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# The herpetofauna of the hydrographical basin of the Moca stream from Valea lui Mihai town, Bihor County, Romania

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**Abstract.** In the Moca stream basin from Valea lui Mihai town we identified 9 amphibian species (*Lissotriton (Triturus) vulgaris, Triturus dobrogicus, Bombina bombina, Pelobates fuscus, Hyla arborea, Epidalea (Bufo) viridis, Pelophylax (Rana) ridibundus, Rana dalmatina, Rana arvalis*), 5 reptile species (*Emys orbicularis, Lacerta agilis, Zootoca vivipara, Podarcis taurica, Natrix natrix*) and populations of *Pelophylax (Rana)* kl. *esculentus*). The herpetofauna of the region is characteristic to the northwestern plain areas from Romania, including beside typical plain species, glacial relicts connected to a colder and moister climate together with postglacial immigrants specific to the warmer and dryer areas. The herpetofauna diversity is determined by the habitat diversity, in the area being present wide marshes together with sand dunes. In addition, endangered species, which are protected at a national and European level, are present in the area. The most distinct herpetofauna lies in the marsh upstream of the town, the sector situated in the locality being heavily affected by man. The authors recommend the conservation of the marshes both upstream and downstream of the town, and the limitation of any interventions upon the stream strictly to the town sector, which is presently degraded.

**Key words:** herpetofauna, anthropic activities, *Podarcis taurica, Zootoca vivipara*

## Introduction

An important challenge for the present conservationist biology is the understanding of the environmental factors responsible for the distribution and persistence of the organisms in the habitats and landscape (Hartel & Öllerer 2009). This challenge is extremely actual in Romania, where there is presently a high biodiversity, but little known at an European level (Hartel et al. 2008). Thus, the existence of studies upon biodiversity prior to any anthropical actions upon some relatively natural habitats, even more in areas with a distinct flora and fauna, is extremely necessary. These studies must be both general as well as concentrated on certain target groups. In this context, the herpetofauna is a distinct group, with many rare species, with strict ecological requirements. The majority of the Romanian herpetofauna species are protected, being included in the Romanian and European conservation legislation (Iftime 2005, O.U.G. 27/2007). The herpetofauna data are even more important in the western part of Romania where there are recent studies that prove the existence of a special herpetofauna area (Covaciu-Marcov et al. 2004, 2005, 2006, 2007, 2008a,b, 2009).

The present study aims the determination of the herpetofauna of the Moca stream from Valea lui Mihai town. The research began from a pragmatic necessity, namely the wish of the authorities to arrange the course of the Moca stream across the territory of the town. As a consequence the present paper is a part of the study regarding the arrangement of the stream and contains data concerning the herpetofauna. Our objectives were: i.) The establishment of the composition and distribution of the herpetofauna from the level of the Moca stream course from Valea lui Mihai town. ii.) The identification of the rare, important and protected species. iii.) The establishment of the stream sectors that present a distinct herpetofauna. iv.) The identification of the herpetofauna particularities of the area. v.) The emission of some recommendations to the local authorities in order to protect the areas with a distinct herpetofauna during the modifications applied to the stream.

### Materials and methods

The study was realized in the fall of 2008 and in the spring of 2009. Valea lui Mihai is situated in the northern part of Bihor County (fig.1), in the plain that has the same name (Posea & Badea 1984), at an altitude of 125 meters. The locality lies in the hydrographical basin of the Ier River, being crossed by a tributary, Moca stream. The brook is a reduced-sized water-

course, typical for the northwestern plain regions from Romania. It forms to the north of the town from several wet lands and from an modified pond. North of the town the stream crosses a wide marsh (fig.2a), which is little affected by man. The town sector is dammed, with raised banks, being partially intubated. This sector is heavily affected by pollution. Due to the lack of a sewerage system, the residual waters are directly discharged in the stream. South of the locality the stream is partly arranged, forming a second important wetland (fig.2b), more reduced than the one upstream.

