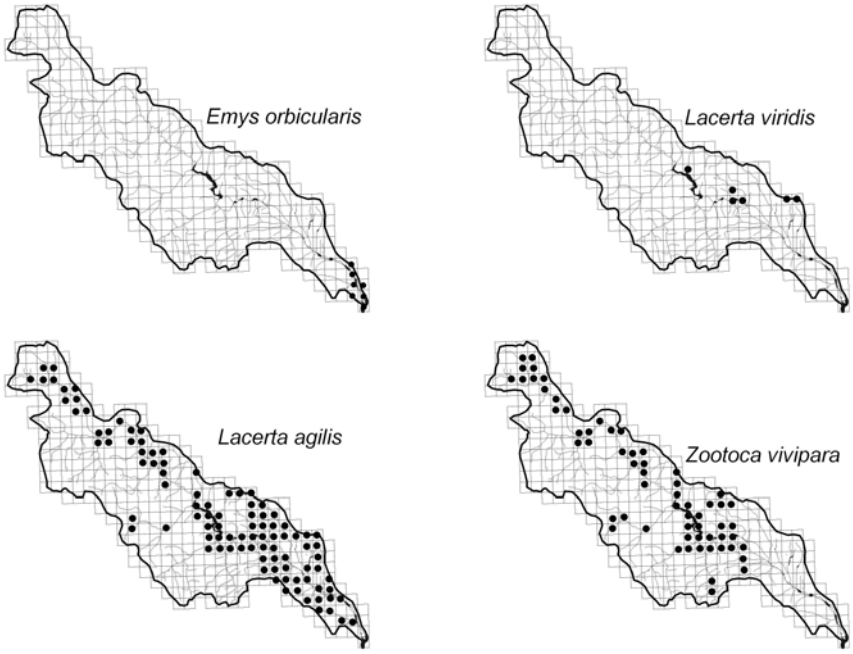

Figure 3/A. Geographical distribution of the reptiles in the Bistrita river basin.

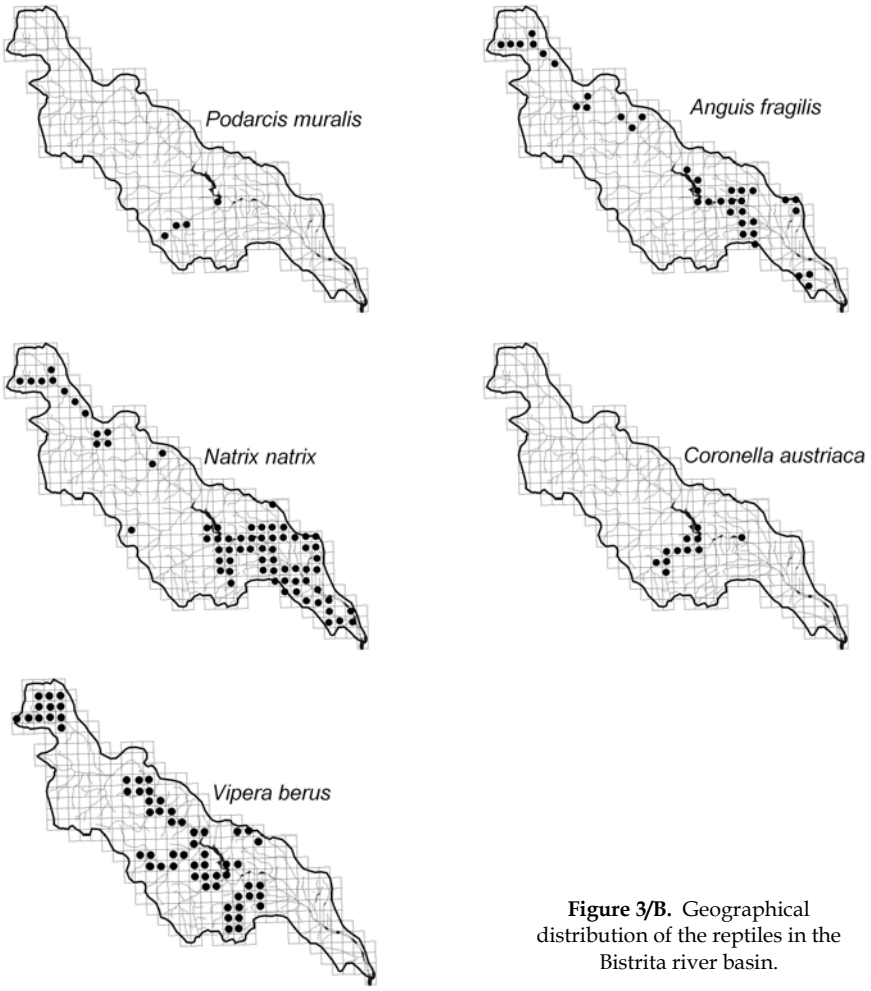

Figure 3/B. Geographical distribution of the reptiles in the Bistrita river basin.

Emys orbicularis (Linnaeus, 1758). The pond terrapin is present in artificial dam lakes from the confluence of the Bistriţa and Siret rivers, near the town of Bacău. We found this species at altitudes between 140 and 160 m ASL, in a single locality.

