

## A rapid survey of the herpetological fauna from Vaslui County (Romania) with the first record of the slow-worm (*Anguis fragilis*) in the region

Alexandru STRUGARIU<sup>1,\*</sup>, Iulian GHERGHEL<sup>1</sup>, Andreea NICOARĂ<sup>1</sup>,  
Mihail V. HUȚULEAC-VOLOSCIUC<sup>1</sup>, Valentina MORARU<sup>2</sup>, Andrei MIZERUȘ<sup>3</sup>

1. Faculty of Biology, "Alexandru Ioan Cuza" University, Carol I. Blvd. Nr. 20A, 700506, Iași, Romania
2. Faculty of Biology, University of Bucharest, Splaiul Independenței Nr. 91-95, Sector 5, 050095, Bucharest, Romania.
3. "Radu Cernătescu" School Group, Socola Blvd. Nr. 61A, 700267, Iași, Romania.

\*Corresponding author's e-mail address: alex.strugariu@gmail.com

**Abstract.** The present paper represents a contribution to the knowledge regarding the current composition and distribution of the herpetological fauna from a poorly surveyed Romanian region (Vaslui County, Eastern Romania). We confirm the presence of most of the recently recorded amphibian and reptile species from the region (*Lissotriton vulgaris*, *Triturus cristatus*, *Bombina bombina*, *Pelobates fuscus*, *Bufo viridis*, *Hyla arborea*, *Pelophylax ridibundus*, *P. kl. esculentus*, *Rana dalmatina*, *Emys orbicularis*, *Anguis fragilis*, *Lacerta agilis*, *Lacerta viridis* and *Natrix natrix*), give the first recent records for two species (*Coronella austriaca* and *Vipera berus*) which have not been recorded in the county since the 1960's and also give the first ever record for the slow-worm (*Anguis fragilis*) in Vaslui County.

**Key words:** Romanian Moldavia, amphibians, reptiles, distribution, anthropogenic impact.

### Introduction

Amphibians and reptiles are probably the most threatened groups of vertebrates, both of them facing significant global decline (e.g. Alford & Richards 1999; Gibbons et al. 2000). Consequently, the European and Romanian environmental regulations consider a high number of reptiles and amphibians to be species whose presence in a certain area, require the designation of special areas for conservation (European Council Directive 92/43/EEC, transposed as Romanian Government Ordinance no. 57/20.06.2007).

The Romanian herpetofauna also comprises of several such species, represented in numerous cases by large and thriving populations (e.g. Iftime 2005 a). However, in order, to compose or impose measures for their conservation, detailed knowledge of their distribution is needed. Therefore, in recent years, numerous herpetofaunal surveys have been conducted throughout Romania with the aim of broadening the limited dataset concerning the distribution of the herpetofauna as well as to establish the main regional anthropogenic threats for these species at a regional or local scale (e.g. Transylvania - Ghira

et al. 2002; Covaciu-Marcov et al. 2004, 2005 a, b; Southern Romania - Lazăr et al. 2005; Iftime 2005 b, Dobrudja - Covaciu-Marcov et al. 2006 a; Strugariu et al. 2008 a; Moldavia - Strugariu et al. 2006 a, b, 2008 b; Gherghel et al. 2008). The herpetofauna from the lowlands of eastern Romania have received much interest in recent years as the landscapes in this region have been greatly altered by a high number of human settlements, deforesting, and, especially, agricultural fields, making amphibians and reptiles in this area particularly vulnerable (Krecsak & Zamfirescu 2001, 2008; Covaciu-Marcov et al. 2006 a; Strugariu et al. 2008 a, b; Zamfirescu et al. 2007, 2008, 2009 a, b).

In this paper, we present the results of a rapid survey on the herpetofauna from Vaslui County, a lowland region from Eastern Romania for which very little herpetofaunal data is available.

### Material and Methods

**Study area.** Vaslui County is located in Eastern Romania, in the historical region of Moldavia (Figure 1). The area belongs to the Prut (in the East) and the Siret (in the West - through the Bârlad River) River basins. The county occupies the southern part of the Central Moldavian Plateau and the Bârlad Plateau. The

lowest altitude in the area is 10 m in the Prut River meadow while the highest altitude is 485 m on the Mângăralei Hill.

