

The herpetofauna of the north-western region of Bihor County, Romania

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Abstract. In the researched area, we identified a total of 16 species for the herpetofauna. Among these, 11 belong to the amphibians (*Triturus vulgaris*, *Triturus cristatus*, *Triturus dobrogicus*, *Bombina bombina*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana ridibunda*, *Rana lessonae*, *Rana dalmatina*) and 5 to the reptiles (*Emys orbicularis*, *Lacerta agilis*, *Lacerta viridis*, *Podarcis taurica*, *Natrix natrix*). Aside these 16 species, we also identified populations of *Rana kl. esculenta*, a hybrid form between *Rana ridibunda* and *Rana lessonae*.

Key words: herpetofauna, geographical distribution

Introduction

Knowing the composition and the geographic distribution of the herpetofauna represents an important field of study even in the present, a fact proven by the numerous recent articles dedicated to this theme (Naumov 2005, Demeter et al 2006, Toth et al 2006, Yildiz et al 2007, Göçmen et al 2007). These researches have a special importance because without them no efficient protection programs could actually be made (Ghira et al 2002). The herpetofauna of Bihor County is actually one of the best investigated ones from Romania. Unlike other regions from the country, in this sector many such studies took place regarding the herpetofauna (Covaciu-Marcov et al 2000, 2002, 2003 a, b, c). This present work aims to complete the prior knowledge referring to the composition and the geographic distribution of the herpetofauna from Bihor County by analyzing the only area unpublished in detail until this point: the plain sector from the north-western part of the county. Some of the data regarding the herpetofauna of this region were previously comprised in a preliminary work focused on the herpetofauna of the Ier Valley (Covaciu-Marcov 2003) or in the monograph on the Flora and Fauna of the Ier Valley (Ardelean & Karácsonyi 2002). Aside these studies, information about some species from the area are to be found in vaster articles dedicated to North-west Romania (Covaciu-Marcov et al 2003 d, e, 2007 a, Sas et al 2006, 2007).

Material and methods

Our study took place between 2000 and 2004. We used the transects method (Cogălniceanu 1997), marking numerous surveys, in all the five years of our study, in each investigated locality. The animals were mostly determined directly, without the necessity of capturing them. When the capture of some specimens was compulsory, it was usually made by hand. Amphibians in their aquatic period were captured with the help of rectangle drags or using round nets mounted on long metallic poles. After determining the captured species, they were set free in their habitat of origin. An important role in the charting of the herpetofauna of the investigated region was played by the dead animals found, killed either by the local people or by traffic.

The region in which we studied the herpetofauna contains the plain sectors from the north-western part of Bihor County (fig. 1). To the west, the investigated region stretches to the Romanian-Hungarian border while to the north, until the limit between the Bihor and Satu-Mare counties; in the east and south, the region reaches the hills of Viișoara and Oradea (Posea & Badea 1984). Thus, the relief of our research area is represented by plain sectors with an average altitude of about 150m asl, consisting in different regions of the Western Plain. The area is drained by the Ier and Barcău rivers. The most significant localities here are Valea lui Mihai and Săcuieni. Along the years of study, we investigated tens of habitats in 53 localities. Among these, 27 are premieres for the herpetofauna.

Results and Discussions

In the researched area, we identified a total of 16 species for the herpetofauna. Among these, 11

belong to the amphibians (*Triturus vulgaris*, *Triturus cristatus*, *Triturus dobrogicus*, *Bombina bombina*, *Pelobates fuscus*, *Bufo bufo*, *Bufo viridis*, *Hyla arborea*, *Rana ridibunda*, *Rana lessonae*, *Rana dalmatina*) and 5 to the reptiles (*Emys orbicularis*, *Lacerta agilis*, *Lacerta viridis*, *Podarcis taurica*, *Natrix natrix*). Aside these 16 species, we also identified populations of *Rana kl. esculenta*, a hybrid form between *Rana ridibunda* and *Rana lessonae*.

