

## THE CURRENT STATUS OF THE HERPETOFAUNA AND THE IMPORTANT HERPETOFAUNAL AREAS FROM SUCEAVA COUNTY (ROMANIA)

Alexandru STRUGARIU<sup>1</sup>, Iulian GHERGHEL<sup>2</sup>, Cristina M. PUȘCAȘU<sup>3</sup>  
and Tiberiu C. SAHLEAN<sup>1</sup>

<sup>1</sup> “Al. I. Cuza” University, Faculty of Biology, Carol I Boulevard, Nr 20 A, Iasi, Romania.  
alex.strugariu@gmail.com, tiberiu.sahlean@gmail.com

<sup>2</sup> Piatra Neamt Techinical College, Stefan cel Mare Street, Nr. 67/104, Piatra Neamt, Romania,  
i\_gherghel@yahoo.com.au

<sup>3</sup> “Gr. T. Popa” University, Faculty of General Medicine, Universității Street, Nr. 16, Iasi Romania,  
mecristiname9@yahoo.com

**Abstract.** Since 2001, the authors of this paper have been conducting herpetological surveys in Suceava County, studying the composition and geographical distribution of the native amphibian and reptile species, time in which we have identified 16 species of amphibians (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus montandoni*, *Triturus cristatus*, *Triturus alpestris*, *Bombina bombina*, *Bombina variegata*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana lessonae*, *Rana ridibunda*, *Rana arvalis*, *Rana temporaria* & *Rana dalmatina*) and 8 species of reptiles (*Emys orbicularis*, *Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix*, *Coronella austriaca*, *Zamenis longissimus* and *Vipera berus*) along with *B. bombina* X *B. variegata* and *Rana kl. esculenta* (*R. lessonae* X *R. ridibunda*). Based on our previous work, this paper presents the current status of the local herpetofauna and identifies and describes the most obvious important herpetological areas from Suceava County. The most important areas for the herpetofauna seem to be the deciduous forests from the Suceava Plateau, the mountain forested areas and the lake system from the Moara-Fălticeni area.

**Keywords:** herpetofauna, amphibians, reptiles, protected species, human impact, glacial relicts.

**Rezumat. Situația actuală a herpetofaunei și zonele de importanță herpetofaunistică din județul Suceava (România).** Începând cu anul 2001 autorii prezentului articol au efectuat studii herpetologice în județul Suceava, cercetând compoziția și răspândirea geografică a speciilor indigene de amfibieni și reptile, timp în care am identificat 16 specii de amfibieni (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus montandoni*, *Triturus cristatus*, *Triturus alpestris*, *Bombina bombina*, *Bombina variegata*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana lessonae*, *Rana ridibunda*, *Rana arvalis*, *Rana temporaria* & *Rana dalmatina*) și 8 specii de reptile (*Emys orbicularis*, *Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix*, *Coronella austriaca*, *Zamenis longissimus* and *Vipera berus*) precum și hibridi între *B. bombina* și *B. variegata* și hibridul *Rana kl. esculenta* (*R. lessonae* X *R. ridibunda*). Pe baza cercetărilor noastre precedente, această lucrare prezintă situația actuală a herpetofaunei și identifică și descrie cele mai evidente zone de importanță herpetofaunistică. Cele mai importante zone pentru herpetofauna sunt pădurile de foioase din Podișul Sucevei, zonele împădurite montane și sistemul lacustru din zona Moara-Fălticeni.

**Cuvinte cheie:** herpetofauna, amfibieni, reptile, specii protejate, impact antropic, relicte glaciare.

### Introduction

The Moldavian herpetofauna has been very poorly studied, compared to the other regions of the country. Up until recently the most comprehensive data regarding the composition and geographical distribution of herpetological fauna in Moldavia could be found in the two „Fauna Republicii Populare Române” volumes published by Fuhn (1960) and Fuhn & Vancea (1961) regarding the native romanian amphibian and reptile species. Other publications in the past include the work of Șova (1970, 1972) and Ionescu *et al.* (1968). Cogălniceanu (1991) published a preliminary report regarding the distribution of amphibian fauna in Romania followed by a more complete one in 2000. Since then,

herpetological work in Moldavia has been restricted to individual counties or river basins and has been carried out by Covaciu-Marcov *et al.* (2003), Ghiurcă *et al.* (2005), Strugariu *et al.* (2006 a,b,c), Gherghel & Ilie (2006). Even with these recent publications, that contain data about the herpetofauna in Suceava, Neamț and Botoșani counties, almost nothing has been written about the other regions of Moldavia.

