

PRELIMINARY DATA CONCERNING THE HERPETOFAUNA IN NEAMŢ COUNTY (ROMANIA)

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Abstract. In the researched area we identified 14 amphibian species: (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Triturus alpestris*, *Triturus montandoni*, *Bombina bombina*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Pelobates fuscus*, *Hyla arborea*, *Rana ridibunda*, *Rana dalmatina*, *Rana temporaria*) and 8 reptilian species (*Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Anguis fragilis*, *Natrix natrix*, *Elaphe longissima*, *Coronella austriaca*, *Vipera berus*). Within the region we identified species quoted (Cogălniceanu et al 2000) to have the lowest altitudinal limit of their spreading area at much higher altitudes. The species *Triturus montandoni* was identified at 320 m altitude at Agârcia and Doamna. Most of the amphibian and reptilian species are not endangered in the researched area.

Key-words: amphibians, reptiles, Neamţ County, spreading area

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. Amfibia* (Fuhn 1960) and *Reptilia* (Fuhn & Vancea 1961). However the researches didn't satisfactory cover the surface of Romania so the herpetofauna of Neamţ County was less studied (Ionescu 1968, Ghiurcă 2004). Concerning these issues we aimed to realize a synthesis of the knowledge regarding the herpetofauna from Neamţ County, based both on the previous studies and our field researches.

The history of herpetological researches in the area

The herpetofauna of this area was very poorly studied. During the '60 were published the volumes of Romania Fauna in which were described the Romanian species involving, also, only scarce data regarding the amphibians and reptilian from Neamţ county. In 1968 Ionescu et al published a paperwork on the vertebrate from the mountain basin of Bistriţa river in which were presented some data on the herpetofauna within the region of our study. A synthesis of the knowledge regarding the amphibian spreading in Romania is published in 1991 by Cogălniceanu followed by a more complete work on this issue in 2000 (Cogălniceanu et al 2000). The paper describes the Romanian amphibian species, includes information regarding their spreading illustrated with general maps without quoting the localities in which the species were recorded. Some spreading maps overlap with the region of our study.

MATERIAL AND METHODS

Our studies were carried out during the years 2004 and 2005, the mapping being based on transects method (Cogălniceanu 1997), comprising the limitrophe localities of Piatra Neamţ, including the town, localities within Vânători Neamţ Natural Park boundaries and other random chosen. There was used information given by local people, which were checked by us in the field. 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 town Piatra Neamţ is the residentship of the Neamţ County. The region is placed in Moldavia Subcarpathians in an area with high hills and mountains, with the lowest altitudes of 290 m (Gura Văii) and the highest point at 850,6 m (Cernegura peak). The Vânători Neamţ Natural Park covers the North part of the county in a region with hills and mountains, with altitudes between 540 and 850 m.

RESULTS AND DISCUSSIONS

During our preliminary researches in Neamţ county were identified a number of 14 amphibian species (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Triturus alpestris*, *Triturus*

montandoni, *Bombina bombina*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Pelobates fuscus*, *Hyla arborea*, *Rana ridibunda*, *Rana dalmatina*, *Rana temporaria*) and 8 reptilian species (*Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Anguis fragilis*, *Natrix natrix*, *Elaphe longissima*, *Coronella austriaca*, *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 more frequent in the locations around Piatra Neamț (fig. 1), the populations within this area being, probably, connected. *Salamandra salamandra* appears, also, in Vânători Neamț Natural Park in Leghin region. There wasn't identified this species in the areas around the town Roman (Bașta, Dulcești) and nor in other areas with the Vânători Neamț Natural Park. We identified the spotted salamander in 11 new localities for Romania (table 1).

Triturus 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 (Ionescu et al 1968, Cogălniceanu et al 2000). We identified this species in 18 localities (fig. 2) within Neamț County out of which 17 are new mentioned for this area (table 1).

Triturus cristatus Laurentus 1768

This is a common species in the studied area, identified in the majority of the localities from which we collected data regarding herpetofauna (fig. 3). The crested newts were sampled from areas with low altitude of 250 m (Dulcești) to altitude of 780 m in the Magazia and Mitocu Bălan region. A greater abundance was recorded in higher regions. This species breed 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.