Lacerta viridis (Laurentus, 1768). The green lizard was observed at the margin of deciduous forests, in 6 localities. The maximum altitude at which we identified this species was 600 m ASL at Hangu while the minimum altitude was 340 m ASL at Piatra Neamţ.

Lacerta agilis (Linnaeus, 1758). The sand lizard is a widely spread species in the studied region, occupying forest

margins, pastures, the margin of agricultural fields and even wetlands. The maximum altitude at which we identified this species was 1342 m ASL at Mt. Ceahlău while the minimum altitude was 160 m ASL at the Siret river meadow. We have identified this species in 94 localities.

Zootoca vivipara (Jacquin, 1787). The viviparous lizard was mostly encounterd in humid regions from the Carpathian region, in conniferous forests but also around rocky areas where it is sympatric with *Podarcis muralis.* The maximum altitude at which we identified this species was 1850 m ASL, while the minimum altitude was 335 m ASL near Piatra Neamţ. The minimum altitude is lower than the one where it was found in the Dragomirnei Plateau (394m) (Strugariu et al. 2006a). In North-Eastern Romania, this species was found at altitudes of 150 m ASL (Covaciu-Marcov et al. 2003d). We identified this species in 48 localities.

Podarcis muralis (Laurentus, 1768). The wall lizard (Fig. F) inhabits the stony walls and cliffs at the margins of coniferous and deciduous forests. Sometimes, it can be found on railroad enbankments, like in the North-Western areas of the country (Covaciu-Marcov et. al. 2006b). The maximum altitude at which this species was observed was 970 m ASL at Red Lake (Lacul Roşu) and the minimum was 420 m ASL at Bicaz/ Dodeni (Fig. G). The species was recorded in 5 localities.

Anguis fragilis (Linnaeus, 1758). The slow-worm was mostly found in or near forested regions. We have identified the species in 33 localities.

Natrix natrix (Linnaeus, 1758). The grass snake was found in almost every investigated habitat, except for the inside of dense forests and rocky areas. The maximum altitude at which this species was observed was 850 m ASL while the minimum altitude was 140 m ASL. We identified this species in 79 localities.

Natrix tessellata (Laurenti, 1768). The dice snake was previously recorded in the Bistriţa river basin (Fuhn & Vancea 1961, Ionescu et al. 1968, Iftime 2005). However, despite numerous visits to the areas in which this species was previously cited, we could not reconfirm its presence. This is probably due to the fact that the species' habitat, the fish farms (Băcescu & Matei 1958), were destroyed for construction purposes. Thus, it is most probable that *N. tessellata* is extinct from the area.

Coronella austriaca (Laurentus, 1768). The smooth snake was observed at forest margins, near rocky areas and in pastures from the Bicaz Chei-Dodeni/Bicaz areas and also near the city of Piatra Neamţ on the Cârlomanul hill. The maximum altitude at which this species was observed was 561 m ASL at Dămuc, while the minimum altitude is 341 m ASL at Piatra Neamţ. We have identified it in 12 localities.

Zamenis longissimus (Laurentus, 1768). The Aesculapian snake was found in areas with deciduous or mixt forests near the localities of Doamna, Cut and Gârcina (Ghiurcă et al. 2005). However, in recent years, large parts of

Figure F. Adult *Podarcis muralis* from Bicaz/Dodeni (photo by Al. Strugariu 2007)

Figure G. Habitat of *B. variegata, C. austriaca, P. muralis, Z. vivipara* from Dodeni/Bicaz (photo by I. Gherghel 2007)

Figure H. Habitat of *P. muralis* and *Z. vivipara* from Cheile Bicazului (photo by I. Gherghel 2007)

Figure I. Typical landscape from the Ceahlău Mountains.
Habitat of *B. variegata, Z. vivipara, V. berus* (photo by I. Gherghel 2007)

those habitats have been destroyed and no specimens have been recorded in the region in the last years of our study.

Vipera berus (Linnaeus, 1758). The common adder (Fig. J) was observed at the margin of coniferous forests, in recently deforested areas (5-10 years ago) and in alpine habitats with *Juniperus* (Ceahlău Mountain) (Fig. I). The maximum altitude where this species was encountered is 1750 m ASL at Ceahlău Mountain and the minimum altitude is 452 m ASL at Bicaz. We have identified it in 37 localities.

Figure J. Adult female*Vipera berus* from the Ceahlău Mountains at 1250 m a.s.l. (photo by I. Gherghel 2007)