The investigations were realised using the transect method (Heyer et al. 1994). We performed several transects in the habitats from the region, from which we determined the species and counted the individuals. The transect method was recently used in other similar studies (Kati et al. 2007, Covaciu-Marcov et al. 2009). The animals were not generally captured, rather they were identified using the direct observation method (Brown 1997). In the situations in which it was necessary to capture the individuals, this was made by hand. The aquatic amphibians and especially the newts were captured with different nets during spring. After the determination, the captured animals were released in their habitats, being eventually photographed. In some situations we also determined the animals killed by locals or cars. Our study was followed a faunistic, zoogeographical and conservative direction.

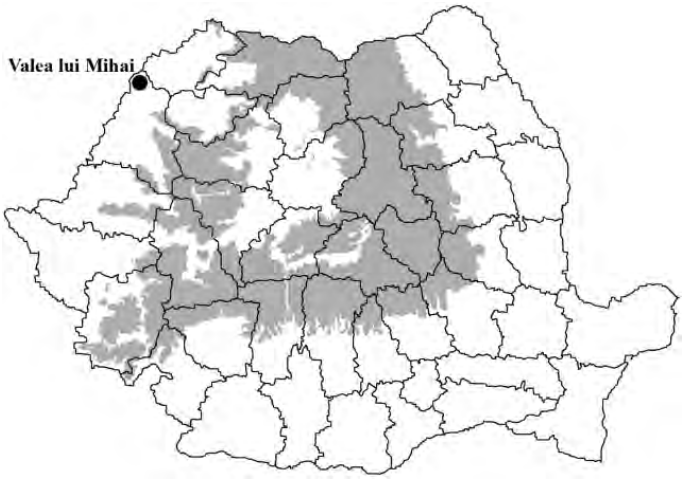


**Figure 1**. The geographical position of the studied area

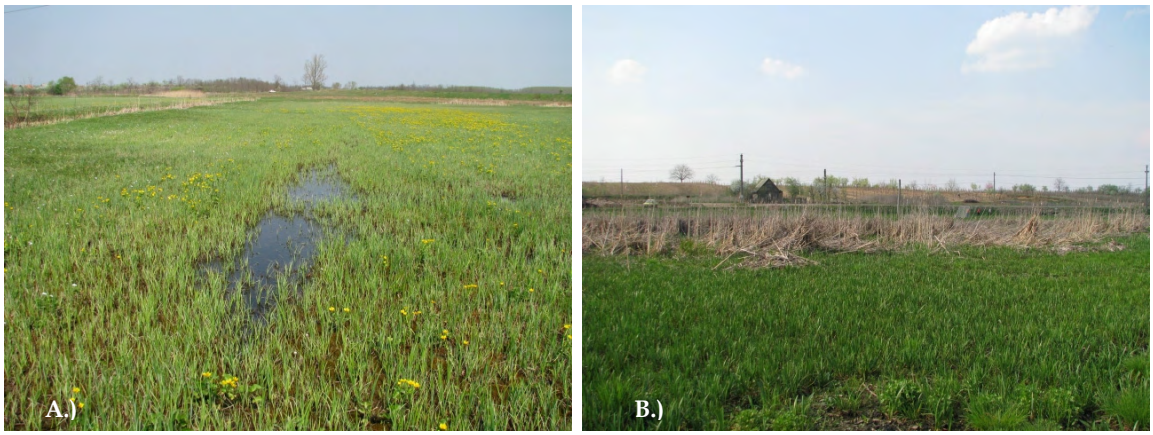


**Figure 2.** The studied habitats: **A.-** the upstream marsh; **B.-** the downstream marsh.

## Results

In the analysed region we identified 14 herpetofauna species (tab.1, fig.3), together with a hybrid category between two amphibian species (*Pelophylax (Rana)* kl. *esculentus)*. From the 14 species, nine belong to the amphibians (*Lissotriton (Triturus) vulgaris, Triturus dobrogicus, Bombina bombina, Pelobates fuscus, Hyla arborea, Epidalea (Bufo) viridis, Pelophylax (Rana) ridibundus, Rana dalmatina, Rana arvalis*) and five belong to the reptiles (*Emys orbicularis, Lacerta agilis, Zootoca vivipara, Podarcis taurica, Natrix natrix*).

