

***VESPERTILIO MURINUS* L., 1758**  
**(CHIROPTERA: VESPERTILIONIDAE) – DOMICOL SPECIES**  
**IN ROMANIAN FAUNA**

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**Abstract.** To the distribution of *Vespertilio murinus* new localities are added. This species is represented by small and isolated populations in Romania. Although there are individual variation, the values of the body and skull measurements are within the limits of the individuals of the Palaearctic species. The collecting from rooms and lofts of the studied specimens permitted the inclusion of the species within the domicol ones. Both the test of direct immunofluorescence for B – 058 (code 2.7) made on brain prints of *V. murinus* and the white mouse bio-sample (code 2.1) were negative.

**Résumé.** On ajoute de nouvelles localités à la répartition de l'espèce *Vespertilio murinus*. Elle est représentée en Roumanie par de petites populations isolées. Bien qu'ayant des variations individuelles, les valeurs des dimensions corporelles et crâniennes mesurées s'inscrivent dans les limites pour les individus de l'espèce des populations paléarctiques. Les exemplaires examinés ayant été collectés dans des chambres et des greniers a permis d'encadrer cette espèce parmi celles domiciles. Aussi bien le test d'immunofluorescence directe pour B – 058 (code 2.7) effectué sur des empreintes du cerveau de *V. murinus* que la bioépreuve sur des souris blanches (code 2.1) ont été négatives.

Key words: domicol, distribution, measurements, rabie test.

*INTRODUCTION*

When we make references on the flying vertebrates, we compare the bats with the birds, the last ones using to build nests, at least for laying eggs. But also, in comparison with the other mammals, which use to build nests, some of them dig shelters and complicated galleries. The bats cannot build nests, and they use as shelters any places which protect them during rest and hibernation – for those from the temperate regions.

Therefore, the bats shelter in natural places (caves, rock clefts, tree hollows or even in the canopy (especially in the Tropical areas), as well as in artificial places, built by man: highway and railway bridges, mine tunnels and galleries or in stone quarries, steeples, houses and their annex, pantries, basements, casemates, etc.

Among the 30 bat species reported for the Romanian fauna, *Vespertilio murinus* L., 1758 is also present. It has a geographical distribution from Great Britain and South Scandinavian Peninsula, eastwards up to Ussuri (Russia), eastern part of Afghanistan, North Pakistan, and in China, in provinces Sinkiang and Kansu.

The species was reported from the Romanian territory since the 19<sup>th</sup> century. Therefore Daday (1885) remarked the presence of four bat species in the garret of “Maria Tereza” Orphanage from Sibiu, among them also being *Vespertilio murinus*. In the 20<sup>th</sup> century, especially in its second half, the species was reported from almost all historical provinces, and Botnariuc & Tatole (2005) marked the following localities on its distribution map: from Bihor (Aleșd - FT01 47°04'00"N-22°25'00"E and Zece Hotare – FT20 46°59'00"N-22°42'00"E) from locality

Şuncuiş neighborhood; from Sighetul Marmaţiei – GU11 47°56'00"N-23°53'00"E; from Cluj – FS98 46°46'00"N-23°36'00"E; from Zărneşti - Braşov – LL85/95 45°38'00"N-25°35'00"E; Peştera Mare (Nr. 14 and 27) – LM82 - 46°14'00"N-25°27'00"E near locality Mereşti from Cheile Vârghişului; from Banat at Oraviţa – EQ58 - 42°02'01"N-21°40'53"E; from Oltenia – Căineni - KL84 45°29'00"N-24°18'00"E and Sopot – FQ92 44°25'00"N-23°30'00"E; from Moldova – Tazlău – MM57 46°43'00"N-26°28'00"E, Rarău – LN95 47°27'00"N-25°34'00"E and Trifeşti – NN35 47°27'00"N-27°31'00"E (Fig. 1). The same distribution was also presented by Murariu (2000), when he proposed this species to be included in the „Red Book of Romanian Vertebrates”.

The purpose of this papers has three directions: (a) reconfirmation of *Vespertilio murinus* presence in the Romanian fauna and the updating of the distribution map adding new localities where it occurred; (b) underlining the body and skull measurements of the material we had at our disposal, for the first time; (c) the mention of the shelter types used by the individuals of this species.