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Appendix 1/A. Geographical distribution of the amphibian species in the Bistriţa river basin (BC = Bacău county, HR = Harghita county, NT= Neamţ county, SV= Suceava county, S.s. = *Salamandra salamandra*, T.c. = *Triturus cristatus*, L.v. = *Lissotriton vulgaris*, M.a. = *Mesotriton alpestris*, L.m. = *Lissotriton montandoni*, L.x. = *Lissotriton vulgaris* X *Lissotriton montandoni*, B.b. = *Bombina bombina*, B.v. = *Bombina variegata*, B.x. = *Bombina bombina* X *Bombina variegata*, H.a. = *Hyla arborea*, P.e. =*Pelophylax* kl. *esculentus*, P.r.= *Pelophylax ridibundus*, R.d. = *Rana dalmatina*, R.t. = *Rana tempoaria*, Bf. b. = *Bufo bufo*, Bf. v. = *Bufo viridis*, P.f. = *Pelobates fuscus*) (X = Localities in which we identified the species for the first time; S = Localities in which we reconfirmed the presence of the species; O = Localities in which the species was previously mentioned but the data is not reconfirmed by us; Σ = The sum of localities)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Almaş / Gîrcina	NT	MN 50.03	X	X	X	X	X			X		X		X		X	X	X	
Agârcia / Piatra Neamţ	NT	MM 49.3	S	S	S	S	S			S		S		S		S	S	X	
Ardeluţa / Tarcău	NT	MM 37.3		O		O	S			X						X			
Bacău / Bacău	BC	MM 95.1		O			O			S		X	S	S			X	S	
Băluşeşti / Dochia	NT	MM 69.3		X	X				X	X	X	X		X				X	
Bicaz / Bicaz	NT	MM 29.3	S	S	S	S	S			X				X		S	O	S	
Bicaz Chei / Bicaz Chei	NT	MM 18.3	S	S	S	S	S			S						X			
Bicazul Ardealean / Bicazul Ardelean	NT	MM 18.3	X			S	S			X						X			
Bîrgăoani / Bîrgăoani	NT	MN 70.1		X	X				X	X	X	X		X			X	X	
Bisericani / Viişoara	NT	MN 41.00			X		X												
Bistricioara / Ceahlău	NT	MN 14.10	O	X	X	X	X			X									
Blăgeşti / Blăgeşti	BC	MM 76.1	X							X		X		X					
Bodeşti / Bodeşti	NT	MN 50.3		X	X				X	X	X	X		X			X	X	
Bodeştii de Jos / Bodeşti	NT	MN 50.3			X									X		X	X	X	
Borca / Borca	NT	MN 02.3	X			X	X			X						X			
Borleşti / Borleşti	NT	MM 57.3	O	O	O	S	S			X		X		X	X		X		
Borsec / Borsec	HR	LN 80.4	X			S	X			S				X		X		X	
Brateş / Tarcău	NT	MM 32.8		X		X	X			X						X			

Appendix 1/A. (Continued)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Broşteni / Broşteni	SV	MN 03.2	X	S		S	S			S						O			
Buda / Blăgeşti	BC	MM 76.3								X			X	X					
Buhalniţa / Hangu	NT	MN 30.03	S	S	S	S	S			S			O	S		S		O	
Buhuşi / Buhuşi	BC	MM 77.3	X	X	S					X		X	X	X	X	X	X	X	X
Căciuleşti / Girov	NT	MN 50.04								X		X	X	X		X	X	X	
Călugăreni / Călugăreni	NT	MN 20.11	X	X	X	X	X			X				X		X			
Cândeşti / Cândeşti	NT	MM 67.4	X	X	X					X		X		X	X	X	X	X	
Capşa / Bicaz	NT	MM 31.92			X					X				X				X	
Capu Corbului / Corbu	HR	LN 90.3	X	X	X	X	X			X				X		X	X	X	
Cârlibaba / Cârlibaba	SV	LN 56.3	X			S	S			X						S			
Cârlibaba Nouă / Cârlibaba	SV	LN 56.4	X			X	X			X						X			
Căşăria / Tarcău	NT	MN 52.01		X	X					X		X	X	X		X		X	
Cazaci / Tarcău	NT	MM 38.1	X	X	X	X	X			X				X		X	X		
Ceahlău / Ceahlău	NT	MN 20.1	S			X	S			X						S	O	O	
Chintinici / Roznov	NT	MM 68.1		X						X		X	X	X	X	X	X	X	
Chiril / Crucea	SV	LN 95.2		S		S	S			S						S			
Cojoci / Crucea	SV	LN 94.1		O	S	S	S			S		O							
Corni / Bodeşti	NT	MN 60.04		X	X							X		X	X				
Costişa / Costişa	NT	MM 77.1	X	X	X					X		X	X	X			X	X	X
Cozanesti / Dorna - Arini	SV	LN 84.2	O		S	S	S			X		O				S	O		
Crăcăoani / Crăcăoani	NT	MN 41.3		X	X					X		X		X					
Cracăul Negru / Crăcăoani	NT	MN 41.11		X	X	X	X			X						X			
Crucea / Crucea	SV	LN 94.1		O		S	S			S					O	O			