The knowledge regarding the composition and geographical distribution of the herpetofauna from Suceava County has been, up until recently, limited to very old or scarce data (Fuhn, 1960, Fuhn & Vancea, 1961, Ionescu *et al.*, 1968, Șova, 1970, 1972, Cogălniceanu, 1991, Cogălniceanu *et al.*, 2000). Due to the fact that a large part of the native amphibian and reptile species are considered to be vulnerable, threatened or endangered (Iftime, 2001, 2005) and because, in order to establish effective conservation measures for these species their precise distribution must be known (Ghira *et al.*, 2002), we aimed to study the herpetofauna in Suceava County (Strugariu *et al.*, 2006 a, b, c). The precarity of the previous data about the area was showed by us in our previously published papers, as we mentioned several species for the first time for Suceava County.

Taking the above stated into consideration, the aims of the present paper are:

1. To assess the situation of the amphibian and reptile species native to Suceava County.
2. To evaluate the damage done by human activities and to determine the main threats for the herpetofauna.
3. To determine which are the most important areas for the herpetofauna in the investigated region.

#### **Material and Methods**

Our field investigations took place between 2001 and 2006 and covered a total of 84 geographical localities. With the aim of mapping the herpetofauna we used the transect method (Cogălniceanu, 1997), making numerous surveys in the investigated areas. The animals were determined mostly directly, without the necessity of capturing them. When the capture of some specimens was compulsory, it was usually done by hand, the only exceptions being the venomous snakes, for which we used herpetological hooks. An important role in the charting of the herpetofauna of the investigated region was played by the dead animals that we found, killed either by local people or by cars. The hybrids were determined after their morphological and chromatic characteristics, the determination being made after main features and measurements indicated in the scientific literature (Berger, 1966, 1973, Cogălniceanu *et al.*, 2000, Csata, 1998, Fuhn, 1960, Stugren, 1980, Szymura, 1993). As mentioned above, the precise data regarding the distribution of the herpetofauna in Suceava County is showed in our previous papers (Strugariu *et al.*, 2006 a,b,c).

Based on our previous work we established the important herpetofaunal areas, these being areas that sustain populations of national threatened or endangered species that are protected by law, which are of community or national interest and demand the establishment of protected areas through their presence (Torok, 1999).

The studied area is situated in the North-Eastern sector of Romania and partially covers the northern group of the Eastern Carpathians and on the Suceava Plateau. Most of the hydrographical units consist of rivers and streams but lakes, ponds, wamps and important sub-terrestrial springs are also present. Almost all rivers flow into the Siret River. The most important of these rivers are Suceava, Moldova and Bistrita (Botnariuc, 1980).

**Results and Discussion**

**1. The herpetofauna in Suceava county:**

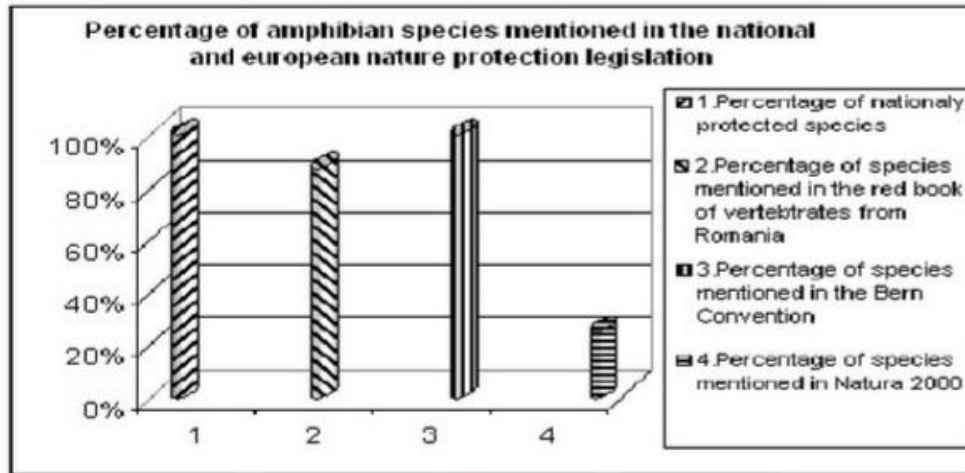
As discovered in our previous studies, the herpetological fauna in our research area consists of 16 species of amphibians and 8 species of reptiles, as showed in Table 1 and 2; the current protection status of the native herpetofauna is showed in Fig. 1 and 2:

**Table 1.** The current status of the species of reptiles from Suceava County.

| Species                    | No. of localities in which we identified it | National status (Iftime, 2001) | Local status (this study) |
|----------------------------|---|--------------------------------|---------------------------|
| <i>Emys orbicularis</i>    | 6   | Vulnerable                     | Endangered                |
| <i>Anguis fragilis</i>     | 34  | Vulnerable                     | Vulnerable                |
| <i>Zootoca vivipara</i>    | 34  | Vulnerable                     | Near threatened           |
| <i>Lacerta agilis</i>      | 57  | Vulnerable                     | Least concern             |
| <i>Natrix natrix</i>       | 44  | Least concern                  | Least concern             |
| <i>Coronella austriaca</i> | 4   | Vulnerable                     | Endangered                |
| <i>Zamenis longissimus</i> | 5   | Vulnerable                     | Endangered                |
| <i>Vipera berus</i>        | 20  | Endangered                     | Vulnerable                |

**Table 2.** The current status of the species of amphibians from Suceava County.

| Species                      | No. of localities in which we identified it | National status (Iftime, 2001) | Local status (this study) |
|------------------------------|---|--------------------------------|---------------------------|
| <i>Salamandra salamandra</i> | 29  | Vulnerable                     | Vulnerable                |
| <i>Triturus alpestris</i>    | 21  | Vulnerable                     | Near threatened           |
| <i>Triturus cristatus</i>    | 28  | Vulnerable                     | Vulnerable                |
| <i>Triturus montandoni</i>   | 28  | Vulnerable                     | Near threatened           |
| <i>Triturus vulgaris</i>     | 44  | Near threatened                | Least concern             |
| <i>Bombina bombina</i>       | 30  | Near threatened                | Vulnerable                |
| <i>Bombina variegata</i>     | 53  | Near threatened                | Least concern             |
| <i>Pelobates fuscus</i>      | 3   | Vulnerable                     | Data deficient            |
| <i>Bufo bufo</i>             | 35  | Near threatened                | Near threatened           |
| <i>Bufo viridis</i>          | 30  | Near threatened                | Near threatened           |
| <i>Hyla arborea</i>          | 48  | Vulnerable                     | Near threatened           |
| <i>Rana lessonae</i>         | 9   | Least concern                  | Data deficient            |
| <i>Rana ridibunda</i>        | 40  | Least concern                  | Least concern             |
| <i>Rana arvalis</i>          | 5   | Endangered                     | Endangered                |
| <i>Rana dalmatina</i>        | 16  | Vulnerable                     | Vulnerable                |
| <i>Rana temporaria</i>       | 61  | Vulnerable                     | Least concern             |