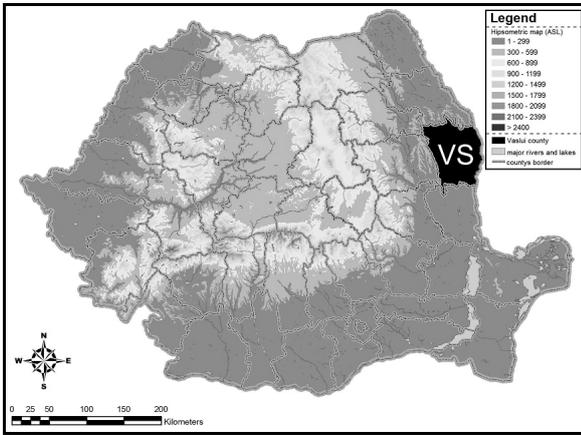


Figure 1. Location of Vaslui County in Romania

The county belongs to two European bioregions: steppic and continental (Figure 2). A vast percentage of the surface area of the county (> 70%) is covered by agricultural fields. The remaining natural or semi-natural landscapes present in the county are, in descending order of the percentage of the total surface occupied: deciduous forests, aquatic habitats (rivers, lakes, ponds) and steppe and forest steppe (Mititutu 1975; Mititutu et al. 1996).

**Field methods and data analyses.** Fieldwork was conducted during six visits of one and two days during the spring of 2007, the spring and summer of 2008 and the spring of 2009. The surveyed sites were chosen to cover the major habitat types depicted above but were selected randomly for each type. Extensive transects of variable lengths (0.5 - 3 km) were made, mostly during daytime. Two night surveys were also carried



Figure 2. Biogeographical regions of Vaslui County.

out. Ecological dissimilarity between the identified amphibian and reptile species was investigated using a cluster analyses with unweighted pair average and the Jaccard coefficient.

**Results**

Nine amphibian (*Lissotriton vulgaris*, *Triturus cristatus*, *Pelobates fuscus*, *Bombina bombina*, *Bufo viridis*, *Hyla arborea*, *Rana dalmatina*, *Pelophylax ridibundus*, *Pelophylax kl. esculentus*) and seven reptile (*Emys orbicularis*, *Anguis fragilis*, *Lacerta agilis*, *Lacerta viridis*, *Natrix natrix*, *Coronella austriaca*, *Vipera berus*) species have been recorded during the survey period in Vaslui County (Figure 3). According to our data, the most widespread amphibian species were *P. ridibundus*, *P. kl. esculentus*, *B. bombina* and *B. viridis* while the rarest amphibians were the newt species (*L. vulgaris* and *T. cristatus*) and *R. dalmatina*. The most widespread reptiles were *L. viridis*, *L. agilis* and *N. natrix* and the rarest ones were *A. fragilis*, *C. austriaca* and *V. berus* (Table 1). Areas with deciduous forest covering appeared to be more suitable for the two newt species as well as *R. dalmatina*, *L. viridis*, *A. fragilis* and *V. berus*. The only *C. austriaca* specimen captured was found in a meter wide strip of ruderal vegetation located between a large wheat (*Triticum sp.*) plantation and a county road.

The other species were mostly observed in grassland and floodplain habitats (either aquatic or terrestrial).

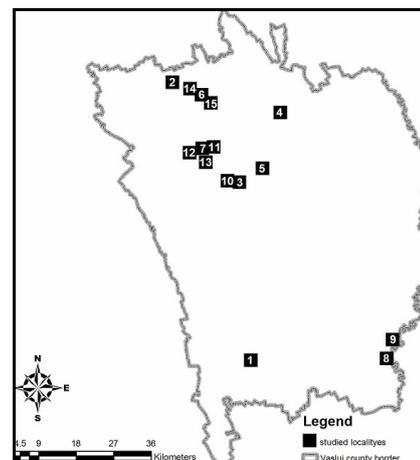


Figure 3. The investigated localities from Vaslui County in which at least one species of amphibian/reptile was found.