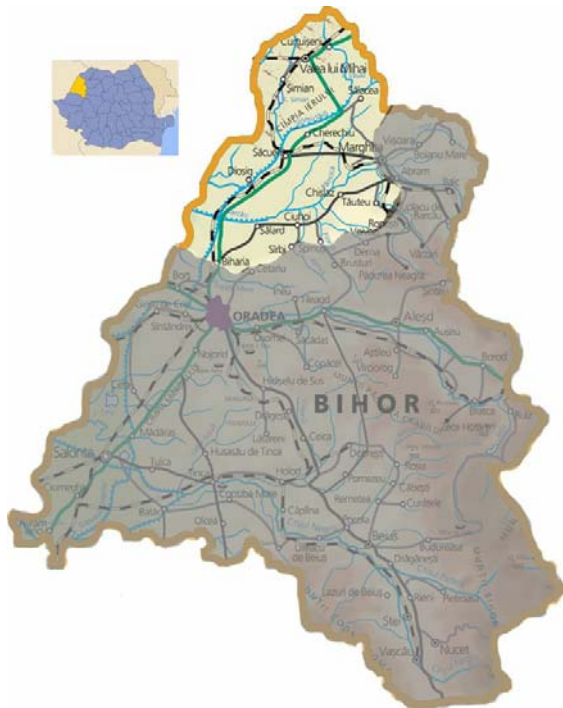


Figure no.1 The studied region

We analyzed the distribution of these 16 species and the hybrid form of the herpetofauna in all the 53 localities from the studied region. Consequently, we managed to identify 461 localities for the encountered species in the 53 field localities (Appendix 1). Out of the entire number, 371 represent new localities for Romania's herpetofauna. Both species of crested newts (*Triturus cristatus*, *Triturus dobrogicus*) were identified for the first time in this region, while for the reptiles, *Lacerta viridis* represents a premiere for this area.

Triturus cristatus (Laurenti 1758) is a rare species for the investigated area, being identified only in 5 of the 53 localities. This fact is a consequence of the general distribution of the species in Romania – in regions found under the influence of hill and mountain climates (Fuhn 1953). In the studied area, the species occurs only

in the sectors with higher altitudes than 150m asl, the same as in other areas from the western part of Romania (Covaciu-Marcov et al 2000, 2002, 2003 b). This is how *Triturus cristatus* lives only near the hill sectors from the eastern part of the region. However, we encountered it in the Barcău Plain as well, fact made possible by the much unlevelled relief around this sector.

Triturus dobrogicus (Kiritzescu 1903) is a much more representative species for the north-western part of Bihor County, being common in the plain sectors with the plane relief. It is absent from the hilly region which separates the Ier River hydrographic basin from that of the Barcău River, despite the fact that the altitude of this segment doesn't exceed 200m asl. However, in spite of the low altitude values, the actual look of that segment does in fact resemble one typical for a hill region and though is not one suited for this species. Although *Triturus dobrogicus* has only been indicated scarcely for the western part of Romania for a rather long time, its presents in the area is not at all surprising because *Triturus dobrogicus* is the characteristic crested newt species for the Pannonian Basin (Arntzen et al 2007). The fact that it was so little identified in this area before can only be caused by the lack of studies in this region prior to ours.

Triturus vulgaris (Linnaeus 1758) is the most common species of newts for this region, being well distributed on the entire surface. As a consequence of the fact that most of the plain areas are affected by human activities, the majority of the populations reproduce in the artificial ditches and channels. With all that, large populations are to be found in the vast natural swamps, especially from the Carei Plain.

Bombina bombina (Linnaeus 1761) is one of the best represented amphibian species from the investigated region. The red bellied toad is evenly distributed in all the studied area. The populations we've identified are very numerous, the species also proving to be rather "plastic" from the ecological point of view by occupying almost all types of aquatic habitats from the region. Thus, *Bombina bombina* is to be found both in vast swamps that are hardly affected by human activities and in channels and ditches from the Ier and Barcău Rives meadows. The species also populates biotopes strongly affected by human activities, polluted with wastes or used as drinking water for cattle.