**Figure 1.** Protection status of the amphibians from Suceava County.

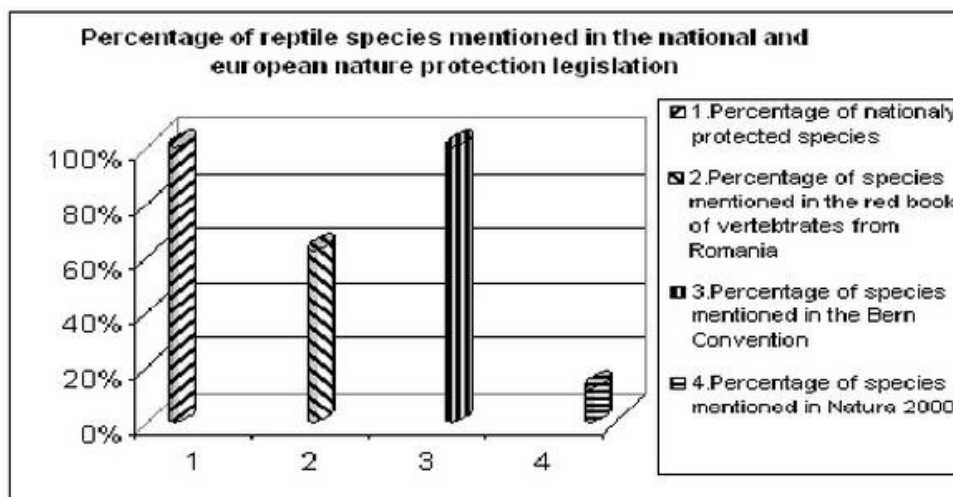


Figure 2. Protection status of the reptiles from Suceava County.

## 2. Human impact and main threats for the herpetofauna:

Human activities that threaten the herpetofauna from Suceava County and their habitats are mainly represented by:

- Illegal collecting for commercial purposes: these activities mainly pose a threat to the frogs from the *Rana esculenta* complex, *Rana temporaria* and *Rana dalmatina*. We have personally seen the effects of these actions near the Moldova river, in Gura Humorului and in the lakes near Suceava. We have reason to believe that these actions are not restricted to these areas and that countless frogs are being butchered each year for the commercial meat trade. Wild caught *Emys orbicularis* have been seen by us in pet stores from the city of Suceava. Adders (*Vipera berus*) could also be the target of illegal collections for the venom market (Iftime, 2001). In Neamt and Iasi counties, significant numbers of newts are being collected and sold as pets (Gherghel & Ilie, 2006; Hutuleac-Volosciuc, personal communication); this is not to be excluded for Suceava County.
- The use of pesticides and insecticides: being that amphibians and reptiles, in general, are dependent on a certain habitat and are especially sensitive to any chemical disturbance in their habitat (Iftime, 2001), this threat is a very serious one.
- The deliberate dry-ups of the amphibian breeding pools: this activity is especially common in urban areas or in areas with a high urbanisation activity. In the town of Suceava, water pools inhabited by *Triturus cristatus*, *Triturus vulgaris*, *Bombina bombina*, *Bufo viridis* and *Hyla arborea* have been destroyed in this way.
- The clearing of forests: being that Suceava County is the most forested county in Romania, forest exploitations are a common activity in the area; this activity is probably the most destructive and has the most negative effect on the herpetofauna, most of the species being linked to forested areas. The species which are most threatened by these activities are *Salamandra salamandra*, *Rana dalmatina*, *Rana temporaria*, *Anguis fragilis*, *Coronella austriaca*, *Zamenis longissimus* and *Vipera berus*.
- Heavy traffic: as we have observed during our surveys, countless amphibians and reptiles are killed each year by cars on the local roads. The most victims belong to the anuran species, such as *Bufo bufo*, that commonly migrate during the breeding period

and often cross roads. A reptile species that was often observed dead on the roads from the area is *Anguis fragilis*.

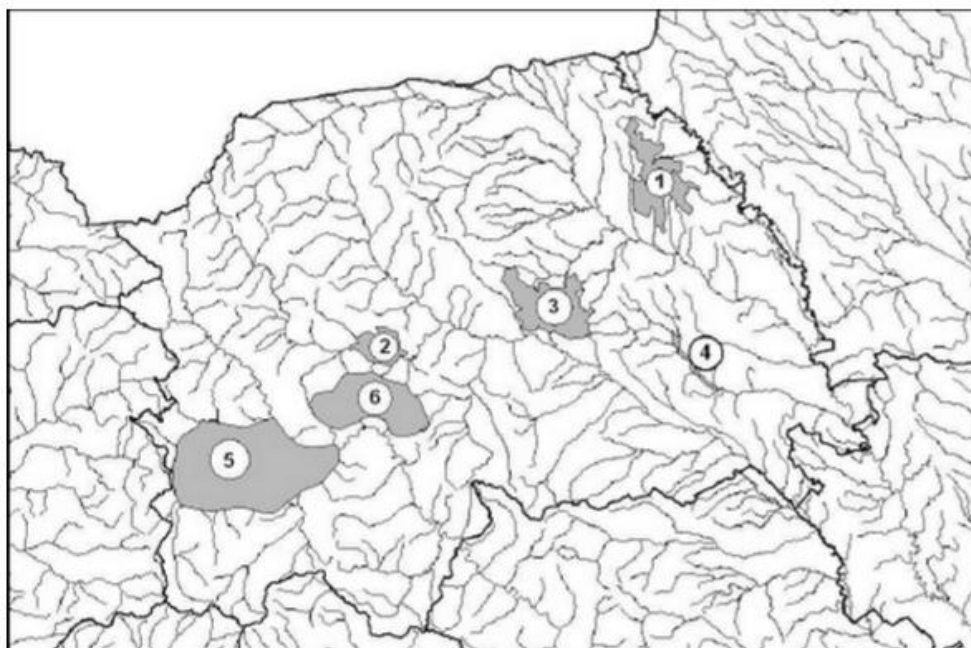
- The deliberate killing of the animals: due to various preconceptions, mythology (Fuhn, 1969, Nicoara, 2003), fear or ignorance, a large number of amphibians and reptiles are intentionally killed each year by the local people. Snakes are mostly the victims of these habits, because they are thought of as venomous and dangerous and usually killed on sight. Another important victim is, again, the slow-worm (*Anguis fragilis*) which is usually mistaken for the adder.