The herpetofauna identified in the area of Moca stream is extremely different according to its sectors. Thus, three distinct areas can be differentiated regarding the herpetofauna composition: **1.** the marsh from upstream of the town, **2.** the intermediary sector which crosses the town and **3.** the marsh from downstream of the town. The distinctions between them are a consequence of some natural ecological factors, but mostly are a result of anthropic actions. The most diverse and quantitatively rich herpetofauna is registered in the marsh from upstream, while the lowest is found in the intermediary sector (tab.1). The results highlight the importance of the anthropical actions, and also the way in which the habitats are used on reduced surfaces. In the natural areas, in the case of the upstream marsh, it is emphasized in the same territory the existence of some species with very different ecological requirements.

**Table 1.** The distribution of the herpetofauna species in the Moca stream sectors from Valea lui Mihai town.

| | Species presence | | | N2K status | | | |
|---|---|---|---|---|---|---|---|
| | U.M. | I.S. | D.M. | SpCA | CI-SP | NI-SP | CI-M |
| Amphibians | | | | | | | |
| *Lissotriton (Triturus) vulgaris* | YES | - | - | - | - | X | - |
| *Triturus dobrogicus* | YES | - | - | X | - | - | - |
| *Bombina bombina* | YES | - | YES | X | - | - | - |
| *Pelobates fuscus* | YES | - | YES | X | X | - | - |
| *Hyla arborea* | YES | - | - | - | X | - | - |
| *Epidalea (Bufo) viridis* | YES | - | YES | - | X | - | - |
| *Pelophylax (Rana) ridibundus* | YES | YES | YES | - | - | - | X |
| *Pelophylax (Rana)* kl. *esculentus* | YES | - | - | - | - | - | X |
| *Rana dalmatina* | YES | - | YES | - | X | - | - |
| *Rana arvalis* | YES | - | YES | - | X | - | - |
| Reptiles | | | | | | | |
| *Emys orbicularis* | YES | - | - | X | X | - | - |
| *Lacerta agilis* | YES | YES | YES | - | X | - | - |
| *Zootoca vivipara* | YES | - | YES | - | X | - | - |
| *Podarcis taurica* | YES | - | - | - | X | - | - |
| *Natrix natrix* | YES | - | YES | - | - | - | - |

Legend:
UM= Upstream marsh; IS= Intermediary sector; DM= Downstream marsh;
N2K=Natura 2000 status; SpCA=species needed special conservation areas; CI-SP=species with community interest – strictly protected; NI-SP= species with nationally interest – strictly protected; CI-M= species with community interest with exploitation management.

## Discussions

The herpetofauna of the hydrographical basin of the Moca stream from Valea lui Mihai town is characteristic to the north-western plain areas from Romania, which is obvious in comparison to other studies realised in this area (Covaciu-Marcov et al. 2004, 2005, 2008 a, b, 2009). The encountered species are the ones possible to identify in this region. The majority are species dependent on the ecological conditions of the plain sectors. However, the region also presents some characteristics that set it in a narrow sector from the north-western part of Romania, individualised by the presence of some glacial relict species together with a species related with the warmer and dryer areas. This situation was registered in Romania only in the plain sectors with a sandy substratum from the northwestern part of the country (Covaciu–Marcov et al. 2009).

Many of the identified species (*T. dobrogicus, B. bombina, P. fuscus)* are herpetofaunistic elements widely spread and identified in the majority of the low sectors from Romania (Cogălniceanu et al. 2000). In the region are

also present, beside the ones previously mentioned, species with a more restrictive area, such as *R. arvalis*. This is a glacial relict in Romania (Fuhn 1960, Poliş 1977), where it is found at the southern limit of its area, surviving only in the marshes from the northern and central part of the country (Sas et al. 2008), in areas with a colder and moister climate. A distinct characteristic of the region is given by the presence of the *P. taurica* lizard, an endemic Balkan element, characterized to the open areas, that present a warmer and dryer climate, which is found in the area at its northern limit (Chondropoulos 1997). Its presence in Valea lui Mihai is a consequence of the existence in the region of sand dunes, the distribution of the species in the north-western part of Romania being limited to such areas (Covaciu-Marcov et al. 2003). The species is one of the rarest ones from the studied region, being identified only in the extreme northern end of the marsh upstream of the town. The rarity of the species is a consequence of the scarcity of its habitats in the region. Therefore, the