#### MATERIAL AND METHOD

We had at our disposal the specimens of *Vespertilio murinus* – two from the mammal collection of “Grigore Antipa” National Museum of Natural History (Bucharest) (Inv. No. MAM 5884 and MAM 6200) and one specimen collected in October 2006 from Pantelimon District, Bucharest (with Inv. No. MAM 9724). Another specimen was collected and released by us, in September 1980, from the loft of “Grigore Antipa” National Museum of Natural History, and Victor Gheorghiu (*in verbis*) collected a specimen of the same species in August 2003, between the walls of the closed blocks of flats, from Tei District, Bucharest.

A part of the body measurements (e.g. body length, tail length and forearm length) were taken from the labels of the inventoried specimens. The three skulls were measured by us using the vernier caliper Measy 2000, Typ 5921 (0.1 – 150 mm). Each of the 12 skull measurements (Fig. 2) has the following abbreviation:

GL – greatest length of skull;  
 CBL – condylobasal length;  
 ZW – zygomatic width;  
 IC – interorbital constriction;  
 BB – breadth of braincase;  
 MW – mastoid width;  
 MXW – maxillary width at M3;  
 HS – height of braincase (including tympanic bullae);  
 MXT – maxillary toothrow (C-M3);  
 MDT – mandibular toothrow (C-M3);  
 M – total length of mandible;  
 HCP – hight of the coronoid process.

#### RESULTS AND DISCUSSIONS

The individuals of *Vespertilio murinus* prefer to shelter in the tree hollows, there being formed the most nursery colonies. Also, in the tree hollows they remain for hibernating, if such shelters are deep enough and the inner microclimate is not subjected to important temperature fluctuations, or at least the inner temperature is higher than the outer one. Just for these conditions of the shelters, most of the

individuals of *V. murinus* leave the superficial hollow in autumn, and search for refugees in the building lofts and in those of the annexes.

All specimens known by us or present in the mammal collection of “Grigore Antipa” National Museum of Natural History are either from lofts, limited spaces between buildings, wall clefts or from houses.

Dumitrescu & coll. (1962 – 1963) asserted that besides the seven localities from where *V. murinus* was reported, beginning with 1918 (sic!), they added other three localities. One of them was Bucharest where an individual was collected from the loft of the University Central Library, on the 4<sup>th</sup> of May 1957. We underline that in the list of the seven localities mentioned by the same authors, Bucharest is reported with the date of the 10<sup>th</sup> of August 1956 (legit T. Nalbant) and it is not mentioned May 1957 as before. It has to be remarked that Dumitrescu & coll. (op. cit.) explained that the two collecting places were two caves from Cheile Vârghișului (sites no. 141 and 147), but where they found only subfossil remains. When reporting the impressive colonies of some bat species from Șura Mare cave Murariu & coll. (in press) did not also identify *Vespertilio murinus* among them. Commenting the affiliation of this species to the Palaearctic ones, Bazilescu (1967) noted that it preferred the tree hollows as shelters. Finally, Valenciu (1971) made a series of ethological observations on *V. murinus* individuals, collected from the house lofts from Moldova. Keeping and feeding them on different insects, he observed the attack position of the bats when they heard the sounds of the predators on the terrarium floor. The less chitinous insects (e.g. Muscidae and Blatidae) were entirely eaten. From coleopterans and orthopterans, the legs, wings and buccal pieces remained uneaten. From butterflies, microlepidopterans were entirely consumed while macrolepidopterans were eaten without their wings.

According to these assertions we conclude that the individuals of *V. murinus* have an unusual adaptive plasticity which, in the course of time, permitted them to give up looking for refuges in caves, on the one side, and on the other one, the tree hollows are preferred after the shelters offered by lofts and buildings. Adaptive plasticity is also confirmed by the wide range of food components of *V. murinus* individuals. Anywise, both the observations and the collecting results in different shelters, as well as the remarks on the individuals raised in captivity lead to the idea of including this species among the domicol ones.

