

Travaux du Muséum National d'Histoire Naturelle «Grigore Antipa»	Vol. XLVIII	pp. 395–405	© 30 Dec. 2005
---	-------------	-------------	-------------------

**NEW REPORTS ON THE PRESENCE OF *SOREX ALPINUS*
SCHINZ, 1837 (INSECTIVORA: SORICIDAE)
IN THE SOUTHERN CARPATHIANS (ROMANIA)**

DUMITRU MURARIU, ANA MARIA BENEDEK

Abstract. În 2003 and 2004, 10 specimens of *Sorex alpinus* were collected from the Southern Carpathians. Besides the blackish colour, which distinguishes this species from *S. araneus* and *S. minutus*, the tail is always equal or longer than the body, and the tarsus is under 13 mm. Making a correlation between the data from literature with the authors' remarks it resulted that *S. alpinus* is represented by small and isolated populations in the Eastern and Southern Carpathians. The lack of success in collecting, during some years, is due to the dynamics of these populations. The habitat destroying, generated by man, is add to the division of the populations, conditions which increase the vulnerability of the species and justify the protection measures, by the preservation of the natural habitats.

Résumé. En 2003 et 2004, 10 exemplaires de *Sorex Alpinus* ont été capturés dans les Carpates Méridionales. En plus la couleur noirâtre laquelle distingue les espèces *S. araneus* et *S. minutus*, la queue est toujours égale ou plus longue que le corps, et le tarsus est sous 13 millimètres. Faisant une corrélation entre les données de la littérature avec les observations des auteurs on résulte que *S. alpinus* est représenté par des populations petites et isolées dans les Carpates Méridionales et Orientales. Le manque de succès dans les captures faites quelques années est à cause de la dynamique de ces populations. La destruction des habitats par l'homme est ajoutée à la fragmentation des populations, conditions qui augmentent la vulnérabilité de l'espèce et qui justifient les mesures de protection pour la conservation des habitats naturels.

Key words: body measurements, allometry, individuals, populations, habitats, conservation.

INTRODUCTION

The representatives of the order Insectivora are the general type of placental mammals. The knowledge of the orders Insectivora and Rodentia is important for a better understanding of the evolution and of the characters of the other mammal orders.

From the seven present families, with 66 genera and 428 species, the order Insectivora is represented by three families (Erinaceidae, Talpidae and Soricidae) with five genera and 11 species in the Romanian fauna.

Because of their secretive way of life, being nocturnal and burrowing, the insectivores are less known to man. In spite of their morphological characteristics (e.g. the long and pointed muzzle), the insectivores are often confounded with the small rodents. On the one side, their knowledge favour them because they are not interesting to man, therefore they are not controlled. On the other side, the insectivores are important in the complex ecological relationships from their preferred ecosystems, within the general concern on the biodiversity preservation.

Generally, man's interest in insectivores was aroused (at least in the past) by their fur (e.g. the mole) and, in the same time, because they feed on large quantities

of injurious insects, myriapods, snails and earthworms, from the ground, under the leaf layers and from burrows. These areas are untouched by the bats, they feeding on the insects they catch on the fly. More than that, some insectivores (e.g. the hedgehog) control the viper and mouse populations.

Murariu (2000) says that it is interesting and impressive to watch how the shrews succeed in finding enough food during winter or within the alpine and arctic conditions. Why this question appeared? Because another insectivore (the hedgehog) adopted another strategy in order to stand the unfavourable season – it hibernates, while the moles and shrews are active all along the year.

Sorex alpinus belongs to the family Soricidae, with representatives of a small size. Their limbs are short and thin, the muzzle is long and pointed. Usually, the tail is equal or longer than the head+body length. Eyes and ears are small.

Mitchell-Jones & col. (1999: 40) appreciated the statute of the species *S. alpinus*, of an European endemic species. Also, they mentioned its range in the Alps, the Balkans and the Carpathians, as well in some isolated mountains from Germany.

Defining the Balkan Peninsula, Griffiths & col. (2004) compared it with a triangle in which the land of the Central Europe (as the northern limit), the eastern Mediterranean (in the southern side) and the Adriatic, Aegean and Black seas are included.

Kryštufek (2004), comments the quantitative diversity of the mammals from the Balkans, and mentions that six taxa (species and subspecies, our note) are distributed both in the Balkans and the rest of Europe. „...This suggests the greater influence of Europe (rather than Asia Minor) in formation of the recent mammal fauna of the Balkan Peninsula”. As regards *Sorex alpinus*, it is the first in the list of the 16 endemic taxa from Balkans with a small-range (< 500,000km² - arbitrarily selected by Kryštufek) (op. cit.).

Spitzenberger (2001), underlining *S. alpinus* ecological specialisation, in comparison with other shrew species, pointed out the isolated distribution of its populations in the Alps, the Balkans (up to the Albanian border), in the Carpathians and Jura, on the one side, and on the other one the less numerous fossil remains in the deposits from the caves and in the pellets of the birds of prey.