Appendix 1/A. (Continued)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Cut / Dumbrava Roşie	NT	MM 59.4	S	S	S	S	S			S		X	X	S	S	S	S	X	
Cuiejdiu / Gîrcina	NT	MN 40.4	S	S	S	S	S			X				X		X			
Dămuc / Dămuc	NT	MM 17.3				X	X			X						X			
Doamna / Piatra Neamţ	NT	MM 49.3	S	S	S	S	S			S		S		S	S	S	S	X	
Dobreni / Dobreni	NT	MN 50.1			X									X			X	X	
Dochia / Dochia	NT	MM 69.3		X	X				X	X	X	X		X			X	X	
Dodeni / Bicaz	NT	MM 39.1	X	X	X	X	X			X				S		X	X	X	
Doina / Girov	NT	MM 69.1			X				X	X	X	X		X			X	X	
Dorna - Arini / Dorna - Arini	SV	LN 74.4	S	S	S	S	S			S		O				O	S	S	
Dorneşti / Costişa	NT	MM 78.2		X								X	X	X			X	X	
Dumbrava Deal / Săvineşti	NT	MM 69.2		X	X					X		X	X	X					
Farcaşa / Farcaşa	NT	MN 12.2	S	X	X	S	S			X						S			
Făurei / Făurei	NT	MM 79.3	O	S	S				X	X	X	X		X	X	X	X	X	X
Frasin / Broşteni	SV	MN 03.2	S	O	O	S	S			S		O			O	S	O	O	
Galu / Poiana Teiului	NT	MN 13.14			X	X	X			X						X			
Gârleni / Gârleni	BC	MM 86.3								X		X	X	X			X	X	
Gheorghiseni / Dorna - Arini	SV	LN 84.1			S		S			S						O			
Gherman / Bicaz Chei	NT	MM 18.1	X	X	X	X										X			
Girov / Girov	NT	MN 60.1		X	X					X		X		X			X	X	
Goşmani / Români	NT	MM 78.3		S	S				X			X		X	X		X	X	
Grinţieş / Grinţieş	NT	MN 10.1					X			X						X			
Grozăveşti / Hangu	NT	MN 20.3	X	X	X	X	X			X				X		X			
Gura Haitii / Şaru Dornei	SV	LN 62.3				X	X			X						X			

Appendix 1/A. (Continued)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Haleasa / Broşteni	SV	MN03.2			S	X	S			S		O				O	O		
Hangu / Hangu	NT	MN 21.3	S	S	S	S	S			S			O	S		S		O	
Hîrţeşti / Mărgineni	NT	MM 79.4		S	S				X	X	X	X		X	X		X		X
Hoiseşti / Mărgineni	NT	MM 79.2		S	S							X		X			X	X	X
Iacobeni / Iacobeni	SV	LN 75.2	X			X	X			X						X			
Iedu / Cârlibaba	SV	LN 57.3				X	X			X						X			
Iteşti / Bereşti-Bistriţa	BC	MM 86.3								X				X				X	
Itrineşti / Mărgineni	NT	MM 79.1		X	X				X	X	X	X	X	X	X		X	X	X
Ivaneş / Bicaz Chei	NT	MM 18.3	X		X	X	X			X						X			
Lacul Cuiejdel / Gârcina	NT	MN 40.1		X	X	X	X	X		X				X		X			
Lacul Roşu / Lacul Roşu	HR	MM 08.4	S	S	X	S	S	X	O	S			X	S		S	S	S	
Lespezi / Gârleni	BC	MM 86.1								X			X	X			X		
Lilieci / Hemeiuş	BC	MM 96.2		X						X		X		X			X	X	
Luizi Călugăra / Luizi Călugăra	BC	MM 85.4	X							X				X				X	
Luminiş / Piatra Şoimului	NT	MM 58.4		X	X					X		X		X	X	X	X	X	
Lungeni / Broşteni	SV	MN 03.2	S				S			X						O			
Mădei / Borca	NT	MN 02.3	X			X	X			X						X			
Magazia / Crăcăoani	NT	MN 41.1	O	S	S	S	S			S		X		X		O	O		
Mărgineni / Mărgineni	BC	MM 85.3	X	X	X					X						X			
Mărgineni / Mărgineni	NT	MM 79.2		S	S				X			X		X	X		X	X	X
Mastacăn / Borleşti	NT	MM 68.2		O	O					X		X		X	X	X	X	X	
Mestecăniş / Iacobeni	SV	LM 75.1	X			S	X			X						X			
Micşunesti / Făurei	NT	MM 79.4		S	S				X	X	X	X		X	X		X		X

Appendix 1/A. (Continued)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Mitocu Bălan / Crăcăoani	NT	MN 31.3	O	O	S	S	S			S						S	O		
Neagra / Broşteni	SV	MN 03.2		S	S	S	S			S						S			
Neagra / Taşca	NT	MM 29.2		X	X	X	X			X						X			
Neagra Şarului / Şaru Dornei	SV	LN 72.1				X	X			X						X			
Nechit / Borleşti	NT	MM 57.3	S	S	S	S	S	X		X				X	X	X	X		
Negreşti / Dobreni	NT	MN 02.02		X	X					X		X		X		X		X	
Negriteşti / Podoleni	NT	MM 78.1										X		X			X	X	
Neguleşti / Piatra Şoimului	NT	MM 58.4		X	X	X	X			X		X	X	X	X	X	X	X	
Oanţu / Pângăraţi	NT	MM 39.4	S	S	S	S	S			X		O		X		X	S	S	
Ortoaia / Dorna - Arini	SV	LN 84.2		S	S		S			S						O	S		
Oşlobeni / Bodeşti	NT	MN 51.2		X	X					X		X	S	X		X			
Pângăraţi / Pângăraţi	NT	MM 39.3	S	S	O	S	O		O	S		S		S		X	O	S	
Pângăricior / Pângăraţi	NT	MN 40.2	S	S	S	O	S			X		O	S	X		X	O	O	
Petru Vodă / Poiana Teiului	NT	MN 22.2	O				X			X						X			
Piatra Neamţ / Piatra Neamţ	NT	MM 49.3	S	S	O		S		O	S		S		S	X	S	S	S	
Piatra Şoimului / Piatra Şoimului	NT	MM 58.1			X					X		X		X	X	X		X	
Pietroasa / Brosteni	SV	MN 03.4	S	S	S	S	S			S						S			
Plaiu Şarului / Şaru Dornei	SV	LN 74.4				X	X			X						X			
Podoleni / Podoleni	NT	MM 68.4								X		X	X	X				X	
Poiana / Dobreni	NT	MN 41.4	X	X	X	X	X			X		X		X		X			
Poiana / Grinţieş	NT	MN 10.1		X		X	X			X						X			
Poiana Crăcăoani / Crăcăoani	NT	MN 41.4	X	X	X	X	X			X		X		X		X			
Poiana Largului / Poiana Teiului	NT	MN 21.7		X	X	X	X			X				X		X			

