

NEW REPORTS ON THE DISTRIBUTION OF THREE BAT SPECIES (MAMMALIA: CHIROPTERA) OF ROMANIA

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Abstract. *Myotis bechsteini*, *Eptesicus serotinus* and *Miniopterus schreibersii* are three unreported bat species from „Gaura cu Muscă” Cave. Body measurements are useful in bat identifications from pellets as well as from the subfossil and fossil deposits.

Résumé. *Myotis bechsteini*, *Eptesicus serotinus* et *Miniopterus schreibersii* sont trois espèces signalées pour la première fois dans la Grotte „Gaura cu Muscă”. Les mesurages corporels que nous avons fait sont nécessaires pour l'identification des chauve-souris dans les pelotes des oiseaux de proie, ainsi que dans les dépôts sous-fossiles et fossiles.

Key words: bat species, cave, shelters, body measurements, identification.

In comparison with other mammal orders, the chiropterans were less studied by the Romanian mammalogists, both as regards their distribution and the morphological, systematical, ecological, ethological descriptions. In Europe there is valuable information on the bat shifting on small, medium or long distances. Some of these shiftings can be included in the migration phenomenon, taking place on several hundreds or even thousands of kilometers, both latitudinally and longitudinally. This kind of studies began over 50 years ago, but they were abandoned, and I can assert that the information is rather absent from this point of view.

Yet, the published papers on the Romanian bat fauna belong mainly to Margareta Dumitrescu (1954), M. Dumitrescu and collaborators from „Emil Racoviță” Institute of Speleology of Bucharest (1955, 1962 – 1963). Profira Barbu from the Faculty of Biology of the University of Bucharest also published an important series of papers, among which I want to point out a synthesis from 1960, entitled „Contribuții la studiul morfologic al lui *Miniopterus schreibersii* Kuhl.” (“Contributions to the morphological study of *Miniopterus schreibersii* Kuhl.”). Barbu and Sin (1968) as well as Barbu and Sorescu (1968) reported their observations on hibernating *Nyctalus noctula*, respectively on nursery collony of *Plecotus austriacus*. Nicolai Valenciu, from the Faculty of Biology of the „Alexandru I. Cuza” University of Iași, dedicated himself to the study on chiropterans for several years; his thesis for the doctor's degree was entitled „Contribuții la cunoașterea sistematicii și biologiei chiropterelor din Moldova” (“Contributions to the systematics and biology of the chiropterans of Moldavia”) (1971), and in 2002 published the fascicle of “Fauna României” (“Romanian Fauna”) No. 3 – “Chiroptera”, at Romanian Academy Publishing House. Elena Bazilescu (1970, 1977) published data on the bats from Oltenia, synthetized in her thesis for the doctor's degree, „Contribuții la cunoașterea chiropterelor din Oltenia” (“Contributions to the knowledge of chiropterans of Oltenia”).

Occasional papers on bats were published by Marcu (1955), Ionescu (1961), Homei & Barbu (1962), Răduleț (1994 a, b, 1996), Szanto (2000), etc.

By this paper I mention three bat species (*Myotis bechsteini*, *Eptesicus serotinus* and *Miniopterus schreibersii*) from the cave „Gaura cu Muscă” from locality Pescari (ex Coronini), Caraș-Severin County (Fig. 1). From these three, the first two were never reported for the above mentioned shelter. The third species was mentioned once, by Paszlawsky (1918), noting “Coronini” as type locality (see Miller, 1912 for bibliography also). A series of measurements (e.g. the length of the forearm) can be used as comparative material in identification of the bats after the predatory bird pellets or from the subfossil and fossil deposits, as the species *Myotis bechsteini* for which most of the reports were made after the fossil remains.

MATERIAL AND METHOD

On December 25th, 2002, Gabriel Chișamera visited „Gaura cu Muscă” Cave and collected 3 entire specimens of *Myotis bechsteini* and one of *Rhinolophus ferrumequinum*, very well preserved, from the floor of the cave. On February 10th, 2003, Laurențiu Burlacu visited the same cave and collected (also from the floor) a skull of *Miniopterus schreibersii* and another one of *Apodemus sylvaticus*, just at the entrance. Going deeper in the cave, 5–6 m, he found a skull and parts of the skeleton of *Eptesicus serotinus*. I used as study material the best preserved skulls and some remains of the skeleton of the limbs. The last ones are used for the estimation of the forearm length and comparison of the data for the species identification. The skull of *Eptesicus serotinus* and *Miniopterus schreibersii* specimens were measured (Tab. 2) and drawn (Figs 2, 3).