The representatives of the Soricidae are solitary and very active. They feed mainly on the invertebrates from the leaf layers, grass, brooks and pools. They are very greedy and they do not resist without food more than 5 – 6 hours. Their basal metabolism is higher than in the other mammals with a similar size (e.g. the mice). The large quantity of eaten food compensate for the quantity of lost energy, but also the lack of nutritive substances of the food: undigested chitin and large quantities of water.

Murariu (op. cit.) asserts that there are not precise data on the biology, ecology and habits of *Sorex alpinus* Schinz, 1837 and the rare collectings lead to the idea of the existence of a small number of individuals, in isolated populations.

Taking into consideration the fact that they live at altitudes of 700 – 1,500 m (in the Alps they were reported up to 2,500 m altitude) we can explain the state of isolation of the populations from a slope to the other, from a massif to another.

As a matter of fact Miller (1912) studied 31 *S. alpinus* specimens, most of them collected from the Swiss Alps (26 specimens), only one from France and four (3 ♀♀ and 1 ♂) from Hațeg – the Southern Carpathians, at altitudes of 500 – 650 m (Fig. 1).

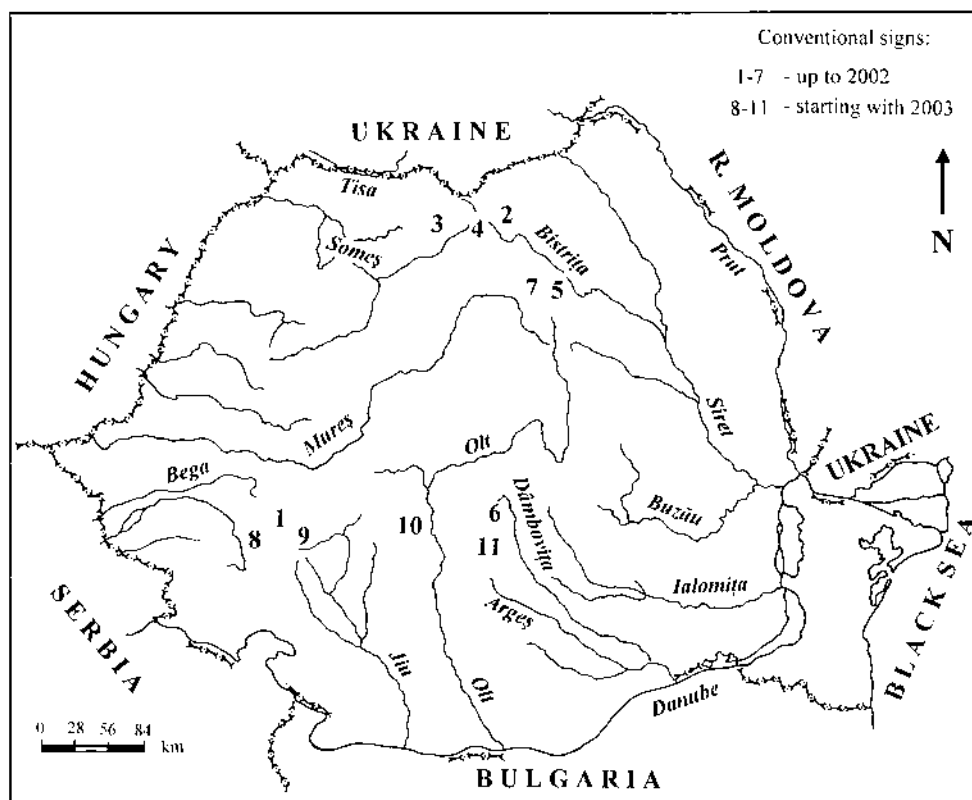


Fig. 1 – Reported distribution of *Sorex alpinus* in Romania: 1 - Retezat (Miller, 1912); 2 - Iacobeni-Vatra Dornei (Cornelson & col., 1955); 3 - Rodna Mt. (Szabo, 1960); 4 - Suhard Mt. (Szabo, 1960); 5 - Ceahlău Mt. (Simionescu, 1968); 6 - Câmpulung-Muscel (Barbu & col., 1980); 7 - Biczazului Gorges (Simionescu, 1985); 8 – Râu Șes – Țarcului Mt.; 9 – Retezat Mt.; 10 – Lotrioarei Valley – Cibinului Mt.; 11 – Făgăraș Mt.

Later, in the Romanian mammalogical literature, Cornelson & col. (1955) reported *Sorex alpinus* from Iacobeni – Vatra Dornei (Suceava County). Simionescu (1968, 1985), Simionescu & Varvara (1983) reported the species from the Eastern Carpathians (Ceahlău Mountain and Biczaz Gorges).

Barbu & col. (1980) reported the same species from Argeș County, within an analysis of the ecological aspects and of the small mammal collectings from the premountainous areas of the Dâmbovița County and mountainous ones of the Argeș County. Using the traps, they collected 219 insectivorous and rodent specimens. Other 457 small mammal specimens were identified studying the skeleton remains from the pellets of *Athene noctua* and *Bubo bubo*. *Sorex alpinus* was represented by three specimens (1 ♂ and 2 ♀♀), collected from the neighbourhood of Voina Chalet from Câmpulung Muscel, in a habitat of fir forest mixed with beech (Fig. 1).