**Figure 3.** Some of the identified amphibian and reptile species from the Moca stream.
**A.-** *Bombina bombina*; **B.-** *Rana arvalis*; **C-** *Bufo viridis*;
**D.-** *Lacerta agilis*; **E.-** *Zootoca vivipara*; **F.-** *Podarcis taurica*.

areas with uneven sand dunes, covered just with grassy vegetation, occupy only the extremely reduced surfaces from the northern end of the studied region.

In addition, a distinct fact could seem, at a first sight, the appearance of the *Z. vivipara* lizard, which was considered in Romania as a mountain species (Fuhn & Vancea 1961). However, in the last years the species was signaled in numerous northwestern plain sectors (Ghira et al. 2002, Covaciu- Marcov et al. 2004, 2005, 2008b). Thus, the identification of the mountain lizard at Valea lui Mihai only contributes to the addition of new localities to the species' area from the plains. *Z. vivipara* is well represented in the upstream marsh, populating humid sectors, with rich grassy vegetation, typical habitats for the species in the north-western plain areas of Romania (Covaciu-Marcov et al. 2008b).

The explanation for the presence of the two groups of different zoogeographical and ecological forms is identical to the one previously provided for the similar situations described in other points from the north-western part of Romania (Covaciu –Marcov et al. 2008b, 2009). Therefore, the group of glacial relicts such as *R. arvalis* and *Z. vivipara* has probably survived in the last maximum glacial in the populated regions and presently in the north-western part of Romania. This point of view is also supported by the recent data according to which the Carpathian and Pannonian basin formed a glacial refuge for the species connected to a colder and moister climate (Brunhoff et al. 2003, Palme et al. 2003, Babik et al. 2005, Ursenbacher et al. 2006). In these areas, there have recently been signaled the most Nordic forests of Europe in the last maximum glacial (Ravazzi 2002). On the contrary, *P. taurica* is a postglacial immigrant, which entered here in the hottest period of the postglacial. Its distribution northwards was enabled by the presence of the sandy substratum. The populations from Valea lui Mihai are connected to the other ones from the sandy plains from the northwestern part of Romania and from the populations from Hungary (Puky et al. 2005). On a whole, this group seems to be presently separated from the rest of the species' area in Hungary (Puky et al. 2005). Therefore, the presence of the sandy substratum drove this postglacial immigrant over the refuge territory of some species connected to a colder and more humid climate.

These particularities highlight the importance of the coterminous areas of the Moca stream. The respective group of forms is unique in a limited area from Romania and from the coterminous territories from Hungary. The characteristics of the region made possible the co-existence of two very different groups. Thus, the herpetofauna of the upstream sector presents zoogeographical and ecological particularities, which should be preserved and sheltered from interventions.

The largest populations have the plain or common species in Romania, such as *B. bombina, P. ridibundus* or *L. agilis*. *R. arvalis* and *Z. vivipara* present large populations (probably hundreds of individuals) in the upstream marsh. The situation is not the same in the downstream marsh, where the number of encountered individuals was reduced. The fact that in the upstream marsh the number of *R. arvalis* individuals was high is important. Although the species is distributed relatively homogenously in the northwestern part of Romania, in the area it is almost always represented by small and isolated populations (Sas et al. 2006). It is very possible that the upstream population is also isolated, even if it was definitely connected in the past to the populations from the downstream marsh. These facts indicate the necessity to protect the moor frog from Valea lui Mihai.

In comparison to the previous species, *H. arborea* is a rare one, being encountered only in the upstream marsh. The fact is a consequence of the lack of wooden vegetation and even the bushy one. Although it is a species related to the forested areas, the toad also appears in open marshes but with bushy vegetation and even more rare just in the grassy vegetation from the humid areas, as it is the case of the upstream marsh. In addition, the water tortoise is rarely seen, this fact being also encountered in Transylvania in general (Ghira et al. 2002). The locals probably directly affect the species.