**Table 1.** Locality records for the amphibian and reptile species identified in Vaslui County during the present survey: L.vu. – *Lissotriton vulgaris*, T.c. – *Triturus cristatus*, B.b. – *Bombina bombina*, P.f. – *Pelobates fuscus*, B.v. – *Bufo viridis*, H.a. – *Hyla arborea*, P.r. – *Pelophylax ridibundus*, P.e. – *Pelophylax kl. esculentus*, R.d. – *Rana dalmatina*, E.o. – *Emys orbicularis*, A.f. – *Anguis fragilis*, L.a. – *Lacerta agilis*, L.vi. – *Lacerta viridis*, N.n. – *Natrix natrix*, C.a. – *Coronella austriaca*, V.b. – *Vipera berus*; Numbers from the first column correspond to the ones from Figure 3; 1 = present; 0 = not detected.

Nr	Locality	Lvu	Tc	Bb	Pf	Bv	Ha	Pr	Pe	Rd	Eo	Af	La	Lvi	Nn	Ca	Vb
12	Albești	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
1	Bârlad	1	0	1	1	1	1	1	1	0	1	0	1	1	1	0	0
9	Bogdănești	0	0	1	0	0	1	1	1	0	0	0	1	0	1	0	0
11	Fundătura	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
13	Hârșova	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
7	Mănăstirea	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
2	Negrești	0	0	1	0	1	1	1	1	0	0	0	1	0	1	0	0
15	Podeni	0	0	1	0	1	1	1	1	0	0	0	1	0	0	0	0
10	Poiana lui Alexa	1	1	0	0	1	1	1	1	1	0	0	0	1	0	0	0
3	Pușcași	1	1	1	0	1	1	1	1	1	0	1	0	1	1	0	1
8	Rânzești	0	0	1	0	1	1	1	1	0	1	0	1	0	1	0	0
4	Solești	0	0	1	1	1	1	1	1	0	0	0	0	1	1	1	0
5	Vaslui	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0
14	Voinești	0	0	1	0	1	1	1	1	0	0	0	1	0	0	0	0
6	Vulturești	0	0	1	0	1	1	1	1	0	0	0	1	0	0	0	0

Cluster Analysis with Jaccard coefficient revealed two well separated groups: the first comprises only of the smooth snake (*C. austriaca*) and the second one contains all the other recorded amphibian and reptile species (Figure 4). Further, the second group is divided into two other groups: the first one is comprised of *P. fuscus*, *E. orbicularis*, *B. bombina*, *P. ridibundus*, *Bufo viridis*, *Hyla arborea*, *P. kl. esculentus* and *N. natrix* while the second one holds *R. dalmatina*, *T. cristatus*, *L. vulgaris*, *L. viridis*, *A. fragilis* and *V. berus*.

## Discussion

The herpetofauna of Vaslui County has been the subject of very few previous studies. Data collected until the 1960's were published in the two monographs on the Romanian herpetofauna (Fuhn 1960, Fuhn & Vancea 1961) and listed the following species as present in the county: *L. vulgaris*, *B. bombina*, *B. viridis*, *H. arborea*, *P. fuscus*, *R. dalmatina*, *P. ridibundus*, *L. agilis*, *L. viridis*, *N. natrix*, *C. austriaca* and *V. Berus*.

The next publications dealing, in part, with the herpetofauna of the county appeared almost 50 years later (Covaciu-Marcov et al. 2006 b; Strugariu & Gherghel 2008).

These latter studies reconfirmed the presence of all the species recorded by Fuhn & Vancea (1961) except for *C. austriaca* and *V. berus* and also added four new species for the region: *T. cristatus*, *B. bufo*, *P. kl. esculentus* and *E. orbicularis* (Covaciu-Marcov et al. 2006 b; Strugariu & Gherghel 2008).

The results obtained from the present survey, thus, reconfirm all the previously reported species, except for *B. bufo*. However, given the fact that the localities in which this species was reported from (Covaciu-Marcov et al. 2006 b) and the short time in which our survey was conducted, we consider that there is no reason to doubt that the species is present in the county. The presence of two of the species (*V. berus* and *C. austriaca*) reported from the county by Fuhn & Vancea (1961) has not been reconfirmed for cca. 50 years, despite the previous two studies conducted in the county.