Appendix 1/A. (Continued)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Poiana Teiului / Poiana Teiului	NT	MN 11.3	O			S	S			S						S			
Poieni / Piatra Şoimului	NT	MM 11.3	S	S	S	S	S			X		X		X	X	X	X	X	
Poloboc / Rediu	NT	MM 58.1		X	X					X		X		X	X		X	X	
Potoci / Bicaz	NT	MN 30.2	S	S	X	S	S			S			O	S		X		O	
Prăjeşti / Secuieni	NT	MM 79.4		S	S				X	X	X	X	X	X	X		X	X	X
Preluca / Pângăraţi	NT	MM 49.1			X		X			X		X		X		X	X	X	
Puntea Lupului / Lunca de Jos	HR	MM 17.4	X	X		X	X			X			X					X	
Racova / Racova	BC	MM 74.4	X	X	S		O			S		X		X	X	X	S	X	
Rediu / Rediu	NT	MM 67.3		S	S					X		X		X			X	X	
Români / Români	NT	MM 78.4		S	S							X		S				X	
Roşu / Vatra Dornei	SV	LN 74.2	X			X	X			X						X			
Roznov / Roznov	NT	MM 68.1								X		X	X	X			X		
Rusca / Dorna - Arini	SV	LN 84.1			X		X			X									
Ruseni / Borleşti	NT	MM 68.2		S	S					X		X		X			X	X	
Rugineşti / Hangu	NT	MN 30.1	S							S									
Sabasa / Borca	NT	MN 02.3	S	S	S	X	S	X		X						X			
Sărata / Dobreni	NT	MN 50.2		X	X					X		X		X		X	X	X	
Satu Mare / Crucea	SV	LN 94.1		S			S			S						O	O		
Săvineşti / Poiana Teiului	NT	MN 12.4				X	X			X						X			
Săvineşti / Săvineşti	NT	MM 58.3								X		X	X	X	X	X	X		
Scăricica / Alexandru cel Bun	NT	MM 49.1	X		X					X									
Schitul Tarcău / Tarcău	NT	MM 37.3		X		X	X			X						X			
Secu / Bicaz	NT	MN 20.4	X	X	X	X	X			X						X			

Appendix 1/A. (Continued)

Locality / Town	County	UTM	Ss	Tc	Lv	Ma	Lm	LX	Bb	Bv	BX	Ha	Pe	Pr	Rd	Rt	Bf	Bfv	Pf
Siliştea / Români	NT	MM 78.4		X	X							X	X	X	X		X	X	
Slobozia / Roznov	NT	MM 68.1			X					X		X	X	X			X	X	
Soci / Ştefan cel Mare	NT	MN 60.1	X	X	X					X						X			
Şovoaia / Borleşti	NT	MM 68.2								X		X		X	X	X	X	X	
Ştefan cel Mare / Ştefan cel Mare	NT	MN 60.2		X	X					X		X		X				X	
Straja / Tarcău	NT	MM 39.4		X	X		X	X		X				X			X		
Tarcău / Tarcău	NT	MM 39.2	O	S	S	S	S	X		X				X		X	X	X	
Taşca / Taşca	NT	MM 29.2	X	X	X	X	X			X				X		X			
Tatomireşti / Făurei	NT	MM 79.3		S	S				X	X	X	X		X	X		X	X	X
Ticoş-Floarea / Taşca	NT	MM 29.2	X	X		X	X			X						X			
Topoliceni / Poiana Teiului	NT	MN 11.3			X		X			X						X			
Traian / Zăneşti	NT	MN 90.2								X		X	X	X			X	X	
Tulgheş / Tulgheş	HR	MM 09.1		X		X	X			X						X	X	X	
Vădurele / Alexandru cel Bun	NT	MM 49.1								X		X		X					
Valea Stânei / Cârlibaba	SV	LN 66.1				X	X			X						X			
Vatra-Dornei / Vatra Dornei	SV	LN 74.2	S			S	S			S						S			
Verşeşti / Girov	NT	MN 60.2			X					X		X	X	X			X		
Zăneşti / Zăneşti	NT	MM 68.1								X			X	X			X	X	
Total number of new localities			33	51	56	40	45	6	13	109	12	60	24	80	25	71	53	58	10
∑ (S)			25	37	37	34	41	0	0	30	0	4	3	12	2	19	9	7	0
∑ (O)			8	8	5	2	3	0	3	0	0	3	3	0	2	0	10	6	0
TOTAL			66	96	98	76	89	6	16	139	12	67	30	92	29	90	72	71	10