In this respect, besides the observation from Bucharest (noted in the chapter *Material and method*) we add Năstase Răduleț's remark (*in verbis*) who found a specimen of *Vespertilio murinus* in one of the rooms of the Celic Dere Station of the Institute of Eco-Museum Research (ICEM) from Tulcea, on 23<sup>rd</sup> of May 2005. Also the specimen included in the collection of “Grigore Antipa” National Museum of Natural History was collected from a house (legit Mihai Băcescu) from locality Baia, Suceava County, on the 1<sup>st</sup> of August 1991. Finally, the specimen no. MAM 5884 was collected by Alexandrina Popescu, on 29<sup>th</sup> of September 1969, from locality Zărnești, Brașov County.

Although the specimens from the collections of “Grigore Antipa” National Museum of Natural History are from different areas of Romania (Baia, Bucharest, Zărnești), the body measurements of three specimens (2 ♂♂ and ♀) are almost similar (Tab. 1). Yet, there is a difference between the head + body length of the specimen from Bucharest/2006 (of only 50 mm) while in the other two specimens it was of 60 mm. Also, an inverse ratio of the values was observed in the wing span, of 290 mm for the first specimen and 250 mm, respectively 240 mm, for the other two.

Table 1

Body measurements (in mm) and weight (in grams) of the three specimens of *Vespertilio murinus* from three different localities.

Measurements	Individuals	Bucharest 2006 MAM 9724	Catalog No. MAM 6200	Catalog No. MAM 5884
Length of head + body	50	60	60*	
Length of tail	35	30	30*	
Length of hind foot (tarsal)	9	8	7**	
Length of forearm	42	40	42*	
Span of wings	290	250	240**	
Length of ear	10	9,0	12**	
Weight	12	-	-	
Sex	♀	♂	♂	

\* - measurements on label;

\*\* - measurements on dry specimens.

As regards the skull measurements we remarked the smallest values in the specimens collected from Zărnești (Tab. 2), medium values in that one with the inv. no. MAM 6200 of "Grigore Antipa" Museum and the highest ones in the specimen collected from Bucharest, in October 2006. The skull and mandible measurements were made after the pattern from fig. 2, inspired by Gaisler & Zukal's paper (2004), in eco-morphometrical comparisons in *Myotis daubentonii* and *M. lucifugus*.

Table 2

Skull measurements (in mm) in same three specimens of *Vespertilio murinus* as in table 1.

Measurements	Individuals	Bucharest MAM 9724	Catalog No. MAM 6200	Catalog No. MAM 5884
GL – greatest length of skull	16.7		14.9	
CBL – condylobasal length	16.5	15.7	14.5	
ZW – zygomatic width	9.1	9.0	7.9	
IC – interorbital constriction	4.9	4.5	4.2	
BB – breadth of braincase	9.5	9.1	8.9	
MW – mastoid width	9.0		8.9	
MXW – maxillary width at $M^3$	6.7		6.0	
HS – height of braincase	7.3	7.0	6.6	
MXT – maxillary toothrow (C- $M^3$ )	5.2		4.6	
MDT – mandibular toothrow (C- $M_3$ )	5.7		5.3	
M – mandible (total length)	11.0	10.8	10.9	
HCP – height of the coronoid process	3.4		3.3	

From epidemiological point of view we underline the results of the parasitological studies made by Chiriac & Barbu (1968) in some small mammals, among which, some chiropteran species were included besides insectivores. Although *Vespertilio murinus* was not the authors' subject, the species was mentioned after "the European literature" as the host of some Cestoidea (e.g. *Staphylocystis* = *Taenia acuta*) and Nematoidea (e.g. *Capilaria* = *Trichosomum speciosa*).

Because during last years, in Europe, some accidents took place as a result of a wrong handing of bats (infestation with rabies virus, therefore the interest on these mammals increased, they being considered potential hosts of this virus) in October 2006, our specimen from Bucharest was subjected to some serological tests and brain samples were taken, at the Institute of Diagnostic and Animal Health (IDSA) of the Faculty of Veterinary Medicine of Bucharest. Both the test of direct immunofluorescence for B – 058 (code 2.7) made on brain prints of *Vespertilio murinus*, and the bio-sample from white mice (code 2.1) were negative (Fig. 3). For a better response, such kind of tests have to be made on several bat specimens, and if it is possible, on all 30 Romanian bat species.