Triturus 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 (fig. 4), we identified this species in mountain regions, being recorded at altitudes lower than in other parts of the country – quit often at 300 m. The species was registered in areas with altitudes of 320 m in the localities Agârcia, Doamna and Bistrița. 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 cover almost all the area with the general features of a mountain region represented by a colder and moist climate, conditions favorable for *Triturus alpestris*. Occasionally was recorded in temporal small pools, alone or along with the other newt species (*Triturus vulgaris*, *Triturus cristatus*, *Triturus montandoni*). The species was identified in 10 new localities (table 1).

Triturus montandoni Boulenger 1880

The species is endemic for Eastern Carpathians and was often recorded in the studied area (fig. 5). The lowest altitude for Montandons newt is 200 m in northern part 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 newt was identified in a great number of localities in Vânători Neamț Natural Park, spread at usual altitudes for this species (540 – 850 m), in ponds along the road side and temporal ponds in forest. This species was often identified alone, but sometimes along with the other newt species within the area (*Triturus vulgaris*, *Triturus cristatus*, *Triturus alpestris*). The Montandons newt was recorded in 8 new localities or Romania (table 1).

Bombina bombina Linnaeus 1761

The fire-bellied toad is spread in plane areas (Cogălniceanu et al 2000) with preference for larger aquatic habitats (Madej 1973) very rare in the researched zone where high relief prevails (fig. 6). We recorded this species in a few localities at altitudes between 250 and 320 m at Turturești, Izvoare and Gura Văii, in the neighbourhood of Piatra Neamț, but also at Farcașa and Dulcești. We identified 5 new localities for *Bombina bombina* (table 1).

Bombina variegata Linnaeus 1758

The yellow-bellied toad is wider spread than fire-bellied toad (fig. 7). We identified this species in many localities 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). We identified 17 new localities for this species (table 1).

Bombina bombina* x *Bombina variegata

It is very possible to occur hybrid populations between the two species due to the overlapping of their spreading areas. We consider that the hybrid populations exist in the region and will carry on with the studies in order to confirm this.

Bufo bufo Linnaeus 1758

The common toad is wide spread in the studied region (fig. 8), which we recorded in almost of the sampled localities. The species is present both in lower altitude areas around Piatra Neamț town and, also, in

higher zones with mixed forests within the Vânători Neamț Natural Park. Out of the total number of localities in which we identified the species 16 are new for Romania (table 1).