Appendix 1/B. Geographical distribution of the reptile species in the Bistriţa river basin (BC = Bacău county, HR = Harghita county, NT= Neamţ county, SV= Suceava county, A.f. = *Anguis fragilis*, P.m. = *Podarcis muralis*, L.a. = *Lacerta agilis*, L.v. = *Lacerta viridis*, Z.v. = *Zootoca vivipara*, Z.l. = *Zamenis longissimus*, C.a. = *Coronella austriaca*, N.t. = *Natrix tessellata*, N.n. = *Natrix natrix*, E.o. = *Emys orbicularis*, V.b. = *Vipera berus*) (X = Localities in which we identified the species for the first time; S = Localities in which we reconfirmed the presence of the species; O = Localities in which the species was previously mentioned but the data is not reconfirmed by us; Σ = The sum of localities)

Locality / Town	County	UTM	Af	Pm	La	Lv	Zv	Zl	Ca	Nt	Nn	Eo	Vb
Almaş / Gîrcina	NT	MN 50.03			X								
Agârcia / Piatra Neamţ	NT	MM 49.3	S		S		S	S			S		S
Ardeluţa / Tarcău	NT	MM 37.3					X						X
Bacău / Bacău	BC	MM 95.1			O						X	X	
Bălușești / Dochia	NT	MM 69.3			X						X		
Bicaz / Bicaz	NT	MM 29.3	X	S	X				X		S		X
Bicaz Chei / Bicaz Chei	NT	MM 18.3		S			O		S				
Bicazul Ardealean / Bicazul Ardelean	NT	MM 18.3							X				S
Bîrgăoani / Bîrgăoani	NT	MN 70.1			X						X		
Bisericani / Viişoara	NT	MN 41.00	X		X	X					X		
Bistricioara / Ceahlău	NT	MN 14.10											X
Blăgeşti / Blăgeşti	BC	MM 76.1			X						X		
Bodeşti / Bodeşti	NT	MN 50.3									X		
Bodeştii de Jos / Bodeşti	NT	MN 50.3			X								
Borca / Borca	NT	MN 02.3			X		X						
Borleşti / Borleşti	NT	MM 57.3			X						X		
Borsec / Borsec	HR	LN 80.4	O		X		X				X		S
Brateş / Tarcău	NT	MM 32.8									X		X
Broşteni / Broşteni	SV	MN 03.2	X		X		S				X		S
Buda / Blăgeşti	BC	MM 76.3			X								
Buhalniţa / Hangu	NT	MN 30.03	X		S		X						
Buhuşi / Buhuşi	BC	MM 77.3			X						X		
Căciuleşti / Girov	NT	MN 50.04									X		
Călugăreni / Călugăreni	NT	MN 20.11			X		X						
Cândeşti / Cândeşti	NT	MM 67.4			X						X		
Capşa / Bicaz	NT	MM 31.92									X		
Capu Corbului / Corbu	HR	LN 90.3					X						X
Cârlibaba / Cârlibaba	SV	LN 56.3	S		S		S				S		S
Cârlibaba Nouă / Cârlibaba	SV	LN 56.4	X		X		X				X		X

Appendix 1/B. (Continued)

Locality / Town	County	UTM	Af	Pm	La	Lv	Zv	Zl	Ca	Nt	Nn	Eo	Vb
Căşăria / Tarcău	NT	MN 52.01	X		X						X		X
Cazaci / Tarcău	NT	MM 38.1			X		X				X		X
Ceahlău / Ceahlău	NT	MN 20.1	O		S	O	O				O	O	S
Chintinici / Roznov	NT	MM 68.1	X										
Chiril / Crucea	SV	LN 95.2			X		X						
Cojoci / Crucea	SV	LN 94.1			X		X						
Corni / Bodeşti	NT	MN 60.04	X		X						X		
Costişa / Costişa	NT	MM 77.1			X						X		
Cozanesti / Dorna - Arini	SV	LN 84.2			X		X				X		
Crăcăoani / Crăcăoani	NT	MN 41.3			X								
Cracăul Negru / Crăcăoani	NT	MN 41.11			X		X						X
Crucea / Crucea	SV	LN 94.1			X		X						
Cut / Dumbrava Roşie	NT	MM 59.4	S		S		X	S			S		X
Cuiejdiu / Gîrcina	NT	MN 40.4	X		X		X				X		
Dămuc / Dămuc	NT	MM 17.3							X				
Doamna / Piatra Neamţ	NT	MM 49.3	S		S	S	S	S	S		S		S
Dobreni / Dobreni	NT	MN 50.1											
Dochia / Dochia	NT	MM 69.3									X		
Dodeni / Bicaz	NT	MM 39.1	X	X	X		X		X		X		X
Doina / Girov	NT	MM 69.1			X						X		
Dorna - Arini / Dorna - Arini	SV	LN 74.4	X		X		X				X		X
Dorneşti / Costişa	NT	MM 78.2			X						X		
Dumbrava Deal / Săvineşti	NT	MM 69.2											
Farcaşa / Farcaşa	NT	MN 12.2	X		X		X				X		X
Făurei / Făurei	NT	MM 79.3	X								X		
Frasin / Broşteni	SV	MN 03.2			X						X		
Galu / Poiana Teiului	NT	MN 13.14											
Gârleni / Gârleni	BC	MM 86.3			X								
Gheorghiseni / Dorna - Arini	SV	LN 84.1	X								X		
Gherman / Bicaz Chei	NT	MM 18.1		X					X				
Girov / Girov	NT	MN 60.1			X						X		
Goşmani / Români	NT	MM 78.3			X						X		
Grinţieş / Grinţieş	NT	MN 10.1											X
Grozăveşti / Hangu	NT	MN 20.3			X		X						