The initial aspect of the entire stream course was probably the one of the upstream marsh. The anthropical activities and the pollution with residual water have almost completely damaged the stream sector within the town. Therefore, in the respective sector only an amphibian species survives, *P. ridibundus*, a form with an ecologically wide valence, common in Romania. Even this species is represented by few individuals and is not homogenously distributed. A single reptile is present, *L. agilis*, at the vegetation level that limits the channel. *L. agilis* is also a species with a wide ecological valence, common in the western part of Romania. Downstream of the town, the situation is partially amended, but the herpetofauna is also significantly reduced in comparison to the upstream marsh (9 in comparison to 15 species). Even if the area is not so heavily affected by pollution, it is however affected by the modification and the partial arrangement of the stream course, having as results the reduction of the wetland areas.

The two marshes and especially the one from upstream have a special conservative value. These shelter large populations of some rare and endangered species from Romania. It is the case of the newts and firstly of the dobrudjan crested ones, which is a Nature 2000 species, noted in the 3 annex of the 57/2007 Decree, which implies the identification of some special con-

servation areas. Of great conservative importance is also the determination of a large *R. arvalis* population in the marsh upstream of the town. This is one of the most southern populations of the species from the western part of Romania, which has its southern limit probably placed at only 30 km southwards (Sas et al. 2008). The *Z. vivipara* populations have to be included in the same context.

Despite the importance of the two marshes, these are both heavily anthropically affected. Thus, large quantities of residual garbage are deposited in both of the areas. In the northern end of the upstream marsh, near the *P. taurica* habitat, there is even a waste disposal used by the locals from the respective part of the town. At least the downstream marsh is annually affected by fire. The burning of the marshes (fig.4A) has been signalled in other similar habitats from the north-western part of Romania, having a direct impact upon several herpetofauna species (Covaciu-Marcov et al. 2009). In the downstream marsh, burning can affect in time the *Z. vivipara* populations, the reptiles being indicators sensible to such anthropic activities (Wilgers & Horne 2006). Although in the vicinity of the upstream marsh there are only country roads, we identified amphibian killed (fig.4B) by traffic (*T. dobrogicus, P. fuscus, E viridis,P. ridibundus*). The road mortality is also a factor that negatively affects the herpetofauna in other regions (Tóth et al. 2006, Sós 2007).

In conclusion, the marshes from the Moca stream course from Valea lui Mihai town register a distinct herpetofauna. This is special both as composition and from a zoogeographical, ecological and conservative point of view. The herpetofauna of the Moca stream integrates in the general north-western region of Romania.

Therefore, any further actions upon the Moca stream should have to bear in mind these particularities. From our point of view the upstream marsh should not be modified in any way by any arrangement action of the stream. At least partial actions should be applied to the downstream marsh. The only areas that we can approve modification actions are the ones inside of Valea lui Mihai town. Practically, this sector is situated between the two marshes, being presently strongly affected by man. Only common, adaptable species represented by few individuals are present here, species which would probably also tolerate the new conditions.

In addition, the arrangement actions of the intermediary sector would have to be limited to the arrangement of the banks and the riverbed, without affecting in any way the level and water course. Any level modification could affect the water regime from the marsh and that could influence the relict species connected to the wetlands. The small puddles from the marsh are reproducing habitats of the amphibians and they would be the first ones to be affected by the modification of the water level. Any arrangement to the leisure stagnant waters should take place outside the two marshes and without affecting in any way the water resources of the stream.


**Figure 4.** Burned marsh (**A**) and an individual of *Natrix natrix* killed by the locals (**B**).

Obviously, this does not mean that the marshes should be taken out of usage. Their exploitation at the present degree can continue, because their impact is reduced. Therefore in the present the upstream marsh is mown by the locals, activity which can continue. However, actions such as the burning of the marsh or the depositing of garbage must have to stop.