The species *Rhinolophus ferrumequinum* was mentioned by Dumitrescu and col. (1962–1963) from the same cave. Being relatively frequent in the underground shelters and already reported by fishermen, I did not consider it as an important mention, but I presented its body measurements, next to the 4 specimens of *Myotis bechsteini* (Tab. 1).

Abbreviations used in figures: a. ang. = angular apophysis; a. cond. = condyloide apophysis; a. cor. = coronoid apophysis; a. z. = zygomatic arcade; b. t. = tympanic bullae; c. = canine teeth; c. a. e. = auditory meatus; f. i. o. = infraorbital foramen; f. m. = mandibular foramen; f. mas. = mastoidaeum foramen; i. imx. = intermaxillary incisure; I¹-I² = upper incisors; I₁-I₃ = lower incisors; M¹-M³ = upper molars; M₁-M₃ = lower molars; o. f. = frontal bone; o. n. = nasal bone; o. o. = occipital bone; o.p. = parietal bone; p. j. = jugal process; Pm¹ = upper premolar; Pm_{1,2} = lower premolars.

RESULTS AND DISCUSSION

From the 4 species reported from „Gaura cu Muscă” Cave, one of them (*Rhinolophus ferrumequinum*) was mentioned by Paszlawsky (1918), and also by Dumitrescu and col. (1962–1963). This representative of the family Rhinolophidae prefer natural refuge, the underground one from the limy areas, especially when gathering in hibernation colonies. In „Gaura cu Muscă” Cave this species was present in groups of 4–5 individuals, sheltered near the entrance of the cave, in December 2002. It is not impossible that the female specimen collected by Gabriel Chișamera to fall on the cave floor because of the important temperature fluctuations. The body measurements (Tab. 1), as well the weighing of that specimen are within the limits of the values from literature given for this species. The inferior values of our specimen, correlated with the unused dentition, allowed