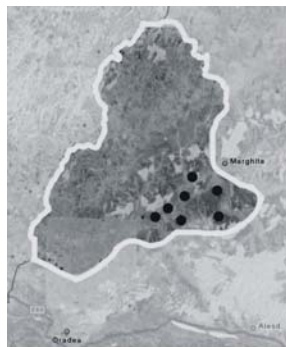
Pelobates fuscus (Laurenti 1768) is, just like the previous species, very common for the north-western region of Bihor County. This is due to the

fact that the north-west of Bihor County comprises plain sectors with rather soft soil, usually sandy, and as such very favorable for a digging toad such as *Pelobates fuscus* (Fuhn 1960). Although generally it is a species that is not easy to spot, the number of encountered specimens is very high, a fact that suggests that the area hosts a one of the biggest population from all western Romania for this species. The common spadefoot toad is also very well distributed in the neighboring areas from Hungary (Puky et al 2005). On the other hand, we also found lots of dead bodies, killed by traffic on both public and country roads.

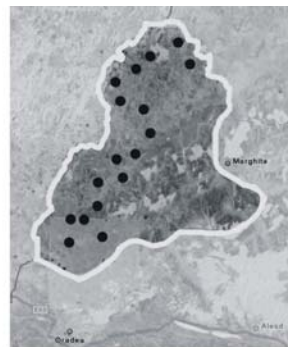
Bufo bufo (Linnaeus 1758) is well represented in the studied area, being identified by us in many localities. The wide distribution of the common brown toad is due to the colder and more humid climate of the regions from northern Bihor

(Stoenescu et al 1966) but also in the same time to a lower degree of human activities that impact on the habitats. The facts stated above are sustained by a simple comparison with other plain regions from the western Romania where the species is much rarer (Covaciu-Marcov et al 2007 b). Even so, in spring hundreds of toads die because of the traffic on some roads from the area.

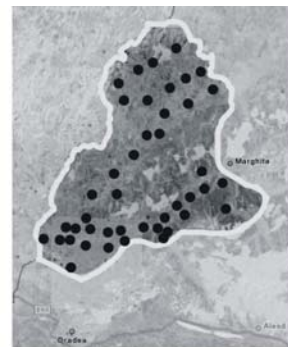
Bufo viridis (Laurenti 1768) is, pretty much like the above mentioned one, a common species for the entire north-western region of Bihor County. The largest populations are present in the sandy areas from the Carei Plain. Just like in the case of the other *Bufo* species, numerous specimens are killed by the traffic on different roads, especially in spring, similar situation to that in other regions of Romania (Sos et al 2007) and a fact that may represent a potential threat to the species.