#### Conclusions

1. *Vespertilio murinus* is represented in the Romanian fauna by small and isolated populations. Yet, individual of this species are present in much more places than those already reported.
2. Body and skull measurements on the studied individuals show values within the limits of the other individuals from the species range. Those from Bucharest fauna present some inversions, as those of a small size but with a wider wingspan, and inversely in the individuals from different areas of Romania. All individuals of the species, either from the collections of "Grigore Antipa" National Museum of Natural History or those reported *in verbis* were remarked in lofts and rooms. None of the specimens were not collected or observed in caves, where they seem to shelter since Holocene.
3. The preference of the individuals for buildings permitted us to include the species among the domicol ones. This think do not reject the possibility of sheltering also in the tree hollows. Considering their adaptive plasticity, they do not shelter in caves.
4. The tests for the rabies virus, made in the laboratories of Institute of Diagnostic and Animal Health, Bucharest, pointed out the negative results of the samples taken from the female of *V. murinus*, collected in the autumn of 2006.

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Fig. 1 – Distribution of the Parti-colored Bat (*Vespertilio murinus* L., 1758) in Romania.

***VESPERTILIO MURINUS* L., 1758 (CHIROPTERA: VESPERTILIONIDAE)  
– SPECIE DOMICOLĂ ÎN FAUNA ROMÂNIEI**

REZUMAT

Se confirmă existența de populații mici și izolate ale speciei *V. murinus*, dar se poate spune că liliacul bicolor există în fauna României, în mai multe localități decât cele raportate până în prezent. Astăzi specia nu mai folosește peșterile drept adăpost de hibernare sau de creștere a puilor. Preferă podurile din locuințe, motiv pentru care specia a fost încadrată între cele domicole. Acolo însă unde astfel de adăposturi sunt mai rare sau nu permit accesul în locuri izolate și liniștite din locuințe, caută scorburile arborilor din parcuri, livezi, păduri.

Măsurările corporale (Tab. 1) și cele craniene (Fig. 2, tab. 2) au valori comparabile cu cele ale indivizilor din restul arealului. Totuși, pentru indivizii studiați din fauna României s-a observat o inversare de valori între talia corpului și anvergura aripilor (Tab. 1).

Testele pentru identificarea virusului rabiei, efectuate în laboratoarele de specialitate au fost negative, în cazul probelor prelevate de la exemplarul colectat în 2006 (Nr. inv. MAM 9724) (Fig. 3).