By this paper, the authors intend to complete the data from literature, with the reports of the representatives of *S. alpinus* from new sites of the Southern Carpathians. At the same time they complete the data which were at Murariu's disposal (op. cit.) for the „Romanian Fauna, Mammalia”, fascicle „Insectivora”, as well as for „Red Book of the Romanian vertebrates“ (Botnariuc & Tatole, eds., 2005).

MATERIAL AND METHOD

Totally ten *S. alpinus* specimens are reported, eight of them collected by the junior author, from the Râul Șes Valley (1,200 m a.s.l.), between Țarcu and Godeanu mountains, from Lotrioara Valley (900 m a.s.l.), from the Cibin Mountains and from the Retezat Mountains (1,300 – 1,450 m a.s.l.). The habitats were of mixed forests place on steep slopes, with rocks and fallen trees. Collectings were made in August, September and November 2003, and September 2004.

During 3rd – 9th of August 2004, the southern slope of the Făgăraș Mountains was investigated, in order to estimate the mammal populations. This was necessary for editing the documentation for declaring the respective region a protected area.

Material collectings were made from several sites, from the neighbourhood of the „Cumpăna” Chalet, near the end of the Vidraru Lake, Argeș County, at about 900 m a.s.l.

From the small mammals collected in August 2004 the species *Clethrionomys glareolus* (67 specimens), *Apodemus sylvaticus* (12 specimens) and *A. flavicollis* (9 specimens) were prevalent. Other collected species: *Arvicola terrestris* (1 specimen) from the Arvicolidae rodents and 4 species of Soricidae insectivores: *Sorex minutus* (5 specimens), *S. araneus* (1 specimen), *Sorex alpinus* (2 specimens) and *Neomys anomalus* (2 specimens). Hills of *Talpa europaea*, nests of *Muscardinus avellanarius* and galleries of *Microtus* (= *Chionomys*) *nivalis* were observed, too. Also, mammals of middle and large size as: *Erinaceus concolor*, *Lepus europaeus*, *Sciurus vulgaris*, *Vulpes vulpes*, *Martes martes*, *Felis silvestris*, *Sus scrofa*, *Cervus elaphus*, *Capreolus capreolus* were observed. On the basis of the local people's and rangers' information and to the correlation with the investigated habitats we consider real the data according to *Canis lupus*, *Ursus arctos*, *Lutra lutra*, *Meles meles*, *Martes foina*, *Mustela putorius*, *M. nivalis*, *M. herminea*, *Felis lynx* and *Rupicapra rupicapra* are present in the area.

The collected specimens were measured and weight on the spot, then preserved in ethylic alcohol and deposited in the collections of “Grigore Antipa” National Museum of Natural History from Bucharest.

RESULTS AND DISCUSSIONS

From the 30 mammal species collected and observed on the southern slope of the Făgăraș Mountains, one of them (*Sorex alpinus* Schinz, 1837) roused a special interest from the faunistic point of view, because there are very few reports of this species in the Romanian fauna, as yet. As we have already mentioned, the species is represented by isolated populations, with a small number of individuals in Europe and Romania, according to other mammalogists' results (ex., Miller – 1912; Cornelson & col., 1955; Szabo, 1960; Simionescu, 1968, 1985; Simionescu & Varvara, 1983; Barbu & col., 1980).

From our experience in the field, we can say that *Sorex alpinus* is a rare species with small and isolated populations. Murariu (op. cit.) mentioned its preferred habitats from Romania, mainly the wet and shadowed compact forests up to 1,500 m altitude. Our expeditions from 2003 and 2004 permitted us to establish that the small populations of *S. alpinus* have an insufficient known dynamics. And that because repeated field trips in different years, in the same places, had different results in observations and in collecting specimens. That means whenever individuals of *S. alpinus* are not caught in traps, the species is absent at altitudes of over 600 m.

On the other hand, the man's disturbing presence and, especially, the damage of the habitats are favoured both by the intensive exploitation of the natural resources and by the total cutting of the forests.

Preferred habitats of *Sorex alpinus* are the mountain forests, the deciduous ones, where the beech is prevalent, but also the mixed forests of deciduous essences (beech, sycamore maple and even willow, alder, hazel, etc) with conifers or only in coniferous forests (spruce fir, fir, pine and even juniper). In these forests it looks for shadowed and wet valleys, crossed by water flows, which might not have large quantities of water but a rich swamp vegetation and spontaneous graminaceae and ferns on the banks. Even in the rocky valleys, where the high grassy vegetation could appear, there are optimum conditions for *S. alpinus* to live. Such conditions occur in Cumpăna Mare Valley – Clăbucet, on the right shore of Vidraru dam lake – Argeş County (Fig. 1).