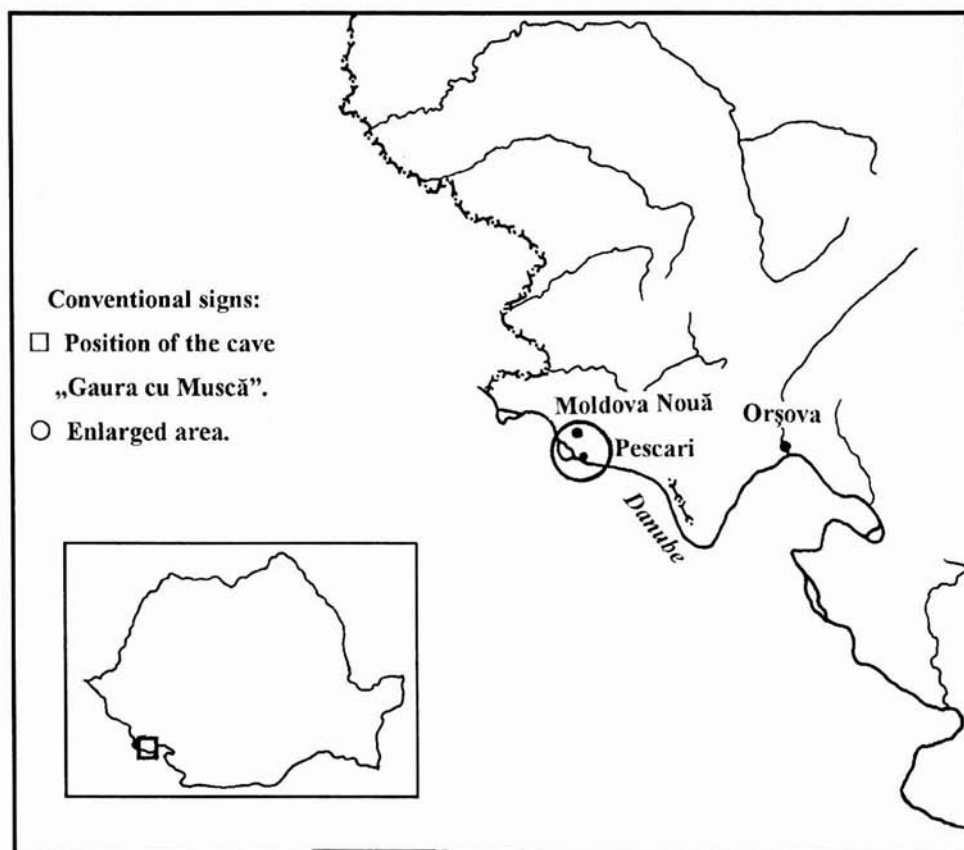


Fig. 1 – Localization of the “Gaura cu Muscă” Cave in south-western part of Romania.

me to presume that it was under a year old, also taking into consideration that *R. ferrumequinum* is the species with the biggest individuals among Rhinolophidae and the maximum values of the head – body length reached 110 mm of the forearm length, 75 mm. This information correlates with the information according to which the mortality of the young during the first hibernation can reach 50%.

The other 3 species belong to the family Vespertilionidae. *Myotis bechsteini* is a rare species both in the Romanian fauna and its own range from the west of the Palearctic area. Dumitrescu and col. (1962–1963) presented: „... la noi în țară nu s-a semnalat decât o singură dată de către Bielz (1888) la Cluj, iar noi am determinat-o din Peștera lui Gruia (Cujmir, reg. Oradea), unde a fost găsit un exemplar femel, la 14 mai 1956...” (“... in our country it was mentioned only once by Bielz (1888) from Cluj, and we identified it from Gruia’s Cave (Cujmir, Oradea county), where a female specimen was found, on 14th of May 1956 ...”). On the other hand, the age of this species on the present territory of Romania was established after the fossils discovered in some Cromerian deposits (in locality Betfia from NW of Romania), Würmian (in the „La Adam” Cave from SW Romania) and some subfossil remains from the caves from Vârghișului Gorges from Covasna County – in central Romania.

Table 1

Body measurements (in mm and grams) on *Rhinolophus ferrumequinum* and *Myotis bechsteini* bat species from „Gaura cu Muscă” Cave - Caraş-Severin County

<i>Rhinolophus ferrumequinum</i>		<i>Myotis bechsteini</i>			
L	60	52	50	52	50
C	39	35	38	38	37
AB	55	41	39	41	41
AUR	20	13	13	13	13
ANV	364	270	267	280	252
GR	20.5	7.5	7	8	8
SEX	♀	♂	♂	♀	♀

Table 2

Skull measurements (in mm) on *Eptesicus serotinus* and *Miniopterus schreibersii* Bat species from „Gaura cu Muscă” Cave, locality Pescari, Caraş-Severin County

Measurements/Species	<i>Eptesicus serotinus</i>	<i>Miniopterus schreibersii</i>
Total length of skull	24.50	15.70
Condyllo-basal length	23.20	15.10
Interorbital constriction	5.30	3.90
Mastoid width	7.40	2.90
Zygomatic width	15.60	8.70
High of skull (at bullae)	9.30	6.70
Upper jugal teth row	7.90	5.30
Width M ¹ -M ³	5.50	3.80
Total lower teeth row	11.70	6.70
Width M ₁ -M ₃	7.30	4.80
Length of mandible	10.89	10.80

This situation increases the value of the report on the presence of this species in „Gaura cu Muscă” Cave, for the first time. The body measurements of the 4 specimens of *M. schreibersii* from this cave are within 50–52 mm for head – body length, and are constant for the forearm length (Tab. 1). Although it is about two male and two female specimens the values of the body measurements and weighing are extremely close, this thing excluding the sexual dimorphism from this point of view.

Without having at my disposal collected material, I also mention the presence of the species *Myotis myotis* from „Gaura cu Muscă” Cave, whose individuals remain in this shelter both during the hibernation period and in summer, when the females form the nursery colonies, at least.