### 3. Important herpetofaunal areas:

During our 6 year survey in Suceava County we were able to identify several areas that are very important for the herpetological fauna. We have organized these areas into six sites. The limits of these areas and medium altitudes are showed in Table 3. The location of the sites in Suceava County can be seen in Fig. 3.

**Table 3.** The medium altitudes and limits of the important herpetofaunal areas.

| Site No. | Medium altitude (m a.s.l.) | Northern limit             | Southern limit             | Western limit              | Eastern limit              |
|----------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1        | 420                        | 47°53'07" N<br>26°08'35" E | 47°41'16" N<br>26°15'18" E | 47°45'57" N<br>26°08'40" E | 47°46'31" N<br>26°18'03" E |
| 2        | 840                        | 47°33'44" N<br>25°34'17" E | 47°30'25" N<br>24°33'05" E | 47°31'48" N<br>25°29'15" E | 47°31'37" N<br>25°37'26" E |
| 3        | 510                        | 47°39'11" N<br>25°51'45" E | 47°32'37" N<br>25°59'42" E | 47°37'54" N<br>25°50'24" E | 47°35'08" N<br>26°03'04" E |
| 4        | 285                        | 47°32'47" N<br>26°14'13" E | 47°27'38" N<br>26°19'25" E | 47°31'58" N<br>26°13'35" E | 47°27'38" N<br>26°19'25" E |
| 5        | 930                        | 47°22'36" N<br>25°17'39" E | 47°17'14" N<br>25°11'37" E | 47°21'58" N<br>25°06'09" E | 47°20'22" N<br>25°26'06" E |
| 6        | 1230                       | 47°27'41" N<br>25°31'45" E | 47°24'29" N<br>25°32'28" E | 47°25'40" N<br>25°27'39" E | 47°26'40" N<br>25°37'04" E |



**Figure 3.** Location of the Important Herpetofaunal Areas in Suceava County.

Site 1 – The deciduous forest area from Adancata-Mitocu Dragomirnei-Patrauti-Darmanesti hosts a large number of nationally threatened amphibians and reptiles and two glacial relicts (*Rana arvalis* and *Zootoca vivipara*). The amphibian fauna is composed of *Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Bombina bombina*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana lessonae*, *Rana ridibunda*, *Rana arvalis*, *Rana temporaria* and *Rana dalmatina*. Of these, *Salamandra salamandra*, *Bombina bombina*, *Rana lessonae* and *Rana arvalis* seem to be the most threatened in the area. Except for these 13 amphibian species, in the area, we have also observed the *Rana kl. esculenta* hybrid (*R. lessonae* X *R. ridibunda*) and *Bombina bombina* X *Bombina variegata*. The reptile fauna is composed of *Emys orbicularis*, *Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix*, *Coronella austriaca* and *Zamenis longissimus*. Of these, *Emys orbicularis*, *Zootoca vivipara*, *Coronella austriaca* and *Zamenis longissimus* are the most threatened, each of these species being observed on very few occasions. The most obvious threats to the herpetofauna from this area are the clearing of forests, the heavy traffic and the deliberate killing of the animals.