In comparison with the species of the genus *Neomys* (water shrews), Alpine shrew prefers only the shadowed and wet habitats, but it never gets in and look for food in water. But it has a similar biology with the other two species, *Sorex araneus* and *minutus*.

Having at our disposal two specimens of *Sorex alpinus* (one caught by the traps for small mammals and another one, found dead on the path, from the same habitat of the southern slope of the Făgăraş Mountains) we were surprised by the fur colour, more blackish than in the other species, *Sorex minutus* and *S. araneus* (Fig. 2), and, especially, by the results of the body measurements.

The length of the tail is very obvious, usually equal or longer than the head+body length in *S. alpinus*, in comparison with the other two species of the genus. In table 1 we present the body measurements (in mm) and the weight (in g) of two specimens of *Sorex alpinus*, in comparison with the same measurements of five specimens of *Sorex minutus*, collected by us from the same habitats of the southern slope of the Făgăraş Mountains, of the Cumpăna Mare Valley, at about 700 m altitude, during the same period.

These data are compared with those presented by Barbu & col. (1980), taken from a material collected in January 1978, also from the southern slope of the Făgăraş Mountains, but on the bank of Râul Târgului stream, in the neighbourhood of Voina Chalet, near Câmpulung-Muscel (Argeş County), at about 900 m altitude. In *S. minutus*, the length of the tail is always shorter than the head+body length. An additional observation, on the basis of the same measurements, refers to the tarsal length, which is over 13 mm in *S. alpinus*, while in *S. minutus* it is under 13 mm.

Table 1

Comparative biometry (in mm; weight in grams) between the specimens of *Sorex alpinus* and *S. minutus*, collected from different places, in different years.

Species Measurements	Murariu & Benedek, 2004						Barbu & col., 1980				
	<i>Sorex alpinus</i>		<i>Sorex minutus</i>				<i>Sorex alpinus</i>		<i>Sorex minutus</i>		
						Min.	Max.	Min.	Max.		
Body length	60	65	61	65	62	56	61	63.0	69.0	50.0	60.0
Tail length	61	65	40	41	38	44	41	63.0	64.0	34.0	42.0
Tarsal length	14	15	13	13	12	12	13	13.0	14.0	9.0	11.0
Ear length	9	8	7	8	8	7	7	-	-	-	-
Weight	7	8	7.5	9	8	8	-	-	-	-	-
Sex	♀	♀	♂	♀	♀	♀	♀	2 ♀♀ and one ♂		3 ♀♀ and 4 ♂♂	