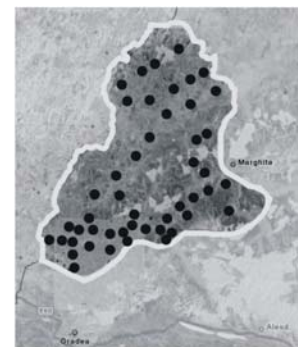
Triturus cristatus



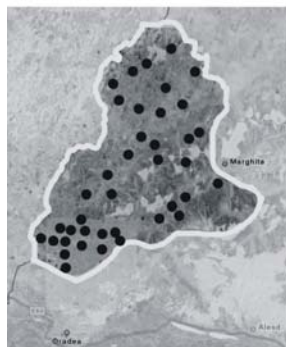
Triturus dobrogicus



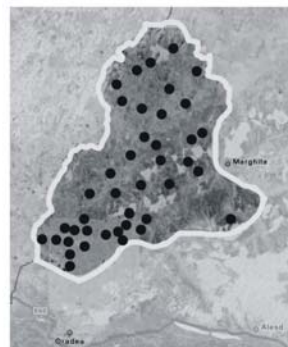
Triturus vulgaris



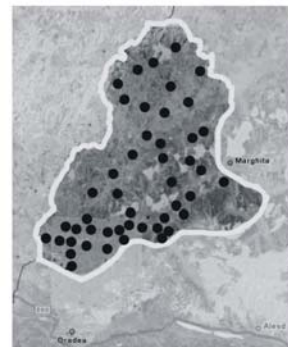
Bombina bombina



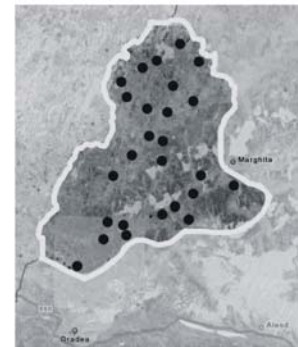
Pelobates fuscus



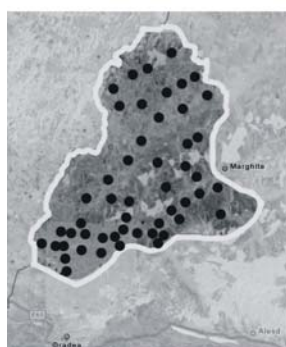
Bufo bufo



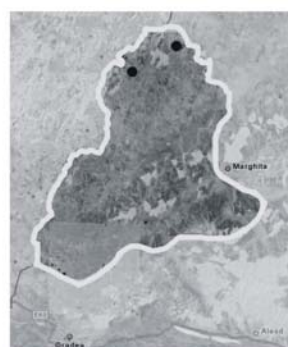
Bufo viridis



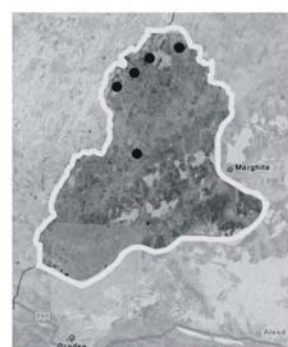
Hyla arborea



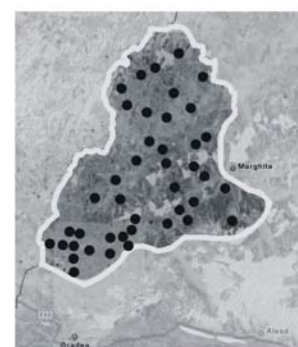
Rana ridibunda



Rana lessonae



Rana esculenta



Rana dalmatina

Figure no. 2 The geographical distribution of the reptilian fauna in the investigated region

Hyla arborea (Linnaeus 1758) is an ordinary species for the investigated region, but still rarer than the previous. Thus, the common tree frog is absent from the areas with a strong human impact, especially from the agricultural fields. Most of the populations are to be found in the afforested zones, but we encountered numerous specimens in the cleared swamps from the Ier and Barcău Rivers meadows as well.

Rana ridibunda (Pallas 1771) is one of the widespread species of amphibians from the north-west Bihor County. The marsh frog is represented by very large populations in almost all localities from the region. This fact is ensured by the presence in the studied area of numerous large permanent waters, habitats preferred by the species. *Rana ridibunda* is present both on the courses of the main rivers from the region, the vast swamps - afforested and cleared, and the channels and ditches alongside the roads. Also, the marsh frog lives in artificial concrete habitats or other waters used as drinking water for cattle.

Rana lessonae (Camerano 1878) was previously indicated in this region in two localities (Covaciu-Marcov *et al* 2007 a). Consequently, some isolated specimens were spotted especially near Curtuișeni.

Rana kl. esculenta (Linnaeus 1758) is a rare form in the researched area, but still more common than the above mentioned species. We managed to identify it in 5 localities. Similar with the number of localities, we encountered much more specimens of this form than *Rana lessonae* individuals. The largest populations live in the vast marshes from the Valea lui Mihai Plain. Aside to the swamps, *Rana kl. esculenta* occurs rarely in the channels alongside the roads or railroads from near Săcuieni. These probably represent extreme habitats in which the frogs found shelter after the artificial draining of the swamps. Among the

systems described amid the green frogs (Tunner & Heppich-Tunner 1991), in the studied area we have the R-E-L or the R-E ones, but in most cases one can only find simple *Rana ridibunda* populations. As a quota, *Rana ridibunda* is by far the best represented one, while *Rana kl. esculenta* is more important in quantity only in the permanent swampy area between the sand dunes and the Carei Plain.

Rana dalmatina (Bonaparte 1839) is a widespread species in the research area, being indicated in its entire territory. Although it is a frog usually linked with afforested sectors (Cogălniceanu *et al* 2000) and forests occupy a very small surface of the investigated region, the agile frog still remains common here. Thus *Rana dalmatina* inhabits all types of marshes with rich vegetation and high humidity where it can be found in large numbers. Less often, the species occurs in vegetation girdles that border different channels or ditches.