Site 2 – The forested (coniferous and mixed) areas and their surroundings from around the town of Câmpulung Moldovenesc are home to 6 species of amphibians (*Salamandra salamandra*, *Triturus montandoni*, *Triturus alpestris*, *Triturus cristatus*, *Bombina variegata* and *Rana temporaria*) and 5 species of reptiles (*Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix* and *Vipera berus*). The most threatened species in the area seem to be *Triturus cristatus* and *Natrix natrix*. The most significant human activities that negatively affect the herpetofauna are the clearing of forests and the deliberate killing of the animals. *Vipera berus*, a species that is endangered on a national level (Iftime, 2005) is represented in the area by strong and numerous populations (Strugariu et al., 2006 a).

Site 3 – The deciduous, coniferous and mixed forested areas between Gura Humorului – Paltinoasa – Cacica host a relatively large number of nationally threatened and endangered species of amphibians (*Salamandra salamandra*, *Triturus vulgaris*, *Triturus cristatus*, *Triturus montandoni*, *Triturus alpestris*, *Bombina variegata*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana temporaria*) and reptiles (*Emys orbicularis*, *Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix*, *Coronella austriaca*, *Zamenis longissimus* and *Vipera berus*). The most vulnerable or threatened species in the area are *Bufo bufo*, *Bufo viridis*, *Emys orbicularis*, *Coronella austriaca*, *Zamenis longissimus* and *Vipera berus*, the most significant human activities that affect them being the clearing of forests and the deliberate killing of the animals.

Site 4 – The pond system from between Suceava and Fălticeni is probably the most important habitat for *Emys orbicularis* from Suceava County. Except for this species, in the area, we have identified 7 amphibian species (*Triturus vulgaris*, *Triturus cristatus*, *Bombina bombina*, *Bufo bufo*, *Bufo viridis*, *Rana ridibunda* and *Rana temporaria*), 3 species of reptiles (*Zootoca vivipara*, *Lacerta agilis* and *Natrix natrix*) and the *Rana kl. esculenta* hybrid. Near this area we have observed the endangered glacial relict *Rana arvalis*, therefore we cannot exclude the possibility that this species could exist in the region. All of the mentioned species are threatened in the area due to the extent of the agricultural fields that surround the lake system, the use of insecticides and pesticides and the illegal collecting of the animals for commercial purposes.

Site 5 – The valleys and forested mountain slopes from Vatra Dornei - Poiana Stampei are a refuge for the endemic species *Triturus montandoni*, which is present in the area in numerous populations. Other 5 amphibian species (*Salamandra salamandra*, *Triturus alpestris*, *Bombina variegata* and *Rana temporaria*) and 6 reptile species (*Emys orbicularis*, *Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix* and *Vipera berus*) are present in the area. Of these, *Emys orbicularis* and *Natrix natrix* are the most

threatened species. The human activity that has the most negative effect on the herpetofauna is forest clearing.

**Site 6** – The Rarău-Giumalău region is another refuge for *Triturus montandoni* as well as other 6 amphibian (*Salamandra salamandra*, *Triturus alpestris*, *Bombina variegata*, *Bufo bufo* and *Hyla arborea*) and 6 reptile (*Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix*, *Coronella austriaca* and *Vipera berus*). The most threatened species in the area seem to be *Bufo bufo*, *Hyla arborea*, *Natrix natrix* and *Coronella austriaca*. Again, the clearing of forests and the deliberate killing of the animals have the most negative effect on the herpetofauna in the area.

### Conclusions

During our 6 year herpetological survey in Suceava County we have identified 16 species of amphibians (*Salamandra salamandra*, *Triturus alpestris*, *Triturus cristatus*, *Triturus montandoni*, *Triturus vulgaris*, *Bombina bombina*, *Bombina variegata*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana arvalis*, *Rana temporaria*, *Rana dalmatina*, *Rana lessonae* and *Rana ridibunda*) and 8 species of reptiles (*Emys orbicularis*, *Anguis fragilis*, *Zootoca vivipara*, *Lacerta agilis*, *Natrix natrix*, *Coronella austriaca*, *Zamenis longissimus* and *Vipera berus*). The presence of hybrids between *Bombina bombina* and *Bombina variegata* and between *Rana ridibunda* and *Rana lessonae* (*Rana kl. esculenta*) has also been validated by our research in the area.