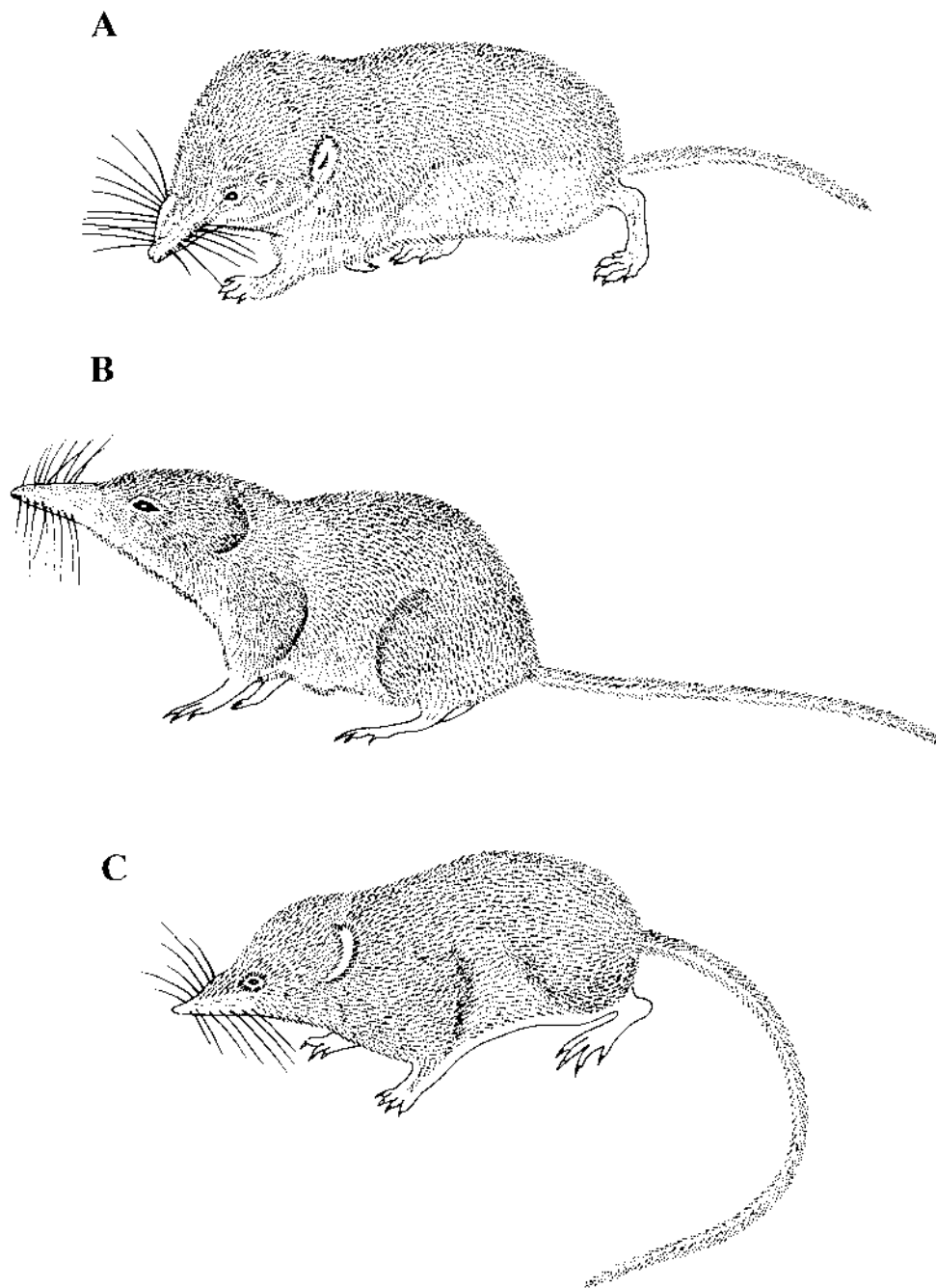


Fig. 2 – Comparison of body and tail length in *Sorex araneus* (A), *S. minutus* (B) and *S. alpinus* (C).

According to Barbu & col. (op. cit), the tarsal length is under 11 mm in the individuals of *S. minutus*. As regards the size of the individuals of the two species, there are not significant differences. They become significant only from the allometrical ratio point of view (e.g. body/tail).

The differences mentioned above are also obvious when comparing the measurements only of the individuals of *S. alpinus*, collected by Barbu & col. (1980), near Câmpulung Muscel, with those collected by us, from Retezat Mountains, Râu Şes (Țarcu Mountains) and Lotrioara valleys (Cibin Mountains), as well as from southern slope of the Făgăraş Mountains, in 2003 and 2004. In the individuals collected from the first three sites, the tarsal length does not decrease less than 13.9 mm.

In two subadult individuals of *S. alpinus*, originating in the Râu Şes Valley, the allometry body/tail has a higher value (54.9/63.8 and 53.7/64.5) than in the adult individuals of the same species, from the same places (Tab. 2). That means, during the growing period, allometrical difference is of 10 mm (in favour of the tail), while in the adults the difference decreases to 3 or even 0 mm. The value of this ratio, correlated with the teeth deterioration and pigmentation degree, as well with the deterioration of the tail hairs, leads to the estimation of the age of this species individuals.

In spite of the relative small weight (6.6 g), a specimen from Retezat Mountains had the largest measurements: 67.9; 71.2 and 14.8 mm. Another specimen, from the southern slope of the Făgăraş Mountains had the tarsal length of 15 mm, indeed.

Table 2

Comparative measurements (in mm; weight in g) of some *Sorex alpinus* specimens.

Measurements	Barbu & col., 1980		Murariu & Benedek, 2003 - 2004									
	Min.	Max.	Râu Şes, Retezat Mt. and Lotrioarei Valley							Făgăraş Mt.		
Body length	6.30	69.0	54.9	53.7	64.5	64.8	-	-	67.9	-	60	65
Tail length	63.0	64.0	63.8	64.5	66.0	66.7	-	-	71.2	-	61	65
Tarsal length	13.0	14.0	14.4	14.4	14.5	13.9	-	14.4	14.8	-	14	15
Ear length	-	-	-	-	-	-	-	-	-	-	9	8
Weight	-	-	-	-	-	-	-	7.2	6.6	-	7	8
Sex	2 ♀♀ and ♂		-	-	-	-	-	-	-	-	-	♀♀

The individuals of *S. alpinus* distinguish very well those of the species *S. araneus* and *S. minutus* by their dentition. I^1 has two cuspids, the second being shorter than the first from the 5 unicuspid teeth in *S. araneus*; the last ones decrease, the fifth being the smallest. In *S. minutus* the second cuspid of I^1 is obviously smaller than the first. The 5 unicuspids have smaller dimensions than in the previous species. Finally, I^1 in *S. alpinus* has the second cuspid obviously under the level of the first one of the 5 unicuspids (Fig. 3 A, B, C).

In all three species, I_1 has three lobes with different degrees of eminences, correlated with the deterioration period. In comparison with *S. araneus* and *S. minutus*, the first inferior premolar has two obvious eminences in *S. alpinus* (Fig. 3 C).