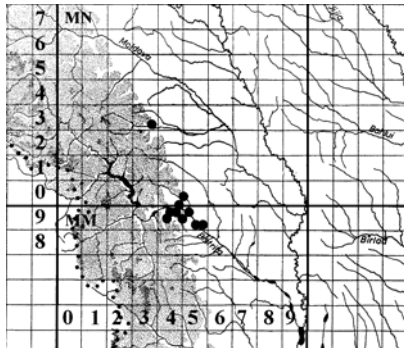


Fig. 1: Distribution area of *Salamandra salamandra* species in Neamț County

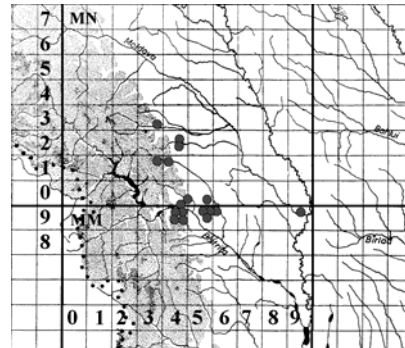


Fig. 2: Distribution area of *Triturus vulgaris* species in Neamț County

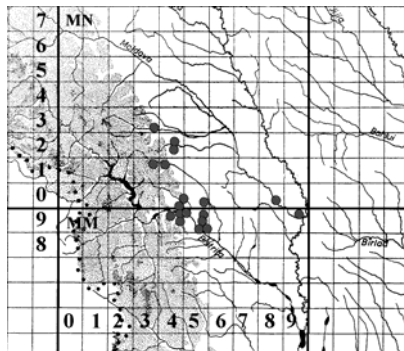


Fig. 3: Distribution area of *Triturus cristatus* species in Neamț County

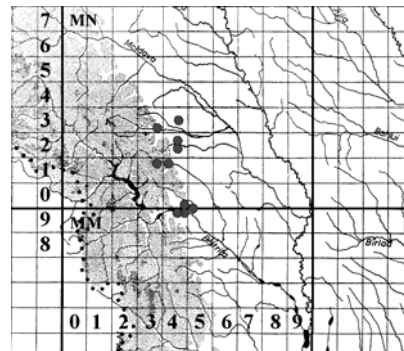


Fig. 4: Distribution area of *Triturus alpestris* species in Neamț County

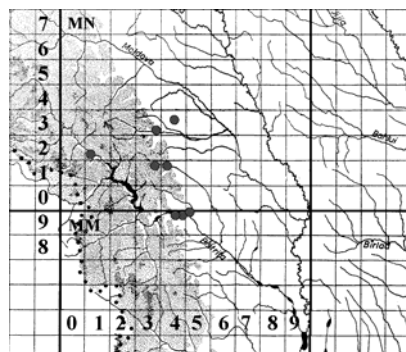


Fig. 5: Distribution area of *Triturus montandoni* species in Neamț County

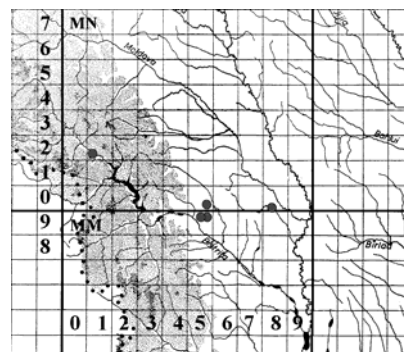


Fig. 6: Distribution area of *Bombina bombina* species in Neamț County

Bufo viridis Laurentus 1768

The green toad is less spread than the previous species (fig. 9) 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). We identified 3 new localities for this species and didn't confirm its presence in 2 areas where the species was mentioned before (table 1).

***Pelobates fuscus* Laurentus 1768**

The brown mud frog wasn't previously mentioned for the studied area, being very difficult to observe due to its nocturnal life (Cogălniceanu et al 2000). We recorded this species at Dulcești and Bașta on agricultural cropland surfaces (fig. 10).

***Hyla arborea* Linnaeus 1758**

The tree-frog is quit common in the researched area, being present in half of the sample localities (fig. 11). We recorded this species up to 540 m altitude in the Nemțișor region within the Vânători Neamț Natural Park area. For this frog we identify 10 new locations for Romania (table 1).