Eight of the 16 amphibian species from Suceava County are vulnerable on a national level, 5 of them are near threatened and 1 is endangered. Of the reptiles, 6 species are vulnerable and 1 is endangered on a national level. On a local level, 4 amphibian species are vulnerable, 5 are near threatened and 1 is endangered; 1 species of reptiles is near threatened, 2 are vulnerable and 3 are endangered. All of the mentioned species are protected by the national and European legislation. The most endangered species from Suceava County are *Rana arvalis*, *Emys orbicularis*, *Coronella austriaca* and *Zamenis longissimus*. *Vipera berus*, a species that is endangered on a national level (Iftime, 2001, 2005) is a common and wide spread species in the mountain areas from our research area, and, even if it is vulnerable due to human activities that are mentioned in this paper, a good part of the present populations are not in immediate danger.

We have established 6 important herpetofaunal areas in Suceava County, following both quality and quantity criteria. Human activities that have a negative impact on the herpetofauna have been observed in every site; these activities seem to be more common and more frequent in the Suceava Plateau (Site 1 and 4) than in the mountain areas.

In site 1 and 2, *Zootoca vivipara*, a glacial relict that was previously considered a strictly mountain species (Fuhn, 1960), is present at very low altitudes. This fact has a high scientific value especially from a biogeographical point of view (Covaciu-Marcov *et al.*, 2003, Strugariu *et al.*, 2006 a,c).

In site 1, *Bombina bombina* and the hybrids between this species and *Bombina variegata* are present at higher altitudes than anywhere else in the country.

All the sites that we identified as important herpetofaunal areas suit the demands of the „Special Areas for Conservation”, therefore we propose that these areas should be taken into consideration for the establishment of protected natural areas.

### Acknowledgements

The authors of this paper are indebted to all the members of the Moldavia Herpetological Club ([www.moldavia.freeservers.com](http://www.moldavia.freeservers.com)) for their crucial help in the field investigations and to Dr. Stefan Zamfirescu („Al. I. Cuza” University of Iași) and Istvan Sas (University of Oradea) for their comments on earlier versions of the manuscript.