Hamar & col. (1962) made a complex study on the subspecies *Sorex araneus tetragonurus* in the Romanian fauna, presenting the characteristics of the inhabited biotopes, the associations with other species, data on the food, activity rhythm and on weight, on the sex ratio and on the age structure of the populations, shedding periods. The body and skull measurements of *Sorex araneus*, the variability of the

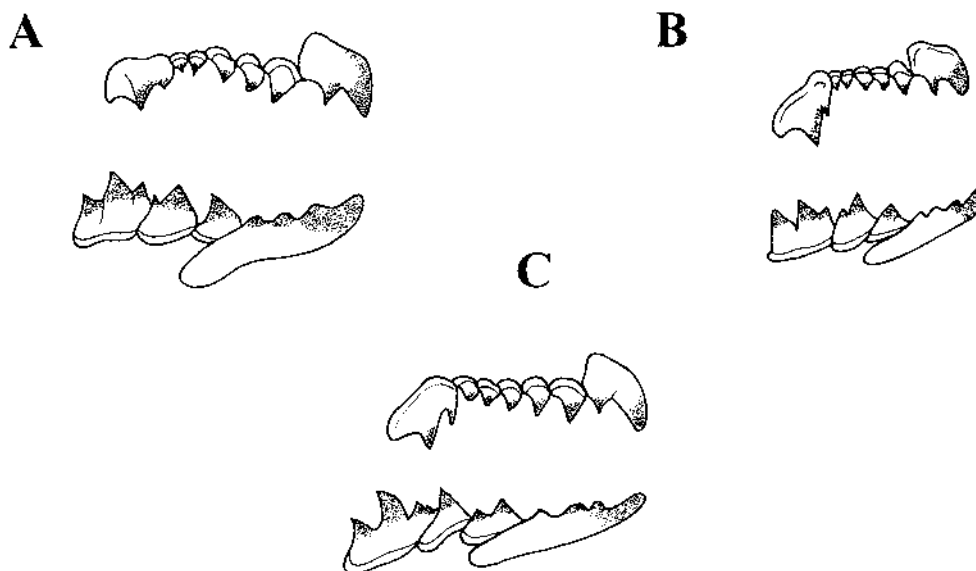


Fig. 3 – Dentition in *Sorex araneus* (A), *S. minutus* (B) and *S. alpinus* (C).

fur colour and the geographical distribution were commented mainly in order to decide that in the Romanian fauna *S. a. tetragonurus* is present.

Without reporting a collecting site, altitude or measurements for *S. alpinus*, Hamar & col. (op. cit.) mentioned at paragraph c (page 353), regarding the association of *S. a. tetragonurus* with other small mammals: „In den unteren Alpenzonen, mit *Chionomys nivalis*, *Microtus (P.) subterraneus*, *Clethrionomys glareolus*, *Sorex alpinus* und *Sorex minutus* (seltener)” (“In the subalpin zones, *S. alpinus* and *S. minutus* seldom are together with *Chionomys nivalis*, *Microtus (P.) subterraneus*, *Clethrionomys glareolus*”). It is obvious that the authors did not collect any *S. alpinus* specimen, but they made only an association based on the knowledge of the distribution of the respective species along the altitude. According to our results, we can assert that on the southern slope of the Făgăraș Mountains, at least, *S. alpinus* is associated with *Talpa europea*, *Neomys anomalus*, *Muscardinus avellanarius*, *Arvicola terrestris scherman*, *Apodemus sylvaticus* and *A. flavicollis*.

Simionescu (1968) analysed the specific structure and the vertical distribution of the small mammals of the Ceahlău Massif. He collected 107 specimens, from three different levels (800 m, 1,300 m and 1,800 m), using an equal number of traps. He caught only one specimen of *Sorex alpinus*, representing 0.93% from all collectings made in the Ceahlău Massif. The habitat was a clearing in the neighbourhood of the „7 Noiembrie” Chalet, at the altitude of 1,800 m. On this occasion, Simionescu (op. cit.) wrote that „...*Sorex alpinus*, semnalată până în prezent doar la Hațeg (2 – Miller, 1912 our note), în Munții Rodnei și pe Suhard (12 – Szabo, 1960 our note) și la Iacobeni - Vatra Dornei (3 – Cornelson & col., 1955 our note) este o specie rară”. (“...*Sorex alpinus*, reported only from Hațeg (two – Miller, 1912, our note), from the Rodna Mountains and Suhard (12 – Szabo, 1960, our note) and from Iacobeni - Vatra Dornei (three – Cornelson & col., 1955, our note), is a rare species”). Unfortunately, in the paper there are not comparative

measurements of the individuals from the Southern Carpathians with those from the Eastern Carpathians.

Commenting the shrew population structure and dynamics from the Eastern Carpathians, without mentioning a collecting site, Simionescu & Varvara (1983) wrote later: „The first two species (*Sorex araneus* and *S. minutus* – our note) have a general distribution and high numbers while *Sorex alpinus* has a sporadic distribution in the mountain area only...”. The assertion is correct, verified also by the results of our collectings in different regions of Romania.

Simionescu (1985) published his investigations on the small mammal fauna from Bicaz Gorges (the Eastern Carpathians), based on 275 insectivorous and rodent specimens, only two of them (representing 0.72%) being *Sorex alpinus*, collected at 1,200–1,400 m altitude. Also for this report body measurements were not presented, for some comparisons.