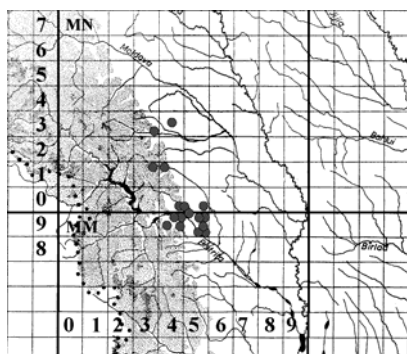


Fig. 7: Distribution area of *Bombina variegata* species in Neamț County

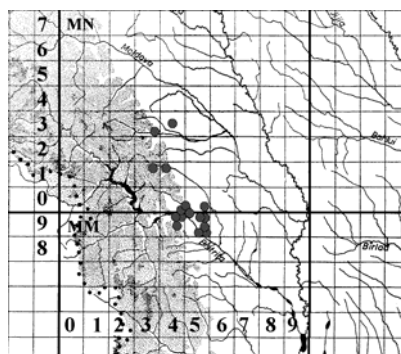


Fig. 8: Distribution area of *Bufo bufo* species in Neamț County

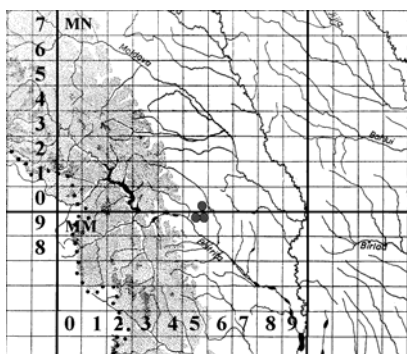


Fig. 9: Distribution area of *Bufo viridis* species in Neamț County

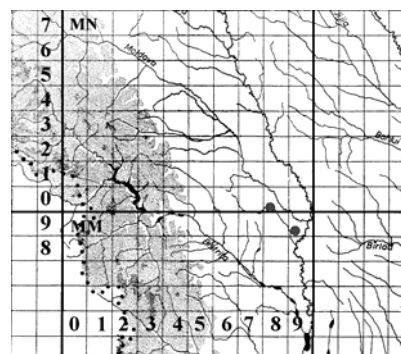


Fig. 10: Distribution area of *Pelobates fuscus* species in Neamț County

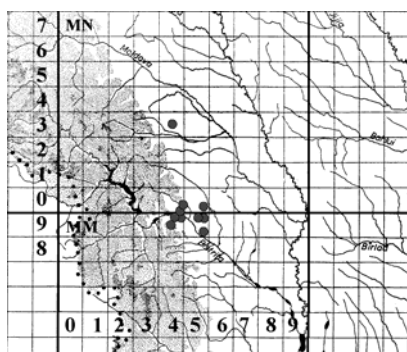


Fig. 11: Distribution area of *Hyla arborea* species in Neamț County

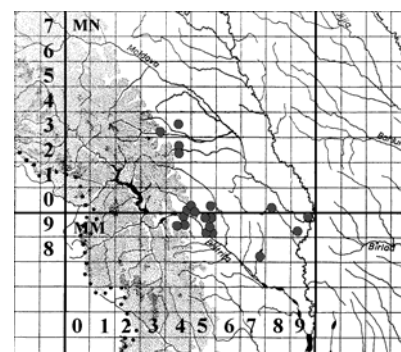


Fig. 12: Distribution area of *Rana ridibunda* species in Neamț County

***Rana ridibunda* Pallas 1771**

The edible frog is wide spread in studied area with large populations in almost all the sample localities (fig. 12). Most of the populations are localized in low altitude regions, along water streams, especially along the rivers Bistrița and Moldova; this frog is classified as a plain species in Romania, rare in hill region, spread up to 600 m altitude (Cogălniceanu et al 2000). *Rana ridibunda* populate both the water stream and the ponds and swamps along their course. Actually in the studied area the species was registered at altitudes higher than those mentioned for this species. Thus, the edible frog is common in the forests from the surroundings of Piatra Neamț at altitudes of 180 – 320 m and, also, in localities within Vânători Neamț Natural Park area, in region with high altitudes for this species (540-650 m). In the studied zone we established 20 new localities for this species beside those mentioned in the literature (Fuhn 1960, Ionescu et al 1968) (table 1).

***Rana dalmatina* Bonaparte 1839**

This is a rarely recorded species, in the researched area being identified only in 2 localities (fig. 13) out of a total studied number of 24 (table 1).

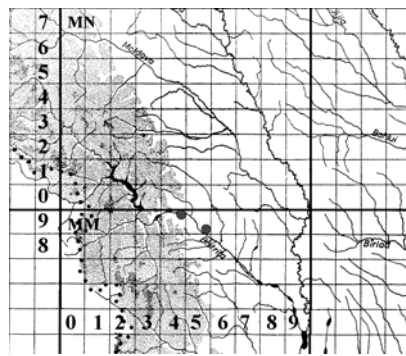


Fig. 13: Distribution area of *Rana dalmatina* species in Neamț County

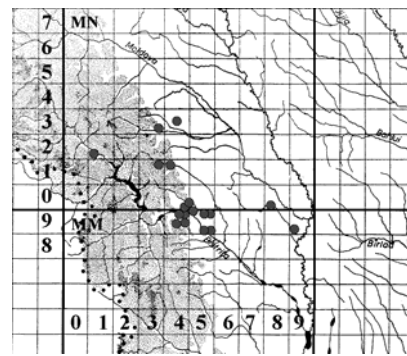


Fig. 14: Distribution area of *Rana temporaria* species in Neamț County

***Rana temporaria* Linnaeus 1758**

The common frog was identified in the most of the sample localities (fig. 14), at altitudes between 180 and 780 m. We recorded this species both in the localities around Piatra Neamț and within Vânători Neamț Natural Park. There were established 19 new localities for this species spreading area in Romania (table 1).