Appendix 1/B. (Continued)

Locality / Town	County	UTM	Af	Pm	La	Lv	Zv	Zl	Ca	Nt	Nn	Eo	Vb
Gura Haitii / Şaru Dornei	SV	LN 62.3	O		O		O						S
Haleasa / Broşteni	SV	MN03.2	X								X		
Hangu / Hangu	NT	MN 21.3	X		S	X	S						
Hîrţeşti / Mărgineni	NT	MM 79.4			X						X		
Hoiseşti / Mărgineni	NT	MM 79.2			X						X		
Iacobeni / Iacobeni	SV	LN 75.2	O		S		O		O		S		S
Iedu / Cârlibaba	SV	LN 57.3			X		X						X
Iteşti / Bereşti-Bistriţa	BC	MM 86.3											
Itrineşti / Mărgineni	NT	MM 79.1	X		X	X							
Ivaneş / Bicaz Chei	NT	MM 18.3											X
Lacul Cuiejdel / Gârcina	NT	MN 40.1			X		X				X		
Lacul Roşu / Lacul Roşu	HR	MM 08.4	O	X	O		O						S
Lespezi / Gârleni	BC	MM 86.1			X						X		
Lilieci / Hemeiuş	BC	MM 96.2									X		
Luizi Călugăra / Luizi Călugăra	BC	MM 85.4	X		X						X		
Luminiş / Piatra Şoimului	NT	MM 58.4	X		X						X		
Lungeni / Broşteni	SV	MN 03.2			X		X				X		
Mădei / Borca	NT	MN 02.3			X		X						
Magazia / Crăcăoani	NT	MN 41.1	O		S		X				O		S
Mărgineni / Mărgineni	BC	MM 85.3			X						X		
Mărgineni / Mărgineni	NT	MM 79.2									X		
Mastacăn / Borleşti	NT	MM 68.2			X						X		
Mestecăniş / Iacobeni	SV	LM 75.1			X		X				X		X
Micşuneşti / Făurei	NT	MM 79.4			X						X		
Mitocu Bălan / Crăcăoani	NT	MN 31.3	O		S						O		S
Neagra / Broşteni	SV	MN 03.2					X						
Neagra / Taşca	NT	MM 29.2					X		X				
Neagra Şarului / Şaru Dornei	SV	LN 72.1											
Nechit / Borleşti	NT	MM 57.3	X		X						X		
Negreşti / Dobreni	NT	MN 02.02			X								
Negriteşti / Podoleni	NT	MM 78.1											
Neguleşti / Piatra Şoimului	NT	MM 58.4			X						X		
Oanţu / Pângăraţi	NT	MM 39.4	X		X		X				S	O	S

Appendix 1/B. (Continued)

Locality / Town	County	UTM	Af	Pm	La	Lv	Zv	Zl	Ca	Nt	Nn	Eo	Vb
Ortoaia / Dorna - Arini	SV	LN 84.2											
Oşlobeni / Bodeşti	NT	MN 51.2			X								
Pângărați / Pângărați	NT	MM 39.3	S		S	S	O		O			O	O
Pângăricior / Pângărați	NT	MN 40.2			X						X		
Petru Vodă / Poiana Teiului	NT	MN 22.2					X						
Piatra Neamț / Piatra Neamț	NT	MM 49.3	S		S	S			X		S		
Piatra Şoimului / Piatra Şoimului	NT	MM 58.1			X								
Pietroasa / Brosteni	SV	MN 03.4	X		X		X				X		
Plaiu Şarului / Şaru Dornei	SV	LN 74.4											
Podoleni / Podoleni	NT	MM 68.4									X		
Poiana / Dobreni	NT	MN 41.4			X								
Poiana / Grințieș	NT	MN 10.1											
Poiana Crăcăoani / Crăcăoani	NT	MN 41.4			X		X						
Poiana Largului / Poiana Teiului	NT	MN 21.7			X		X						X
Poiana Teiului / Poiana Teiului	NT	MN 11.3					X						X
Poieni / Piatra Şoimului	NT	MM 11.3	X		X		X				X		
Poloboc / Rediu	NT	MM 58.1			X						X		
Potoci / Bicaz	NT	MN 30.2	S		S		S		S		S		S
Prăjești / Secuieni	NT	MM 79.4			X						X		
Preluca / Pângărați	NT	MM 49.1			X						X		
Puntea Lupului / Lunca de Jos	HR	MM 17.4											
Racova / Racova	BC	MM 74.4			X						X		
Rediu / Rediu	NT	MM 67.3											
Români / Români	NT	MM 78.4			X						X		
Roşu / Vatra Dornei	SV	LN 74.2			X		X				X		
Roznov / Roznov	NT	MM 68.1											
Rusca / Dorna - Arini	SV	LN 84.1	X		X		X				X		
Ruseni / Borlești	NT	MM 68.2											
Rugineşti / Hangu	NT	MN 30.1										O	
Sabasa / Borca	NT	MN 02.3											
Sărata / Dobreni	NT	MN 50.2			X								
Satu Mare / Crucea	SV	LN 94.1											