Barbu & col. (1980), collected 219 insectivorous and rodent specimens, making an analysis of the ecological aspects and collecting small mammals from the premountain regions of the Dâmbovița County and the mountain ones of the Argeș County. Other 457 small mammal specimens were identified after the skeleton remains from the pellets of *Athene noctua* and *Bubo bubo*. *Sorex alpinus* was represented by three specimens (1 ♂ and 2 ♀), collected from the neighborhood of Voina Chalet, in a habitat of fir forest mixed with beech.

If we take into consideration the two *S. alpinus* specimens, collected from the southern slope of the Făgăraș Mountains, in 2004, we remarked a similarity of the body size values with those reported by Barbu & col. (1980). More than that, the similarity can be extended on the habitats – fir forest mixed with beech, but also complex grassy vegetation, with hygrophilous and umbriferous grass up to bushes and trees of *Salix* sp. and *Corylus* sp.

Conclusions

1. In the Romanian fauna *Sorex alpinus* is represented by small populations, isolated on different slopes of the mountain massifs from the Eastern and Southern Carpathians.

2. Although have a similar biology with the individuals of other two species (*S. araneus* and *S. minutus*), the individuals of *S. alpinus* distinguish by the darker colour of the fur and by the ratio body length/tail length, usually equal or in the favour of the tail. The tarsal length is also over the medium values recorded for the other two species.

3. The allometry body/tail (in the case of *S. alpinus* subadults) can reach the value of 10 mm, in the favour of the tail.

4. Both from literature and from our own studies the preference of *S. alpinus* for the wet, shadowed habitats from the steep slopes afforested with deciduous, mixed or coniferous essences resulted. Many times, collectings were richer in the forests and grass layed near the thin or abundant water flows.

5. Normal dynamics of the *S. alpinus* populations can lead to wrong conclusions on the presence or the absence of a species in a certain area. That means that the estimation of the populations can be made after several monitoring years (3–5).

6. As the whole biodiversity, *S. alpinus* endure the more and more frequent man's intervention in the natural habitats and, especially, their damage, because of the exploitation of the natural resources. The species is included in the “Red Book of the Romanian vertebrates” (Botnariuc & Tatole, eds., 2005) and needs to be protected. Under the above mentioned circumstances it is considered vulnerable.

ACKNOWLEDGEMENTS

The senior author thanks to the colleagues from „Grigore Antipa” National Museum of Natural History, Dr. Mihai Stănescu and Dr. Iorgu Petrescu for their help in the mounting and control of the traps, in the measurements of the collected material and in the preliminary preservation on the spot. Also to Dr. Victoria Tatole for the organization of the trip in good working conditions. Our thanks are also for Oana and Alexandru Iftime, for the collecting of one of the two specimens of *S. alpinus*, reported in the paper. A *Sorex araneus* specimen, reported in the chapter “Material and method” was caught using Barber traps, put by Dr. Melnya Stan, to whom we thank on this occasion. We thank to the anonymous referees for the time spent for reading and improving the manuscript. Also, to Mrs Petruța Dumitrică for tracing the illustration in China ink.

NOI RAPORTĂRI ASUPRA EXISTENȚEI SPECIEI *SOREX ALPINUS* SCHINZ, 1837
(INSECTIVORA: SORICIDAE) ÎN CARPAȚII MERIDIONALI (ROMÂNIA)

REZUMAT

Cercetările autorilor, în anii 2003 și 2004, în diferite zone ale Carpaților Meridionali, au permis ca între colectările de mamifere mici să identifice și specia *Sorex alpinus*. Raportările anterioare din literatură, apoi rezultatele ultimilor doi ani și numărul mic de indivizi colectați sunt puse pe seama reprezentării speciei prin populații mici și izolate, pe diferiți versanți montani, la altitudini de peste 600 m.

Habitatele preferate sunt pădurile cu esențe foioase, în amestec sau numai cu conifere, situate pe versanți abrupti. Rezultate mai bune la colectări au fost obținute când capcanele au fost instalate la baza versanților, de obicei în vecinătatea unui curs de apă sau de-a lungul unei văi cu grad ridicat de umiditate, invadată de vegetație umbroasă (ferigi și graminee), dar și cu subarboret.

În total au fost colectate 10 exemplare de *S. alpinus*. Atât cele opt exemplare colectate de pe văile Râu Șes (Munții Țarcului), Lotrioara (Munții Cibinului) și din Retezat, cât și cele două de pe versantul sudic al Munților Făgăraș au coada egală sau mai lungă decât corpul, iar tarsul – peste 13 mm (Tab. 1 și 2); la *S. minutus* și *S. araneus*, coada este întotdeauna mai scurtă decât corpul, iar tarsul – sub 13 mm. La doi indivizi subadulti, colectați de pe valea Râu Șes, raportul corp/coadă este semnificativ în favoarea cozii – mai lungă cu aproximativ 10 mm decât corpul (Tab. 2). Este vorba despre ritmuri diferite de creștere a diferitelor părți ale corpului, cunoscute sub numele de alometrie.