Emys orbicularis (Linnaeus 1758) is a well represented species in the north-western part of Bihor County, yet it isn't distributed uniformly in this territory. Thus, almost all the populations are concentrated in the Ier River hydrographic basin, while the species is very rare in the Barcău River area where it can be found only in its secondary tributaries. The largest populations inhabit the vast swamps from the Valea lui Mihai Plain and the channels coming from the Ier River.

Lacerta agilis (Linnaeus 1758) is the most common reptile species from the studied region, being present in very many localities spread all around the territory. It is not a demanding lizard and as such we found it in a large diversity of habitats, starting with swamps, skirts of forests all the way to railroads stations.

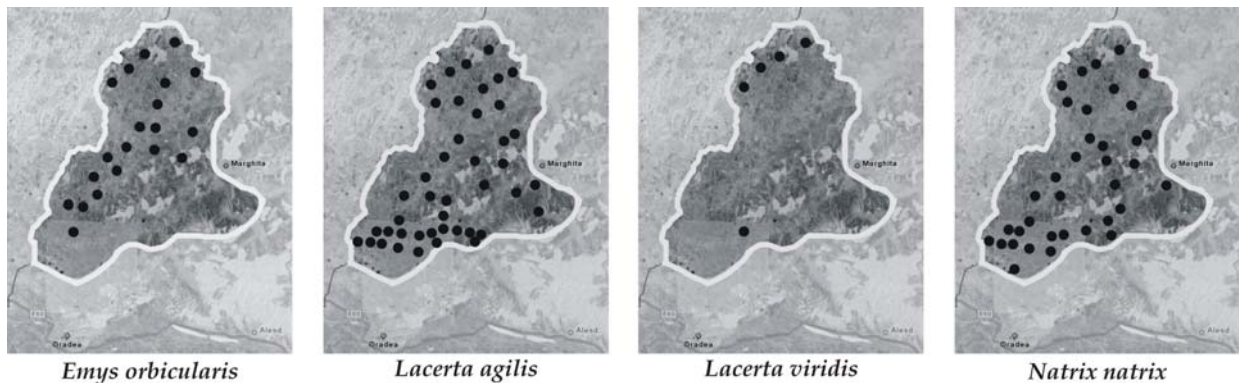


Figure no.3 The geographical distribution of the reptilian fauna in the investigated region



Figure no.4 *Triturus dobrogicus*: -(up) from Cheşereu (Bihor County)
-(down) from Şimian (Bihor County)

Lacerta viridis (Laurenti 1768) is much rarer than the previous species, being identified for the first time in 4 localities. All these places are situated in the sandy plain from Valea lui Mihai. The green lizard populations from the 4 localities are connected to each other due to a continuity of their habitats. The species is present on sand dunes, skirts of forests and also sand quarries. In many cases, it occurs together with *Podarcis taurica*. A particularity of these populations here is that they are separated by the other ones from the north-western Romania by the plane and humid flatlands of the Ier Plain. As a general characteristic for the western Romania, the green lizards inhabit the uneven hill sides, with altitudes of over 150m asl, that present a bushy vegetation (Covaciu-Marcov et al 2000, 2002). Thus, the Ier Plain represents a very effective barrier for this species. These sand dunes from the Valea lui Mihai Plain practically represent an enclave of the species' biotope, completely separating it from all the other Romanian populations. However, these populations here are in direct connection with the ones in Hungary which are rather numerous in the sandy sectors from near the border (Puky et al 2005).

Natrix natrix (Linnaeus 1758) is a frequently found and widespread species in our research area. The grass snake is present near almost all wet areas from the northern Bihor County. The identified populations are quite large, but in many cases we also found specimens killed by either the locals or by traffic.

Along with these species, in the north-western part of Bihor County, two other ones were previously mentioned: *Rana arvalis* (Covaciu-Marcov et al 2003 d, Sas et al 2006, 2007) and *Podarcis taurica* (Covaciu-Marcov et al 2003 e). The species were also encountered afterwards, but because the present article does not bring any new contribution referring to them, they are not mentioned in the discussions.