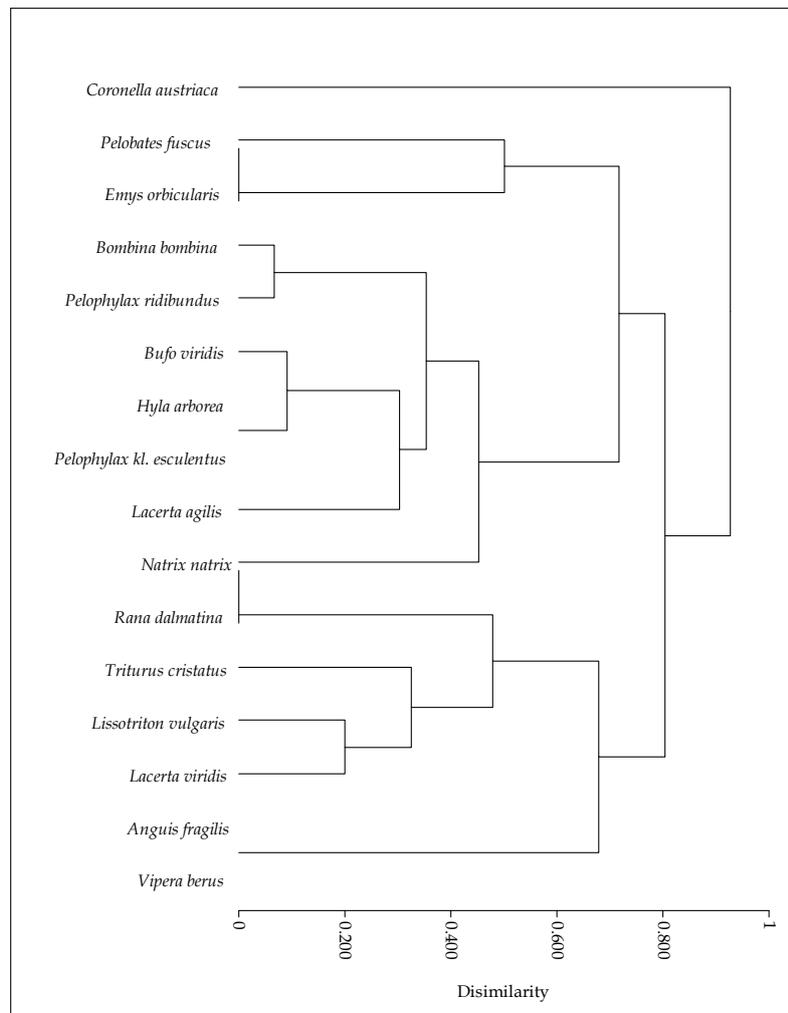
Thus, the present paper provides evidence that these species are still present in the region and

probably stands as an indicator of the fact that a higher sampling effort should be used in order to increase the chance of detecting these species in certain habitats. To our knowledge, the slow-worm (*A. fragilis*) has never been previously recorded in Vaslui County. Therefore, our surveyed provides the first record for this species in the region. The sole specimen observed was captured at 11.40 h., on July 19, 2008, in a deciduous forest from the vicinity of the Pușcași village.

The habitats in which the amphibians and reptiles were observed during the present survey are generally similar to the ones in which the same species were observed in the neighboring counties of Iași (Strugariu et al. 2008 b) or Galați (Strugariu & Gherghel 2008). The division of the second

group (the first one being comprised only of *C. austriaca*) in the cluster analyses indicates the presence of two ecological groups: one connected to deciduous forested landscapes (e.g. *T. cristatus*, *R. dalmatina*, *A. fragilis*, *V. berus*) and one more linked to open landscapes such as grasslands or floodplains (e.g. *B. bombina*, *P. fuscus*, *E. orbicularis*, *L. agilis*). Again, a similar separation of these groups could be observed in the neighboring Iași County (Strugariu et al. 2008 b).

Although not adequately quantified, numerous localities from Vaslui County, which are not mentioned in the results of this paper, were surveyed using the same methods depicted above, but without observing any amphibian or reptile species.



**Figure 4.** Ecological disimilarity between the species of amphibians and reptiles recorded in Vaslui County, inferred by Cluster Analysis with Jaccard coefficient

This is probably due to the intensive anthropogenic alterations of the landscape, most of the surface of the county being covered at present by large agricultural fields or black locust (*Robinia pseudoacacia*) plantations.