Class REPTILIA Blainville 1816***Lacerta agilis* Linnaeus 1758**

The sandlizard is the most common lizard in the studied region and was recorded in the most of the sample localities (fig. 15), from low altitudes of 180 m up to highs of almost 800 m. For this species we identified 18 new localities for Romania in the researched area (table 1).

***Lacerta viridis* Laurentus 1768**

The green lizard is a mesophyll big size species (Fuhn and Vancea 1961). Due to the unfavorable environment condition, this species was rarely identified in the studied region where we established 2 new localities for its spreading area in Romania (fig. 16).

***Zootoca vivipara* Jacquin 1787**

The viviparous lizard is scarce spread in the researched area. We identified this species only in 3 sample localities in Neamț County (fig. 17) and couldn't confirm its existence for 2 previously mention locations (table 1). As long as the studies are at the beginning we assume that the species could be present in a higher number of localities with the area.

***Anguis fragilis* Linnaeus 1758**

The slow worm is a species wide spread in hill and mountain region covered with forest vegetation, being identified both at low altitudes (200 – 300 m) in the surroundings of Piatra Neamț and, also, in higher regions (700 – 800 m) in the Vânători Neamț Natural Park area (fig. 18). We identified 15 new localities for this species spreading area in Romania (table 1).

***Natrix natrix* Linnaeus 1758**

The grass snake is a common species for Romania fauna, usually spread closely to the water (Fuhn and Vancea 1961). In the studied region we identified this snake in 18 localities (fig. 19) all of them being

new for this species spreading area in Romania (table 1). The great number of identified specimens shows that the species is not endangered in the area.