Includerea speciei *S. alpinus* în „Cartea Roșie a vertebratelor din România” (2005) și constatarea pe teren a degradării habitatelor prin intervenția omului pentru exploatarea resurselor naturale din Carpații Răsăriteni și Meridionali sunt argumentele susținerii statutului de ocrotire a speciei, pe care, în condițiile date o considerăm vulnerabilă.

LITERATURE CITED

- BARBU, P., N. BOTEANU, S. BLIDĂRESCU, 1980 – Contribution a la connaissance des petits mammifères de la région premontagneuse et montagneuse des Carpates Meridionales. *Analele Universității București, Biologie*, 29: 31-40.
- BOTNARIUC N., V. TATOLE, 2005 – Cartea Roșie a Vertebratelor din România. București. 260 pp. (in Romanian)
- CORNELSON, D., D. PETREA, G. MARCHEȘ, M. DUCA, H. FELLER, 1955 – Contribuții la cunoașterea rozătoarelor și insectivorelor susceptibile la tulăremie pe teritoriul Moldovei. Studii și cercetări științifice, Academia R.P.R., Filiala Iași, 6 (3- 4): 61-68. (in Romanian)
- GRIFFITHS, H. I., B. KRYŠTUFEK, J. M. REED, 2004 – Balkan Biodiversity. Pattern and Process in the European Hotspot. Kluwer Academic Publishers, Dordrecht/Boston/London: 1-9 + 1-357.
- HAMAR, M., S. HELLWING, B. SCHNAPP, 1962 – Beiträge zur Kenntnis von *Sorex araneus tetragonurus* Herm. in der Rumänischen Volksrepublik. *Tarvaux du Muséum d’Histoire Naturelle „Grigore Antipa”*, 3: 351-382.
- KRYŠTUFEK, B., 2004 – A quantitative assessment of Balkan mammal diversity. Pp. 79-108. *In: Balkan Biodiversity. Pattern and Process in the European Hotspot*. Kluwer Academic Publishers.
- MILLER, G. S., 1912 – Catalogue of the Mammals of Western Europe (Europe exclusive of Russia) in the collection of the British Museum. London. 1019 pp.
- MITCHELL-JONES, A. J., G. AMORI, W. BOGDANOVICZ, B. KRYŠTUFEK, P. J. H. REIJNDERS, F. SPITZENBERGER, M. STUBBE, J. B. M. THISSEN, V.

- VOHRALÍK, J. ZIMA, 1999 – The Atlas of European Mammals. Academic Press, T and AD POYSER Natural History: 1-11 + 1-484.
- MURARIU, D., 2000 – Insectivora. *In: Fauna României, Mammalia*. Edit. Academiei Române, 16 (1): 1-142. (in Romanian)
- SIMIONESCU, V., 1968 – Contribuții la cunoașterea componenței specifice și repartiției pe verticală a mamiferelor mici de pe masivul Ceahlău. *Analele științifice ale Universității „Al. I. Cuza” din Iași, Secțiunea II, a. Biologie*, 16 (2): 365-372. (in Romanian)
- SIMIONESCU, V., 1985 – Primele investigații asupra faunei de mamifere mici din zona Cheile Bicazului – Lacul Roșu. *Analele Științifice ale Universității „Al. I. Cuza” din Iași, Secțiunea II, a. Biologie*, 31: 23-26 + 4 figures. (in Romanian)
- SIMIONESCU, V., M. VARVARA, 1983 – Contributions concerning the structure and dynamics of the populations of shrews (Insectivora, Soricidae, Soricinae Murray, 1866) from the nature reserve „The secular forest of Slătioara” in the Rarău Massif, East Carpathians. *Analele științifice ale Universității „Al. I. Cuza” din Iași, Secțiunea II, a. Biologie*, 29 (5): 103 – 104 + 3 pages with graphs (1-4) and tables (I-V).
- SPITZENBERGER, F., 2001 – Die Säugetierfauna Österreichs. Grüne Reihe des Bundesministeriums für Land- und Fortschritt, Umwelt und Wasserwirtschaft, Band 13: 1-895.
- SZABO, I., 1960 – Contribuții la cunoașterea faunei de mamifere mici din partea nord-vestică a R.P.R.. *Studia Universitaria „Babeș-Bolyai”*, 2 (2): 119-126. (in Romanian)

Received: February 14, 2005

Accepted: March 25, 2005

Dumitru Murariu

Muzeul Național de Istorie Naturală „Grigore Antipa”

Șos. Kiseleff nr. 1, 011341 București 2, România

e-mail: dmurariu@antipa.ro

Ana Maria Benedek

Universitatea „Lucian Blaga” – Sibiu

Catedra de Ecologie și Protecția Mediului

Str. Oituz 31, 2400 Sibiu, România

e-mail: ana_benedek@hotmail.com