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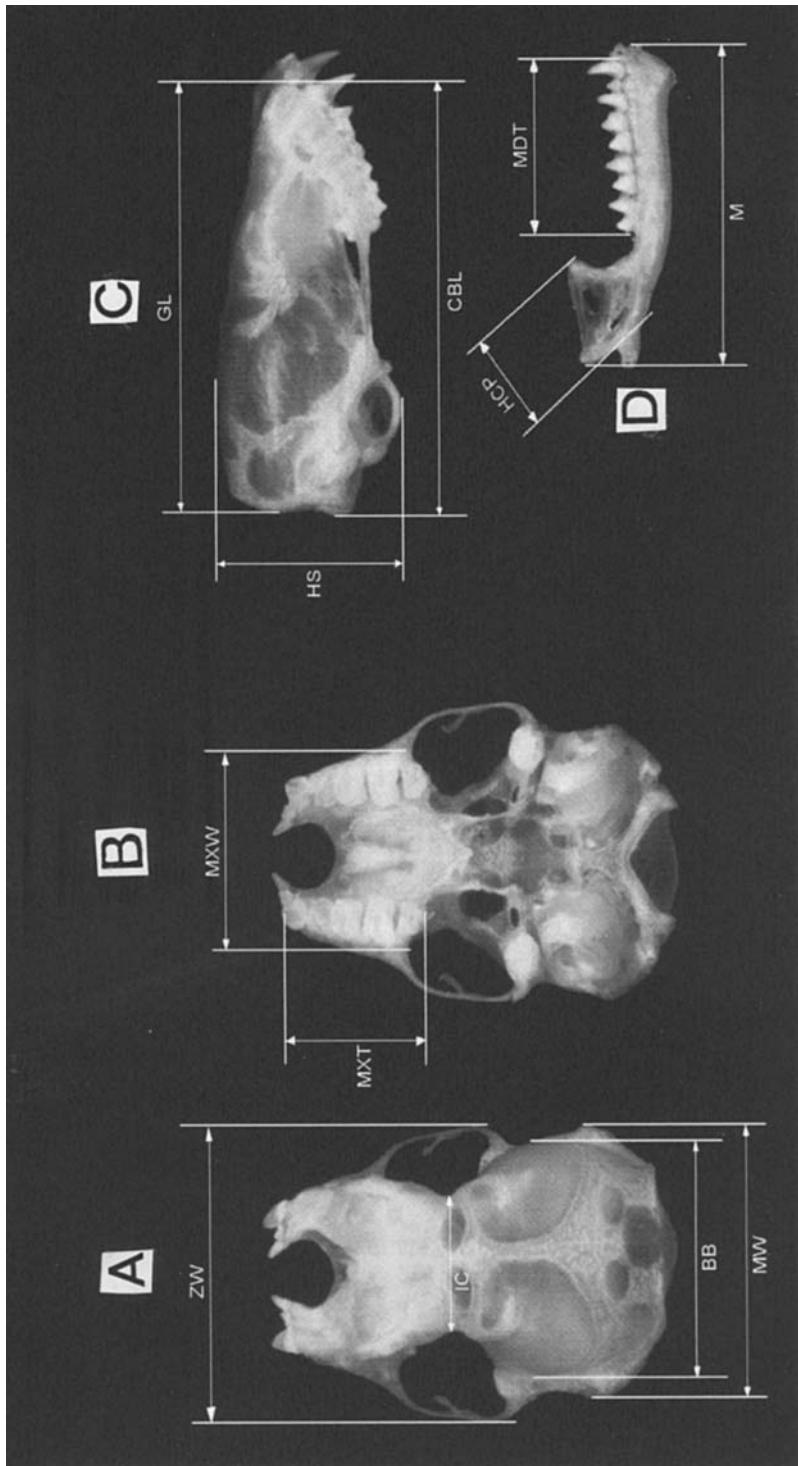


Fig. 2 – Skull measurements in Parti-colored Bat (*Vespertilio murinus* L., 1758). A – dorsal view; B – basal view; C – side view; D – lateral view of the right mandible.

<b>ROMANIA</b>	
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<p><b>Cod: 11-2006</b></p> <p><b>Nr. R.U.: 17788</b></p> <p><b>Data: 17.11.2006</b></p> <p><b>Director:</b> <b>Dr. Gheorghe BĂRBOSIU</b></p> <p><b>Expediator: Director</b></p> <p><b>Examinator: Director</b></p> <p><b>Rezultat: Negativ</b></p> <p><b>Observații:</b> - test de imunoafecție directă pentru B – 058 (cod 2.7) efectuat pe empreinte din creier de liliac negativ.</p> <p><b>Biopsie la pește sărat altib 1 cod 2.1 ; negativă pentru B – 058</b></p>	

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Nr. 18882 data: 16.11.2006

**Data recipzionari probelor:** 17.10.2006 **stareea in care au fost receptionate:** consiliul judetean  
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SOS. Kleist nr. 1, sect. 1, Bucuresti.  
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L.; 1758 and biotest on white mice (code 2.1).

- On the other hand, the results of the present study indicate that the use of a low-dose rate of  $\gamma$ -radiation ( $0.05 \text{ Gy}$ ) did not significantly increase the incidence of mutations in the *lacZ* gene of *S. enterica* serotype *Heidelberg*. This finding is in agreement with previous studies showing that the mutation frequency in *S. enterica* serotype *Heidelberg* was not increased by  $\gamma$ -radiation at doses up to  $0.05 \text{ Gy}$  [11].

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