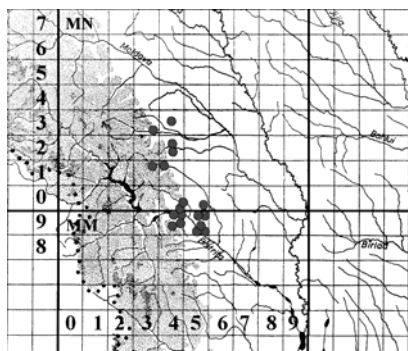


Fig. 15: Distribution area of *Lacerta agilis* species in Neamț County

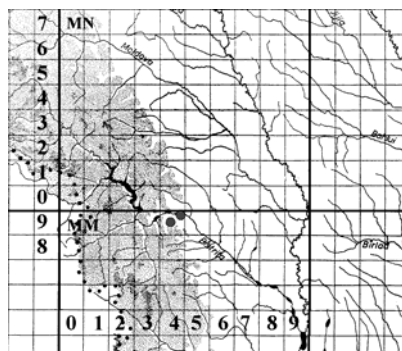


Fig. 16: Distribution area of *Lacerta viridis* species in Neamț County

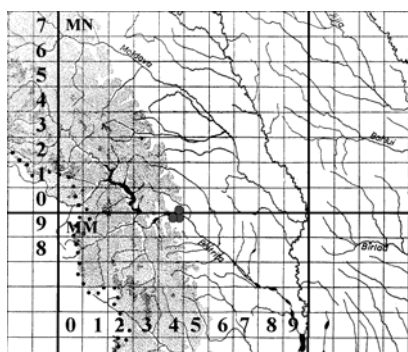


Fig. 17: Distribution area of *Zootoca vivipara* species in Neamț County

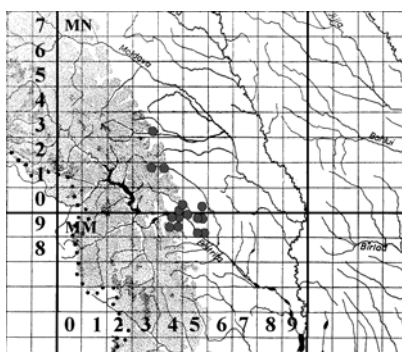


Fig. 18: Distribution area of *Anguis fragilis* species in Neamț County

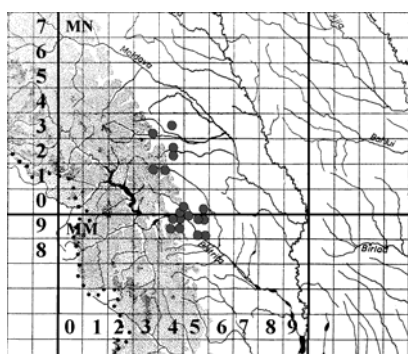


Fig. 19: Distribution area of *Natrix natrix* species in Neamț County

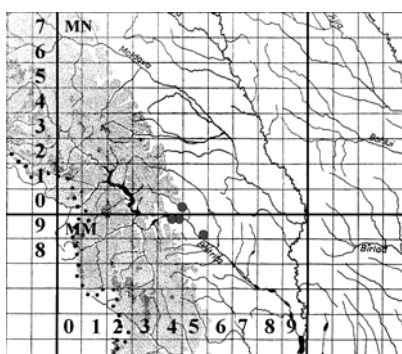


Fig. 20: Distribution area of *Elaphe longissima* species in Neamț County

***Elaphe longissima* Laurentus 1768**

This is a quite rarely spread species and was identified in 4 sample localities (fig. 20), as following: Agârcia, Doamna, Gârcina and Cut (table 1). The species was recorded only in forest ecosystems.

***Coronella austriaca* Laurentus 1768**

The smooth snake is a rare species, being identified in fewer localities than the previous species (fig. 21).

***Vipera berus* Linnaeus 1758**

The viper was recorded in a few localities out the total number of samples (fig. 22). The species was identified at low altitude (300 – 400 m), in wood side from Piatra Neamț surroundings and at higher altitudes (700 – 800 m) at Mitocu Bălan and Magazia within Vânători Neamț Natural Park. It seems that this viper is spread at low altitudes in the researched area.

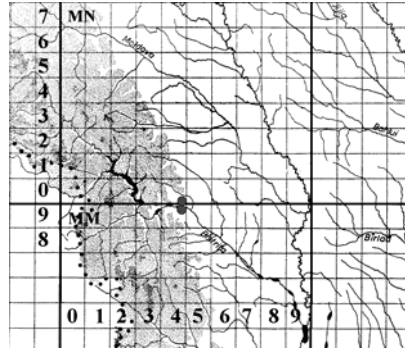


Fig. 21: Distribution area of *Coronella austriaca* species in Neamț County

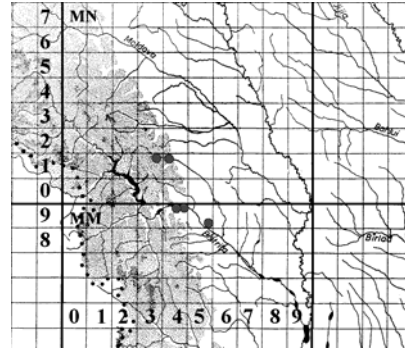


Fig. 22: Distribution area of *Vipera berus* species in Neamț County

CONCLUSIONS

1. Along our study we identified 14 amphibian species (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Triturus alpestris*, *Triturus montandoni*, *Bombina bombina*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Pelobates fuscus*, *Hyla arborea*, *Rana ridibunda*, *Rana dalmatina*, *Rana temporaria*) and 8 reptilian species (*Lacerta agilis*, *Lacerta viridis*, *Zootoca vivipara*, *Anguis fragilis*, *Natrix natrix*, *Elaphe longissima*, *Coronella austriaca*, *Vipera berus*).

2. For all identified amphibian and reptilian species we established new localities for their spreading area in Romania.

3. Concerning the study of Neamț county herpetofauna, we can state, for the first time, the existence of hybrid populations between *Bombina bombina* and *Bombina variegata*, but in order to confirm this we aim to continue the studies for several years.

4. It is remarkable the presence of some species at lower altitudes than usual in the researched area. Thus, the following species: *Salamandra salamandra*, *Triturus alpestris*, *Triturus montandoni*, *Rana temporaria* and *Vipera berus* area spread down to a low limit of almost 300 m. *Triturus montandoni* was identified at Agârcia and Doamna at the lowest altitude (320 m) known for Romania until the present work, probably, due to the cold and moist climate of the area. Contrary, the species *Rana ridibunda* was recorded at altitudes up to 650 m, higher than literature references (Cogălniceanu et al 2000), which specify the presence of the edible frog below 600 m high.