Conclusions

The relatively low number of species found in the studied region is due to its geographic and ecological homogeneity. We can therefore conclude that the herpetofauna in our research area is one clearly typical for the plain sectors of the Romanian north-west. Despite this fact, we managed to identify over 300 new localities in this region, data that represents an important

contribution to the knowledge of the composition and the geographic distribution of the herpetofauna from this part of the country. It is essential to mention the large number of localities in which we found the Danube crested newt – a typical species for the plains but also a rare and endangered one in Romania. The green lizard populations we found in the plain sector with the sand dunes from near Valea lui Mihai also have a significant zoogeographic importance. The latter are isolated from the other ones in Romania by the Ier Plain but linked with the populations from Hungary.

The populations for most of the identified species in our research area are rather large. However, the impact of various human activities is very obvious, classic for a plain region that was transformed and is now used for agricultural purposes. Thus, the draining and the transformation of swamps or marshes into agricultural fields, the direct human impact and also the traffic are the main threats for the region's herpetofauna. The most special sectors from what the herpetofauna is concerned are the Valea lui Mihai Plain, the marshes near the Ier River and the tributaries of the Barcău River as well as the very few natural afforested areas that still persist. In these biotopes, one can find the highest concentration of species from the herpetofauna. On the opposite pole we have the *Acacia* plantations from the sand dunes which host a very scarce herpetofauna.

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Appendix no.1 Geographical distribution of amphibians and reptiles in the north localities of Bihor county
(**Tc**=*Triturus cristatus*, **Td**=*Triturus dobrogicus*, **Tv**=*Triturus vulgaris*, **Bb**=*Bombina bombina*, **Pf**=*Pelobates fuscus*, **Buf**=*Bufo bufo*,
Buv=*Bufo viridis*, **Ha**=*Hyla arborea*, **Rr**=*Rana ridibunda*, **Rl**=*Rana lessonae*, **Re**=*Rana esculenta*, **Rd**=*Rana dalmatina*,
Eo=*Emys orbicularis*, **La**=*Lacerta agilis*, **Lv**=*Lacerta viridis*, **Nn**=*Natrix natrix*.)

| Locality | Tc | Td | Tv | Bb | Pf | Buf | Buv | Ha | Rr | Rl | Re | Rd | Eo | La | Lv | Nn |
|--------------------|----|----|----|----|----|-----|-----|----|----|----|----|----|----|----|----|----|
| Abrămuș | X | - | X | X | - | X | X | X | X | - | - | X | - | - | - | - |
| Adoni | - | - | X | S | X | X | X | X | S | - | - | - | X | X | - | - |
| Albiș | - | - | - | X | X | X | X | - | X | - | - | X | X | X | - | X |
| Buduslău | - | - | - | X | X | X | X | X | S | - | - | S | - | S | - | S |
| Cadea | - | X | S | S | S | S | S | S | S | - | - | S | X | S | - | S |
| Cauaceu | - | - | X | X | X | X | X | X | X | - | - | X | - | - | - | X |
| Cenaloș | - | - | - | X | - | X | X | - | X | - | - | - | - | - | - | X |
| Cherechiu | - | X | S | S | S | S | S | S | S | - | - | S | S | S | - | S |
| Cheșereu | - | X | X | S | X | X | X | X | S | - | - | X | X | X | - | S |
| Chiraleu | - | - | - | X | - | - | - | - | X | - | - | - | - | X | - | - |
| Chișlaz | X | - | X | X | X | - | X | X | X | - | - | X | - | X | - | X |
| Ciocaia | - | X | X | X | X | X | X | - | X | - | - | X | X | X | - | X |
| Ciuhoi | - | - | - | X | - | X | X | - | X | - | - | X | - | - | - | - |
| Ciulești | - | - | X | X | - | - | X | - | X | - | - | - | - | X | - | - |
| Crestur | - | - | - | X | X | X | X | - | X | - | - | X | X | X | - | X |
| Cubulcut | - | - | - | - | - | X | X | - | - | - | - | X | - | X | - | X |
| Curtuiușeni | - | X | S | S | X | S | X | X | S | S | S | X | X | X | X | X |
| Diosig | - | X | X | S | S | S | X | - | S | - | - | X | S | S | - | S |
| Făncica | - | - | - | - | - | - | X | - | - | - | - | - | - | - | - | - |
| Fegernicu Nou | - | - | X | X | X | - | X | X | X | - | - | X | - | X | - | - |
| Galoșpetreu | - | - | - | X | S | X | O | - | X | - | - | - | - | X | - | - |
| Hăucești | - | - | - | X | - | - | X | - | X | - | - | - | - | X | - | X |
| Hodoș | - | - | X | X | - | - | X | - | X | - | - | X | - | X | - | X |
| Ianca | - | X | X | X | X | X | X | - | X | - | - | - | X | X | - | X |
| Mihai Bravu | - | X | X | X | X | X | X | - | X | - | - | X | X | X | - | X |
| Mișca | X | - | X | X | X | - | X | X | X | - | - | X | - | - | - | - |
| Niuved | - | - | X | X | X | X | X | - | X | - | - | X | - | X | - | X |
| Olosig | - | - | - | - | X | X | X | X | X | - | - | X | X | X | - | X |
| Otomani | - | - | S | S | S | S | S | X | S | - | - | S | - | S | - | S |
| Parhida | - | - | X | X | X | X | X | - | X | - | - | - | - | X | - | X |
| Poclușa de Barcău | X | - | X | X | X | - | X | X | X | - | - | X | - | - | - | X |
| Poiana | - | - | X | X | - | - | - | - | - | - | - | - | - | - | - | - |
| Roșiori | - | X | X | X | X | X | X | - | X | - | - | S | X | X | - | X |
| Satu Nou | - | - | - | X | X | X | X | - | X | - | - | - | - | - | - | - |
| Sănicolau de Munte | - | - | - | - | - | X | - | - | X | - | - | X | - | X | - | - |
| Săniob | - | - | - | X | - | X | X | - | X | - | - | X | - | X | - | - |
| Sănlazăr | X | - | X | X | X | - | X | X | X | - | - | X | - | - | - | - |
| Săcuieni | - | X | S | S | X | S | S | X | S | - | X | S | S | S | - | S |
| Sălacea | - | - | X | S | - | X | O | O | S | - | - | X | - | - | - | - |
| Sălard | - | X | X | X | X | - | X | X | X | - | - | X | - | X | - | X |
| Sărsig | - | - | - | X | - | - | X | - | X | - | - | - | - | X | - | - |