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**References**


Babik, W., Branicki, W., Crnobrnja-Isailovic, J., Cogălniceanu, D., Sas, I., Olgun, K., Poyarkov, N.A., Garcia-Paris, M., Arntzen, J. W. (2005): Phylogeography of the European newt species - discordance between mtDNA and morphology. Molecular Ecology 14: 2475-2491.

Brunhoff, C., Galbreath, K.E., Fedorov, V.B., Cook, J.A., Jaarola, M. (2003): Holarctic phylogeography of the root vole (*Microtus oeconomus*): implications for late Quaternary biogeography of high latitudes. Molecular Ecology 12: 957-968.

Brown, L.J. (1997): An Evaluation of Some Marking and Trapping Techniques Currently Used in the Study of Anuran Population Dynamics. Journal of Herpetology 31: 410-419.

Cogălniceanu, D., Aioanei, F., Bogdan, M. (2000): Amfibienii din România, Determinator. Ed. Ars Docendi, Bucharest. [in Romanian].

Chondropoulos, B. P. (1997): *Podarcis taurica* (Pallas 1814). Pp. 296-297. In: Gasc J.P. et al. (eds): Atlas of Amphibians and Reptiles in Europe, Museum National D'Histoire Naturelle, Paris.

Covaciu-Marcov, S.D., Cicort-Lucaciu, A.Ş., Sas, I., Bogdan, H., Peter, V. (2003): Preliminary data about the distribution of *Podarcis taurica* in the North-Western parts of Romania. Analele Universităţii din Oradea, Fascicula Biologie 10: 111-117.

Covaciu-Marcov, S.D., Ghira, I., Sas, I. (2004): Contribuţii la studiul Herpetofaunei zonei Oaşului (Judeţul SM, România). Mediul, Cercetare, Protecţie şi Gestiune (Cluj-Napoca) 2: 107-112. [in Romanian with English summary].

Covaciu-Marcov, S.D., Cicort-Lucaciu, A.Ş., Sas, I., Ile, R. D. (2005): The herpetological fauna of "Culmea Codrului" (Satu - Mare county, Romania). Analele Universităţii din Craiova, Biologie 46: 163-168.

Covaciu-Marcov, S.D., Sas, I., Kiss, A., Bogdan, H., Cicort-Lucaciu, A.Ş. (2006a): The herpetofauna from the Teuz River hydrographic basin (Arad County, Romania). North-Western Journal of Zoology 2: 27-38.

Covaciu-Marcov, S.D., Cicort-Lucaciu A.Ş., Sas, I., Groza, M. I., Bordaş, I. (2007): Contributions to the knowledge regarding the herpetofauna from the Maramureş county areas of "Măgura Codrului", Romania. Biharean Biologist 1: 50-56.

Covaciu-Marcov, S.D., Bogdan, H.V., Paina C., Toader S., Condure N. (2008a): The herpetofauna of the north-western region of Bihor County, Romania. Biharean Biologist 2: 5-13.

Covaciu-Marcov, S.D., Cicort-Lucaciu, A.Ş., Ferenţi, S., David, A. (2008b): The distribution of lowland *Zootoca vivipara* populations in North-Western Romania. North-Western Journal of Zoology 4: 72-78.

Covaciu-Marcov, S.D., Sas, I., Cicort-Lucaciu, A.Ş., Kovacs, E.H., Pintea, C. (2009): Herpetofauna of the Natural Reserves from Carei Plain: zoogeographical significance, ecology, statute and conservation. Carpathian Journal of Earth and Environmental Sciences 4: 69-80.

Fuhn, I. (1960): Amphibia. "Fauna R.P.R.", Vol. XIV, Fasc. I. Editura Academiei R.P.R., Bucharest. [in Romanian].

Fuhn, I., Vancea, Ş. (1961): Reptilia. "Fauna R.P.R.", Vol. 14, Fasc. II. Editura Academiei R.P.R., Bucharest. [in Romanian].

Ghira, I., Venczel, M., Covaciu-Marcov, S.D., Mara, Gy., Ghile, P., Hartel, T., Török, Zs., Farkas, L., Rácz, T., Farkas, Z., Brad, T. (2002): Mapping of Transylvanian Herpetofauna. Nymphaea, Folia Naturae Bihariae 29: 145-203.