5. 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.

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

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Table 1.1 Preliminary data concerning the spreading of amphibian species in studied localities from Neamț County (using the UTM quadrate of 10x10 Km – Lehrer & Lehrer 1990)

Localitatea	Species /													
	<i>S</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>T</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>P</i>	<i>H</i>	<i>R</i>	<i>R</i>	<i>R</i>
	<i>s</i>	<i>v</i>	<i>c</i>	<i>a</i>	<i>m</i>	<i>b</i>	<i>v</i>	<i>fb</i>	<i>fv</i>	<i>f</i>	<i>a</i>	<i>r</i>	<i>d</i>	<i>t</i>
Agapia (MN 42.2-3-4)	-	X	X	X	S	-	S	S	O	-	-	X	-	S
Agircia (MM 49.3)	X	X	X	X	X	-	X	X	-	-	X	X	-	X
Bașta (MM 99.2)	-	-	-	-	-	-	-	-	-	X	-	X	-	X
Bistrița (MM 49.3 / MN 40.4)	X	X	X	X	-	-	X	X	-	-	X	X	-	X
Brășăuți (MM 59.4)	X	X	X	-	-	-	X	X	-	-	X	X	-	X
Cut (MM 59.4)	X	X	X	-	-	-	X	X	-	-	-	X	X	X
Doamna (MM 49.3)	X	X	X	X	X	-	X	X	-	-	X	S	X	X
Dulcești (MM 89.1 / MN 80.2-4)	-	-	X	-	-	X	-	-	-	X	-	X	-	X
Dumbrava Roșie (MM 59.4)	-	-	-	-	-	-	X	X	-	-	-	X	-	-
Farcașa (MN 12.2)	-	-	-	-	X	X	-	-	-	-	-	-	-	X
Gârcina (MN 40.4 / 50.2)	X	X	X	-	-	-	X	X	-	-	X	X	-	X
Gura Văii (MN 50.4)	X	X	X	-	-	X	X	X	X	-	X	X	-	X
Izvoare (MM 59.3)	-	X	X	-	-	X	X	X	X	-	X	X	-	X
Leghin (MN 33.4)	X	X	X	X	X	-	X	X	-	-	-	X	-	X
Magazia (MN 41.1)	-	X	X	X	X	-	X	X	-	-	-	-	-	X
Mitocu Bălan (MN 31.3)	-	X	X	X	X	-	X	X	-	-	-	-	-	X
Nemțișor (MN 43.2-4)	-	-	-	X	X	-	X	X	-	-	X	X	-	X
Piatra Neamț (MM 49.3/59.1/MN 50.2)	X	S	S	X	X	-	X	X	-	-	O	X	-	X
Roman (MM 99.1-3)	-	X	X	-	-	-	-	-	-	-	-	X	-	-
Români (MM 78.4)	-	-	-	-	-	-	-	-	-	-	-	X	-	-
Turturești (MM 59.3)	-	X	X	-	-	X	X	X	X	-	X	X	-	X
Văleni (MM 49.3)	X	X	X	-	-	-	X	X	-	-	-	X	-	X
Văratec (MN 42.4)	-	X	X	X	S	-	S	S	O	-	-	X	-	S
Viișoara (MM 49.1-3)	X	X	X	-	-	-	X	-	-	-	X	X	-	X
Total number of new localities	1	1	1	1	8	5	1	1	3	2	1	2	2	1
	1	7	8	0	8	5	7	6	3	2	0	0	2	9
Σ(O)	-	-	-	-	-	-	-	-	2	-	1	-	-	-
Σ(S)	-	1	1	-	2	-	2	2	-	-	-	1	-	2
Total number of localities	1	1	1	1	1	5	1	1	5	2	1	2	2	2
	1	8	9	0	0	5	9	8	5	2	1	1	2	1

Legend:

Ss - *Salamandra salamandra*, *Tv* - *Triturus vulgaris*, *Tc* - *Triturus cristatus*, *Ta* - *Triturus alpestris*, *Tm* - *Triturus montandoni*, *Bb* - *Bombina bombina*, *Bv* - *Bombina variegata*, *Pf* - *Pelobates fuscus*, *Bfb* - *Bufo bufo*, *Bfv* - *Bufo viridis*, *Ha* - *Hyla arborea*, *Rr* - *Rana ridibunda*, *Rd* - *Rana dalmatina*, *Rt* - *Rana temporaria*,

X – new localities for Romania herpetofauna;

O – localities in which was mentioned a species we didn't confirm;

Σ(O) – the sum of these localities;

S – localities mentioned for a species which we confirmed;

Σ(S) – the sum of these localities;

Table 1.2. Preliminary data concerning the spreading of reptilian species in studied localities from Neamț County (using the UTM quadrate of 10x10 Km – Lehrer & Lehrer 1990)

Localitatea	Species /	<i>L</i> <i>a</i>	<i>L</i> <i>v</i>	<i>Z</i> <i>v</i>	<i>A</i> <i>f</i>	<i>N</i> <i>n</i>	<i>E</i> <i>l</i>	<i>C</i> <i>a</i>	<i>V</i> <i>b</i>
Agapia (MN 42.2-3-4)		X	-	O	O	X	-	-	-
Agîrcia (MM 49.3)		X	-	X	X	X	X	-	X
Bașta (MM 99.2)		-	-	-	-	-	-	-	-
Bistrița (MM 49.3 / MN 40.4)		X	S	X	X	X	-	X	-
Brășăuți (MM 59.4)		X	-	-	X	X	-	-	-
Cut (MM 59.4)		X	-	-	X	X	X	-	X
Doamna (MM 49.3)		X	X	X	X	X	X	X	X
Dulcești (MM 89.1 / MN 80.2-4)		-	-	-	-	-	-	-	-
Dumbrava Roșie (MM 59.4)		X	-	-	-	-	-	-	-
Farcașa (MN 12.2)		-	-	-	-	-	-	-	-
Gârcina (MN 40.4 / 50.2)		X	-	-	X	X	X	-	-
Gura Văii (MN 50.4)		X	-	-	X	X	-	-	-
Izvoare (MM 59.3)		X	-	-	X	X	-	-	-
Leghin (MN 33.4)		X	-	-	X	X	-	-	-
Magazia (MN 41.1)		X	-	-	X	X	-	-	X
Mitocu Bălan (MN 31.3)		X	-	-	X	X	-	-	X
Nemțșor (MN 43.2-4)		X	-	-	-	X	-	-	-
Piatra Neamț (MM 49.3/59.1/MN 50.2)		S	S	-	X	X	-	-	-
Roman (MM 99.1-3)		-	-	-	-	-	-	-	-
Români (MM 78.4)		-	-	-	-	-	-	-	-
Turturești (MM 59.3)		X	-	-	X	X	-	-	-
Văleni (MM 49.3)		X	-	-	X	X	-	-	-
Văratec (MN 42.4)		X	-	O	O	X	-	-	-
Viișoara (MM 49.1-3)		X	X	-	X	X	-	-	-
Total number of new localities		18	2	3	15	18	4	2	5
∑(O)		-	-	2	2	-	-	-	-
∑(S)		1	2	-	-	-	-	-	-
Total number of localities		19	4	5	17	18	4	2	5

Legend:

La - *Lacerta agilis*, *Lv* - *Lacerta viridis*, *Zv* - *Zootoca vivipara*, *Af* - *Anguis fragilis*, *Nn* - *Natrix natrix*, *El* - *Elaphe longissima*, *Ca* - *Coronella austriaca*, *Vb* - *Vipera berus*

X – new localities for Romania herpetofauna;
O – localities in which was mentioned a species we didn't confirm;
∑ (O) – the sum of these localities;
S – localities mentioned for a species which we confirmed;
∑ (S) – the sum of these localities;

Table 1.3.

Locality	Total
Total number of new localities	225
∑(O)	7
∑(S)	14
Total number of localities	246

Legend

X – new localities for Romania herpetofauna;
O – localities in which was mentioned a species we didn't confirm;
∑ (O) – the sum of these localities;
S – localities mentioned for a species which we confirmed;
∑ (S) – the sum of these localities;