| | | | | | | | | | | | | | | | | |
|-----------------|---|----|----|----|----|----|----|----|----|---|---|----|----|----|---|----|
| Sântimreu | - | - | X | X | - | - | X | X | X | - | - | X | - | X | X | X |
| Sfârnaş | - | - | X | X | X | X | X | X | X | - | - | X | - | X | - | X |
| Şimian | - | X | X | X | X | X | X | X | X | S | X | X | X | X | X | X |
| Şilindru | - | X | X | X | X | X | X | X | X | - | - | X | X | X | - | X |
| Tarcea | - | - | S | S | S | S | S | S | X | - | - | S | S | S | - | X |
| Târgușor | - | - | X | X | X | X | X | X | S | - | - | X | X | X | - | X |
| Tămășeu | - | X | X | X | X | X | X | - | X | - | - | S | X | X | - | X |
| Tăuteu | - | - | X | X | - | - | - | - | X | - | - | X | - | X | - | - |
| Vaida | - | - | X | X | X | X | X | - | X | - | - | - | - | - | - | - |
| Valea lui Mihai | - | X | X | S | X | S | X | X | S | - | X | X | X | X | X | X |
| Vășad | - | X | X | S | S | S | S | S | S | - | - | X | X | X | - | S |
| Voivozi | - | X | X | X | X | X | X | X | X | - | X | X | X | X | X | X |
| Σ X | 5 | 17 | 32 | 38 | 30 | 29 | 41 | 21 | 38 | - | 4 | 32 | 18 | 34 | 5 | 27 |
| Σ S | - | - | 6- | 12 | 7 | 9 | 6 | 4 | 12 | 2 | 1 | 8 | 4 | 7 | - | 8 |
| Σ O | - | - | - | - | - | - | 2 | 1 | - | - | - | - | - | - | - | - |

Legend:

Geographical localities: 53 (27 investigated for the first time)

New localities (X): 371

Previously signaled localities in which we reconfirmed the presence of the species (S): 86

Sum of the identified localities (X+S): 457

Localities in which the presence of a certain species, previously signaled, was not been reconfirmed (O): 3