Hartel, T.R., Moga, C. I., Őllerer, K., Demeter, L., Sas, I., Ruşti, D. M., Balog A. (2008): A proposal towards the incorporation of spatial heterogeneity into animal distribution studies in Romanian landscapes. North-Western Journal of Zoology 4: 173-188.

Hartel, T., Öllerer, K. (2009): Local turnover and factors influencing the persistence of amphibians in permanent ponds from the Saxon landscape of Transylvania. North-Western Journal of Zoology 5: 40-52.

Heyer, W.R., Donnelly, M.A., McDiarmid, R.W., Hayek, L.C., Foster, M.S. (1994): Measuring and Monitoring Biological Diversity. Standard Methods for Amphibians. Smithsonian Institution Press, Washington, DC.

Iftime, Al. (2005): Amfibieni / Reptile. In: Botnariuc, N., Tatole, V. (eds): Cartea Roşie a Vertebratelor din România. Editura Academiei Române, Bucharest. [in Romanian].

Kati, V., Foufopoulos, J., Ioannidis, Y., Papaioannou, H., Poirazidis, K., Lebrun, P. (2007): Diversity, ecological structure and conservation of herpetofauna in a Mediterranean area (Dadia National Park, Greece). Amphibia-Reptilia 28: 517-529.

Palme, A.E., Su, Q., Rautenberg, A., Manni, F., Lascoux, M. (2003): Postglacial recolonization and cpDNA variation of silver birch, *Betula pendula*. Molecular Ecology 12: 201-212.

Poliş, R. (1977): Răspândirea broaştei de mlaştină (*Rana arvalis*) în valea Erului (Judeţul Satu-Mare şi Bihor). Nymphaea, Folia Naturae Bihariae 5: 417-425.

Posea, G., Badea, L. (1984): România, Harta Unităţilor de relief (Regionarea geomorfologică). Ed. Ştiinţifică şi Enciclopedică, Bucharest. [in Romanian].

Puky, M., Schád, P., Szövényi, G.M. (2005): Magyarország herpetológiai atlasza / Herpetological atlas of Hungary. Varangy Akciócsoport Egyesület, Budapest. [in Hungarian and English].

Ravazzi, C. (2002): Late Quaternary history of spruce in southern Europe. Review of Palaeobotany and Palynology 120: 131-177.

Sas, I., Covaciu-Marcov, S.D., Kovacs, E.H., Radu, N.R., Toth, A., Popa, A. (2006): The populations of *Rana arvalis* Nills. 1842 from the Ier Valley (The Western Plain, Romania): present and future. North-Western Journal of Zoology 2: 1-16.

Sas, I., Covaciu-Marcov, S.D., Demeter, L., Cicort-Lucaciu, A.Ş., Strugariu, A. (2008): Distribution and status of the moor frog (*Rana arvalis*) in Romania. Pp. 337-354. In: Glandt, D., Jehle, R. (eds): Der Moorfrosch / The Moor Frog. Zeitschrift für Feldherpetologie, Supplement 13.

Sos, T. (2007): Notes on the distribution and current status of herpetofauna in the northern area of Braşov County (Romania). North-Western Journal of Zoology 3: 34-52.

Tóth, T., Grillisch, H., Farkas, B., Gál, J., Sušić, G. (2006): Herpetofaunal data from Cres Island, Croatia. Herpetozoa 19: 27-58.

Ursenbacher, S., Carlsson, M., Helfer, V., Tegelström, H., Fumagalli, L. (2006): Phylogeography and Pleistocene refugia of the adder (*Vipera berus*) as inferred from mitochondrial DNA sequence data. Molecular Ecology 15: 3425-3437.

Wilgers, D.J., Horne, E.A. (2006): Effects of different burn regimes on tallgrass prairie herpetofaunal species diversity and community composition in the Flint Hills, Kansas. Journal of Herpetology 40: 73-84.

*****OUG no.27/2007. Privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei şi faunei sălbatice. [in Romanian].


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