#### Acknowledgements

We are grateful to Dr. Ștefan R. Zamfirescu and the anonymous referees for the constructive comments given on previous versions of this manuscript. We also thank all the colleagues from "Al. I. Cuza" University of Iași for the help offered during the fieldwork.

#### References

- Alford, R.A., Richards, S.J. (1999): Global amphibian declines: A problem in applied ecology. *Annual Review of Ecology and Systematics* 30: 133-165.
- Covaciu-Marcov, S.D., Ghira, I., Sas, I. (2004): Contribuții la studiul herpetofaunei zonei Oașului (județul SM, România). *Environment and progress, Cluj-Napoca* 2: 107-112. [in romanian]
- Covaciu-Marcov, S.D., Cicort-Lucaciu, A.Ș., Sas, I., Bredet, A.M., Kovacs, E.H. (2005 a): The herpetofauna from the Basin of Mureș River in Arad County, Romania. *Proceedings volume: Environment & Progress, Cluj-Napoca* 4: 147-152.
- Covaciu-Marcov, S.D., Sas, I., Cicort-Lucaciu, A., Achim, A., Andrișcu, A. (2005 b): The herpetofauna of Tășnad hills (Satu Mare county, Romania). *Analele Științifice ale Universității "Al. I. Cuza" Iași, s. Biologie animală* 51: 159-168.
- Covaciu-Marcov, S.D., Ghira, I., Cicort-Lucaciu, A.Ș., Sas, I., Strugariu, A., Bogdan, H.V. (2006 a): Contributions to knowledge regarding the geographical distribution of the herpetofauna of Dobruja, Romania. *North-Western Journal of Zoology* 2 (2): 88-125.
- Covaciu-Marcov, S.D., Sas, I., Cicort-Lucaciu, A.Ș., Bogdan, H., Groza, M. (2006 b): Contributions to the knowledge of the composition and geographical distribution of Moldova's herpetofauna: between the Siret and Prut rivers. *Muzeul Olteniei Craiova, Oltenia, Studii și Comunicări* 22: 1-6.
- European Commission (1992): Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flore (online). *Official Journal L 206, 22/07/1992 P. 0007-0050. Consolidated version 01.01.2007. Available at: [http://ec.europa.eu/environment/nature/legislation/habitats\\_directive/index\\_en.thm](http://ec.europa.eu/environment/nature/legislation/habitats_directive/index_en.thm).*
- Fuhn I. E. (1960): Amphibia. In: *Fauna R.P.R., Vol. XIV, Fasc. 1, Ed. Academiei R.P.R., București*. [in romanian]
- Fuhn, I., Vancea, Ș. (1961): Reptilia (Țestoase, Șoirlle, Șerpi). in: *Fauna R.P.R., Vol. 14, Fasc. 2. Ed. Academiei R.P.R., București*. [in romanian]
- Gherghel I, Strugariu A., Ghiurcă D., Cicort-Lucaciu A. (2008): The herpetofauna from the Bistrița river basin (Romania): geographical distribution. *North-Western Journal of Zoology* 4 (1): S71-S103.
- Ghira, I. Venczel, M., Covaciu-Marcov, S., Mara, G., Ghile, P., Hartel, T., Torok, Z., Farkas, L., Racz, T., Farkas, Z., Brad, T. (2002): Mapping of Transylvanian herpetofauna. *Nymphaea* 29: 145-201.
- Gibbons, J. W., Scott, D. E., Ryan T. J., Buhlmann, K. A., Tuberville, T. D., Metts, B. S., Greene, J. L., Mills, T., Leiden, Y., Poppy, S., Winne, C. T. (1999): The global decline of reptiles, Deja Vu amphibians. *Bioscience* 50(8): 653 – 666.
- Iftime, A. (2005 a): Amfibieni. Reptile. In: *Tatole, V. & Botnariuc, M. (eds.): Cartea Roșie a Vertebratelor din România. Ed. Academiei, București*. [in romanian]
- Iftime, A. (2005 b): Herpetological observations in the Danube Floodplain Sector in the Giurgiu County (Romania). *Travaux du Museum National d'Histoire Naturelle "Grigore Antipa"* 57: 339-348.