For the species *Eptesicus serotinus* and *Miniopterus schreibersii* I had only skulls whose dimensions are presented in table 2. *Eptesicus serotinus* was reported totally from 13 places from Romania: from Dobrogea, Muntenia, Banat, Transylvania and Maramureş. Also for this species, Dumitrescu and col. (1962 – 1963) reported „...resturi scheletice actuale și subfosile, și ca fosil din perioada würmiană în săpăturile făcute în peștera „La Adam”...” (“... recent and subfossil skeleton remains, and as fossil from the Würmian period, in the diggings made in “La Adam” Cave”). „Gaura cu Muscă” Cave was not mentioned till now, although it

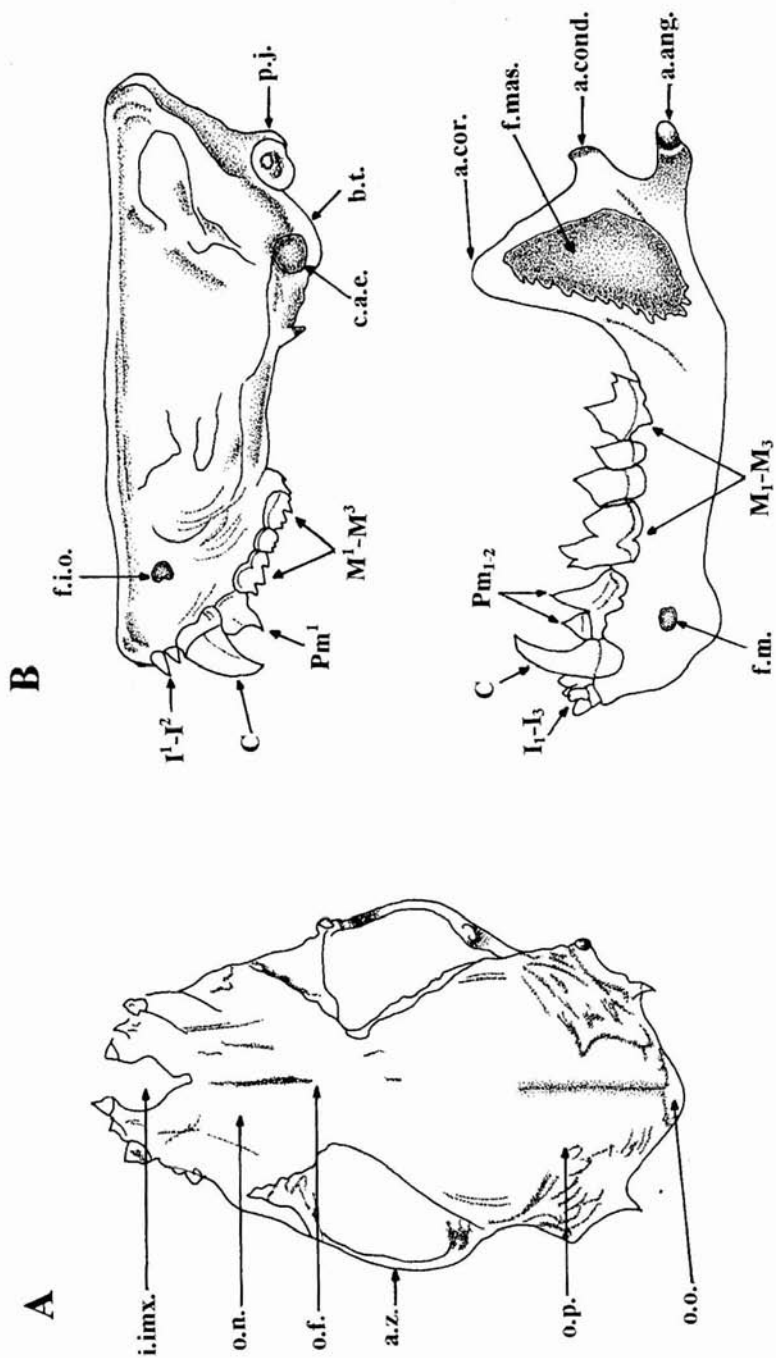


Fig. 2 – A, dorsal view of the skull of *Eptesicus serotinus*; B, lateral views of the same species' skull and mandible.