Appendix 1/B. (Continued)

Locality / Town	County	UTM	Af	Pm	La	Lv	Zv	Zl	Ca	Nt	Nn	Eo	Vb
Săvineşti / Poiana Teiului	NT	MN 12.4					X						
Săvineşti / Săvineşti	NT	MM 58.3									X		
Scăricica / Alexandru cel Bun	NT	MM 49.1	X		X	X							
Schitul Tarcău / Tarcău	NT	MM 37.3					X				X		X
Secu / Bicaz	NT	MN 20.4			X		X				X		
Siliştea / Români	NT	MM 78.4			X								
Slobozia / Roznov	NT	MM 68.1									X		
Soci / Ştefan cel Mare	NT	MN 60.1											
Şovoaia / Borleşti	NT	MM 68.2			X						X		
Ştefan cel Mare / Ştefan cel Mare	NT	MN 60.2									X		
Straja / Tarcău	NT	MM 39.4	X		X						X		
Tarcău / Tarcău	NT	MM 39.2			X				X	O	S		O
Taşca / Taşca	NT	MM 29.2			X		X		X				
Tatomireşti / Făurei	NT	MM 79.3									X		
Ticoş-Floarea / Taşca	NT	MM 29.2											X
Topoliceni / Poiana Teiului	NT	MN 11.3											X
Traian / Zăneşti	NT	MN 90.2											
Tulgheş / Tulgheş	HR	MM 09.1			X		X						
Vădurele / Alexandru cel Bun	NT	MM 49.1			X						X		
Valea Stânei / Cârlibaba	SV	LN 66.1					X						X
Vatra-Dornei / Vatra Dornei	SV	LN 74.2	O		O		O						O
Verşeşti / Girov	NT	MN 60.2			X								
Zăneşti / Zăneşti	NT	MM 68.1									X		
Total number of new localities			26	3	81	4	42	0	9	0	69	1	23
∑ (S)			7	2	13	3	6	3	3	0	10	0	14
∑ (O)			8	0	4	1	7	0	2	1	3	4	3
TOTAL			41	5	98	8	55	3	14	1	82	5	40

Appendix 2. Habitat preferences and vertical limits of occurance of the herpetofauna in the Bistrița river basin (M. = Meadow forest)

	Forests								Pond		Lake					Bioregion	
	deciduous	M	conniferous	M	Pasture	Rocky area	Urban area	Farm land	temporary	permanent	artificial	Natural	Wet lands	River	Altitude (m ASL)	alpine	continental
AMPHIBIANS																	
Salamandra salamandra	X		X										X		240-1556	X	
Triturus cristatus	X		X					X	X	X	X	X	X		229-715	X	X
Lissotriton vulgaris	X		X					X	X	X	X	X	X		229-690	X	X
Mesotriton alpestris	X		X						X	X	X	X			290-1000	X	
Lissotriton montandoni	X		X						X	X	X	X			290-1000	X	
Lissotriton vulgaris X Lissotriton montandoni			X						X		X	X			420-665	X	
Bombina bombina	X							X	X	X	X	X	X	X	300-420		X
Bombina variegata	X		X				X	X	X	X	X	X	X	X	190-1750	X	X
Bombina bombina X Bombina variegata	X							X	X	X	X	X	X		360-430		X
Pelobates fuscus					X			X	X	X					240-420		X
Hyla arborea		X			X		X		X	X	X	X	X		190-750	X	X
Bufo bufo	X	X		X	X		X	X	X		X		X	X	190-630	X	X
Bufo viridis	X	X		X	X		X	X	X		X		X	X	190-780	X	X

Appendix 2. (Continued)

	Forests				Pasture	Rocky area	Urban area	Farm land	Pond		Lake		Wet lands	River	Altitude (m ASL)	Bioregion	
	deciduous	M	coniferous	M					temporary	permanent	artificial	Natural				alpine	continental
Pelophylax ridibundus							X		X	X	X	X	X	X	190-750	X	X
Pelophylax kl. esculentus							X		X	X	X	X	X	X	190-400	X	X
Rana dalmatina	X	X							X			X	X		220-650		X
Rana temporaria	X	X	X	X	X		X	X	X	X	X	X	X	X	290-1620	X	X
REPTILES																	
Emys orbicularis							X				X			X	140-160		X
Lacerta viridis		X					X								340-600		X
Lacerta agilis		X		X	X	X	X	X					X		160-1342	X	X
Zootoca vivipara			X	X	X	X							X		335-1850	X	
Podarcis muralis		X		X		X									420-970	X	
Anguis fragilis	X	X	X	X	X	X	X								260-821	X	X
Zamenis longissimus	X	X	X	X											320-500	contact	
Natrix natrix		X		X	X		X	X	X	X	X	X	X	X	140-850	X	X
Coronella austriaca		X		X	X	X	X								341-561	X	
Vipera berus			X	X											452-1750	X	