- Krecsak, L., Zamfirescu, Ș.R. (2001): Ecological situation and morphological characteristics of *Vipera ursinii moldavica* in the "Valea lui David" Natural Reserve. *Russian Journal of Herpetology* 8 (1): 69-73.
- Krecsak, L., Zamfirescu, Ș. (2008): *Vipera (Acridophaga) ursinii* in Romania: historical and present distribution. *North-Western Journal of Zoology* 4 (2): 339-359.
- Lazăr, V., Covaciu-Marcov, S.D., Sas, I., Pusta, C., Kovacs, E.H. (2005): The herpetofauna in the district of Dolj (Romania). *Analele Științifice ale Universității "Al. I. Cuza" Iași, seria Biologie Animală* 51: 169-178.
- Mititelu D. (1975): Flora și vegetația județului Vaslui. *Studii și Comunicări, Muzeul de Științele Naturii, Bacău* 8: 67-172.
- Mititelu D., Huțanu M. (1996): Noi contribuții la flora și vegetația județului Vaslui. *Studii și Cercetări, Muzeul de Științele Naturii Piatra Neamț* 8: 193-212.
- Guvernul României (2007): Ordonanța de Urgență nr. 57/20.06.2007 privind regulile de preție a ariilor protejate, conservarea habitatelor naturale, a florei și a faunei. *Monitorul Oficial* 442: 29.06.2007. [in romanian]
- Strugariu, A., Gherghel, I. (2008): A preliminary report on the composition and distribution of the herpetofauna from the Lower Prut River Basin (Romania). *North-Western Journal of Zoology* 4 (Supplement 1): S49-S69.
- Strugariu A., Sahlean, T.C., Volosciuc-Huțuleac, M.V., Pușcașu, C. (2006 a): Preliminary data regarding the distribution of reptilian fauna in Suceava County (Romania). *North-Western Journal of Zoology* 2 (1): 39-43.
- Strugariu, A., Sahlean, T.C., Huțuleac-Volosciuc, M.V., Sas, I., Pușcașu, C.M., Gherghel, I. (2006 b): Contributions to the study of the herpetofauna from the Suceava River Basin (Suceava County, Romania). *Studii și Comunicări, Complexul Muzeal de Științele Naturii "Ion Borcea" Bacău* 21: 437-446.
- Strugariu, A., Sos, T., Gherghel, I., Ghira, I., Sahlean, T.C., Pușcașu, C.M., Huțuleac-Volosciuc, M.V. (2008 a): Distribution and current status of the herpetofauna from the Northern Măcin Mountains area (Tulcea County, Romania). *Analele Științifice ale Universității "Al. I. Cuza" Iași, seria Biologie animală* 54: 191-206.
- Strugariu, A., Zamfirescu, Ș.R., Nicoară, A., Gherghel, I., Sas, I., Pușcașu, M.C., Bugeac, T. (2008 b): Preliminary data regarding the distribution and status of the herpetofauna in Iași County (Romania). *North-Western Journal of Zoology* 4 (Supplement 1): S1-S23.
- Zamfirescu, Ș.R., Zamfirescu, O., Ion C., Popescu, I.E. (2007): Research on the habitats of *Vipera ursinii moldavica* populations from Iași County. *Analele Științifice ale Universității "Al. I. Cuza" Iași, s. Biologie animală* 53: 159-166.
- Zamfirescu, Ș.R., Zamfirescu, O., Popescu, I.E., Ion, C., Strugariu, A. (2008): The meadow viper (*Vipera ursinii moldavica*) and its habitats from Moldova (Romania). *Editura Universității "Al. I. Cuza" Iași*.
- Zamfirescu, Ș.R., Zamfirescu, O., Popescu, I.E., Ion, C. (2009 a): Preliminary data on population characteristics of *Vipera ursinii*

*moldavica* from "Dealul lui Dumnezeu" (Iași County, Romania).  
North-Western Journal of Zoology 5 (1): 85-96.

Zamfirescu, Ș.R., Zamfirescu, O., Strugariu, A., Gherghel, I. (2009 b):  
Herpetofauna of the meadows from the site of community  
interest "The Forest and the Meadows from Mârzești" (Iași,  
Romania) and notes on habitats. Analele Universității "Al. I.  
Cuza" Iași, s. Biologie animală 55: 155-163.

*Submitted: 12 September 2009*

*Accepted: 10 November 2009*