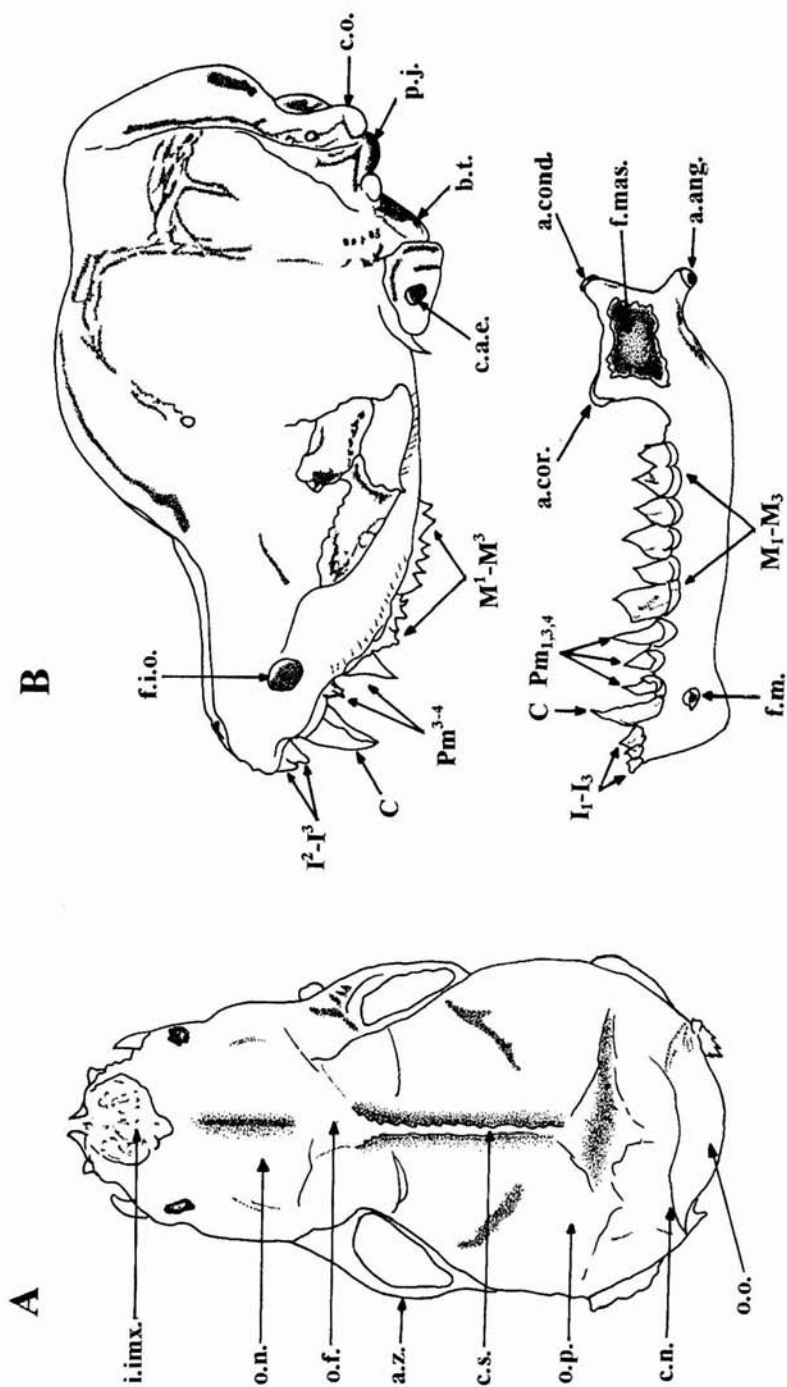


Fig. 3 – A, dorsal view of the skull of *Miniopterus schreibersii*; B, lateral views of the same species' skull and mandible.

is relatively near „La Adam” Cave. The 11 skull measurements (Tab. 2) are within the maximum limits of the values from literature, excepting the condylo-bazal length of 23.20 mm in comparison with the maximum length of 21.5 mm reported by Saint Girons (1973).