## References

- Berger, L., 1966. *Biometrical studies on the population of water frog from the environs of Poznan*. Ann. Zool. 23, 303 – 324.
- Berger, L., 1973. *Systematics and hybridization in European green frogs of Rana esculenta Complex*. J. Herpetol. 7, 1 – 10.
- Botnariuc, M., 1980. *Județele Patriei-Suceava*. Ed. Sport-Turism, Iași.
- Cogălniceanu, D. 1991. A preliminary report on the geographical distribution of amphibians in Romania. *Rev.Roum. Biol-Biol. Anim.* Tome 36, 1.
- Cogălniceanu, D. 1997. *Amphibian ecology practicum – methods and techniques in the study of amphibian ecology*. Ed. Universității din București, 1 – 122. (in Romanian).
- Cogălniceanu, D, Aioanei, F., Bogdan, M., 2000. *Amphibians from Romania. Determination keys*. Ed. Ars Docendi, București, 1 – 99. (in Romanian).
- Covaciu-Marcov S.D., Sas I., Ciort-Lucaciu Al., Kovács E.H., 2003a. Notes upon the herpetofauna of the Northern area of Botosani County (Romania). *Studii și Cercetări Biologie 8, Universitatea din Bacău* Noiembrie: 201-205.
- Csata, Z., 1998. Serologie and morfologic study upon the types belonging to the Rana esculenta complex. *Acta, Muzeul Secuiesc, Sfântu Gheorghe*, 111 – 140. (in Romanian, with English abstract).
- Fuhn, I., 1960. *The fauna of the People's Republic of Romania. vol. XIV, fascicula I, Amphibia*. Editura Academiei R.P.R., București, 1 – 288. (in Romanian).
- Fuhn, I, Vancea, Șt., 1961 - "*Fauna R.P.R.*", *Vol. XIV, II Reptilia*. Ed. Academiei R.P.R., Bucuresti.
- Fuhn, I., 1969. *Broaște, șerpi, șopârle*. Ed. Științifică, București, 246 pp.
- Gherghel, I, Ile, R., 2006. Contributions to the distribution of Amphibia, Caudata in Neamț County, Romania. *North-Western Journal of Zoology*, 2. 1: 44-46.
- Ghira, I., Mara G., 2000. Using the allelomorphic feature in identifying two species belonging to genus Bombina (Anura, Discoglossidae) from Transilvania. *Studia Univ. Babeș – Bolyai, Cluj – Napoca*, XLV, 85 – 95.
- Ghira, I., Venczel M., Covaciu – Marcov, S. D., Mara G., Ghile P., Hartel T., Torok Z., Farkas L., Racz T., Farcas Z., Brad T, 2002. Mapping of Transylvanian Herpetofauna. *Nymphaea, Folia naturae Bihariae, Oradea* XXIX: 145-203. Oradea.
- Ghiurca, D., Rosu, S., Gherghel, I. 2005. Preliminary data concerning the herpetofauna in Neamț County (Romania). *Analele Univ. Oradea*, Fasc. Biologie, Tom. XII, 53-62 pp.
- Iftime, Al., 2001. Lista roșie comentată a amfibienilor și reptilelor din România. *Ocrot. nat. med. inconj.* t. 44-45. pp: 39-49, București.
- Iftime, Al., 2005. Amfibieni.Reptile.In: N. Botnariuc & M. Tatole (eds.) *Cartea Roșie a Veretebratelor din România*. Ed. Acad. Române, 1 – 325.
- Ionescu, V., Miron I., Munteanu D., Simionescu Viorica, 1968. Vertebrate din bazinul montan al Bistriței. *Lucrările stațiunii de cercetări biologice, geologice și geografice „Stejarul”, Pângarați*: 375 – 437.
- Nicoara, A., 2003. Amfibienii ca simboluri. *Lucrarile celei de-a 6-a Conferinte Nationale pentru Protectia Mediului prin Mijloace Biologice si Biotehnice si de a 3-a Conferinte Nationale de Ecosanogeneza*, Brașov. p.279-285.
- Stugren, B., 1980. Geographical variation of the fire – bellied toad (*Bombina bombina* (L.)) in the USSR. (*Amphibia, Anura, Discoglossidae*). *Zool. Abh. Mus. tierk. Dresden*, 36 (5): 101 – 115.
- Strugariu, Al., Sahlean, C.T., Huțuleac-Volosciuc, M.V., Pușcașu, M.C., 2006a. Preliminary data regarding the distribution of reptilian fauna in Suceava County (Romania). *North-Western Journal of Zoology*, Vol.2 (1). Pp. 39-45.
- Strugariu, Al., Gherghel, I., Huțuleac-Volosciuc, M.V., Sahlean, T.C., Sas, I., Pușcașu, Cr.M., 2006b. Preliminary data concerning the distribution of amphibian fauna in Suceava County (Romania). *Anal. Univ. Oradea*, Fasc. Biologie, TOM XIII, pp: 39-47.
- Strugariu, Al., Huțuleac-Volosciuc, M.V., Pușcașu, Cr. M, Sas, I, Sahlean, C.T., 2006c. Contributions to the study of the herpetofauna from the Suceava river basin (Suceava County, Romania). *Studii și Comunicări – Bacău*–In press.
- Szymura, J. M., 1993. Analysis of hybrid zones with *Bombina*. In: R. G. Harrison (ed.) *Hibrid zones and the evolutionary process* pp 261 – 289. Oxford: Oxford University Press.
- Șova, C., 1970. Contribuții la cunoașterea faunei de Amfibii din bazinul mijlociu al Siretului. *Stud. Cerc. Ști. Nat. Inst. Pedag. Bacău*, 3, 101 – 110.
- Șova, C., 1972. *Contribuții la studiul ecologiei amfibilor (ordinul caudata, genul Triturus) din bazinul riului siret*. Teza de doctorat. Universitatea din Buc. 5, 1-198.
- Torok, Zs., 1999. *Ghid pentru descrierea arilor de importanță herpetofaunistică din România*, Ed. Aves, Odorheiu Secuiesc.