The second species (*Miniopterus schreibersii*) was reported only from 9 localities till 1962–1963, when Dumitrescu and col. added the name of 40 caves, among them also being „Gaura cu Muscă”. It is considered the best represented species in the Romanian fauna. It prefers the underground shelters, both for hibernation and for the nursery colonies. Forty years ago, only in „Peștera Liliecilor” (Bat Cave) from Bistrița Monastery (or Sfântul Grigore Decapolitul) it was presumed the presence of a colony of 12,000–14,000 individuals. Today there are not such large colonies, in many of the caves mentioned 4 decades ago no single individual being present. I consider valuable the recent mentioned of the species presence in „Gaura cu Muscă” Cave, because in the '90s, when a census of its population was taken, in some of the caves known they shelter large populations, no individual was found (Gheorghiu, 2004, *in verbis*). Just the lack of information on the bat colony shifting within Romanian territory does not allow us to appreciate if the populations of some species decreased numerically, indeed, (in this case – *Miniopterus schreibersii*) or it is about only one of their shiftings in other refuges, maybe over Romanian borders.

Skull measurements (Tab. 2) made on a single skull found in „Gaura cu Muscă” Cave can be included within the maximum limits of the same measurements reported in literature; as regards the condylo-bazal length of the *M. schreibersii* skull from this cave, it exceeds the maximum value noted by Saint Girons (1973).

The identification of this species and the knowing of its habit of forming mixed colonies allow us to presume the presence of the species *Rhinolophus euryale* and *Myotis capaccinii* in „Gaura cu Muscă” Cave, too. This supposition will be verified during the following visits made for monitoring the chiropteran fauna of SW Romania.

Conclusions

„Gaura cu Muscă” Cave is a refuge with optimum conditions for sheltering several bat species for hibernation, and for other species for nursery (e.g. *Myotis myotis*).

From the four species identified after the studied material, one of them (*Rhinolophus ferrumequinum*) is relatively common, even if it is represented by small populations whose individuals are isolated or 2–5 grouped. From the other three species (*Myotis bechsteini*, *Eptesicus serotinus* and *Miniopterus schreibersii*), the first two are mentioned for the first time from „Gaura cu Muscă” Cave, and the third one was not reported for four decades.

Body and skull measurements are within the limits reported in literature, excepting the condylo-bazal length, in the species *Eptesicus serotinus* and *Miniopterus schreibersii*, with some small exceedings of the maximum limits.

For monitoring chiropteran populations of the Romanian fauna and for a correct estimation of the individual number of the populations of each species it is necessary a programme for ringing and watching of the seasonal dynamics of the respective populations.

NOI RAPORTĂRI ASUPRA RĂSPÂNDIRII A TREI SPECII DE LILIECI (MAMMALIA: CHIROPTERA) DIN ROMÂNIA

REZUMAT

Peștera „Gaura cu Muscă” din localitatea Pescari (fostă Coronini) a fost investigată ca refugiu pentru lilieci încă de la începutul sec. XX, raportându-se mai multe specii, atât din familia Rhinolophidae cât și din familia Vespertilionidae. Din a doua familie semnalăm pentru prima dată speciile *Myotis bechsteini* și *Eptesicus serotinus*. *Miniopterus schreibersii* – a treia specie semnalată de noi, din aceeași peșteră a fost raportată o singură dată (de Paszlawsky, 1918); în literatura chiropterologică românească, ulterioară anului 1918 n-a mai fost menționată. O serie de măsurători corporale efectuate pe exemplarele celor trei specii pot servi la identificările acelorași specii de lilieci din ingluviile păsărilor răpitoare și din depozitele subfosile și fosile.

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LITERATURE CITED

- BARBU, P., 1960 – Contribuții la studiul monografic al lui *Miniopterus schreibersii* Kuhl. Analele Universității „C.I. Parhon” – București. Seria Științele Naturii. Biologie, 24 (9): 83–107. (in Romanian)
- BARBU, P., GH. SIN, 1968 – Observații asupra hibernării speciei *Nyctalus noctula* (Schreber, 1774) în falezale Lacului Razelm – Capul Dolșman – Dobrogea. Studii și Cercetări de Biologie. Seria Zoologie. Edit. Academiei R. S. România, 20 (3): 291–297. (in Romanian)
- BARBU, P., C. SORESCU, 1968 – Observații asupra unei colonii estivale de *Plecotus austriacus* Fischer, 1829 din Banat. Studii și Cercetări de Biologie. Seria Zoologie. Edit. Academiei R. S. România, 20 (2): 165–170. (in Romanian)
- BAZILESCU, E., 1970 – O specie de chiropter nouă pentru Oltenia *Myotis emarginatus* Geoffroy. Revista Muzeelor, 2: 146–147. (in Romanian)
- BAZILESCU, E., 1977 – Contribuții la cunoașterea chiropterelor din Oltenia. (Rezumat al tezei de doctorat). Universitatea din București, Facultatea de Biologie: 1–24. (in Romanian)
- DUMITRESCU, M., 1954 – Din biologia chiropterelor. Analele Româno-Sovietice, Biologie, 3: 80–104. (in Romanian)
- DUMITRESCU, M., J. TANASACHI, TR. ORGHIDAN, 1955 – Contribuții la studiul biologiei chiropterelor. Dinamica și hibernația chiropterelor din Peștera Liliecilor de la Mănăstirea Bistrița. Academia R.P.R.. Buletin Științific. Secțiunea de Științe Biologice, Agronomice, Geologice și Geografice, 4 (2): 317–357. (in Romanian)
- DUMITRESCU, M., J., TANASACHI, TR. ORGHIDAN, 1962 – 1963 – Răspândirea chiropterelor în R. P. Română. Lucrările Institutului de Speologie „Emil Racoviță”, 1–2: 509–575. (in Romanian)
- HOMEI, V., P. BARBU, 1962 – Contribuții la studiul gestației la *Miniopterus schreibersi*. Studii și Cercetări de Biologie. Seria Biologia Animală. Edit. Academiei R. P. R., 16: 57–64. (in Romanian)
- IONESCU, V., 1961 – Contribuții la studiul liliecilor (Chiroptera) din Republica Populară Română. Studii și Comunicări de Biologie. Seria Biologie Animală. Edit. Academiei R. P. R., 13 (2): 312–226. (in Romanian)
- MARCU, O., 1955 – Liliecii, un prețios auxiliar al agriculturii și anexelor sale. Natura, 7 (3): 48–56. (in Romanian)
- MILLER, G. S., 1912 – Catalogue of the Mammals of Western Europe. (Europe exclusive of Russia) in the collection of the British Museum, London. 1009 pp.
- PASZLAWSKY, J., 1918 – Fauna Regni Hungariae, Mammalia. Budapest. (cited after literature)
- RĂDULEȚ, N., 1994 a – Contributions to the knowledge of the distribution and the biology of *Myotis capaccinii* (Bonaparte, 1837) (Chiroptera: Vespertilionidae) in Romania. Travaux du Muséum d'Histoire Naturelle „Grigore Antipa”, 34: 401–409.

- RĂDULEȚ, N., 1994 b - Contributions to the knowledge of the genus *Nyctalus* Bowdich, 1825 (Chiroptera: Vespertilionidae) in Romania. Travaux du Muséum d'Histoire Naturelle „Grigore Antipa”, 34: 411–418.
- RĂDULEȚ, N., 1996 - *Pipistrellus savii* (Bonaparte, 1837) (Chiroptera: Vespertilionidae) signalé pour la première fois en Roumanie. Travaux du Muséum National d'Histoire Naturelle „Grigore Antipa”, 36: 385–389.
- SAINT GIRONS, M. C., 1973 - Les mammifères de France et du Benelux (faune marine exceptée). Doin, éditeurs, Paris: 481 pp.
- SZANTO, L., 2000 - Study of bat communities of the Water Cave of Leșu (Pădurea Craiului Mountains, Romania). Abstracts of the 3-rd International Conference on Carpathian Bats. Rakhiv, Ukraine: 19.
- VALENCIUC, N., 1971 - Contribuții la cunoașterea sistematicii și biologiei chiropterelor din Moldova. (Rezumatul tezei de doctorat). Universitatea „Al. I. Cuza” Iași, Facultatea de Biologie-Geografie: 1–25. (in Romanian)
- VALENCIUC, N., 2002 - Chiroptera. Fauna României. Mammalia, 16 (3): 1–166. Edit. Academiei Române, București. (in Romanian)
- VALENCIUC, N., I. ION, 1964 - Peștera de la Rarău. Date ecologice asupra coloniilor de lilieci din această peșteră. Analele Universității „Al. I. Cuza” Iași, Secțiunea II, 10 (2): 293–303. (in Romanian)

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