

NEW DATA ON SMALL MAMMALS (*INSECTIVORA*, *CHIROPTERA*,  
*RODENTS*) IN SOUTHERN PART OF ARMENIA

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While studying of the fauna of small mammals (*Chiroptera*, *Insectivora*, *Rodentia*) of Syunik region, new data on specific composition, distribution and abundance of species were obtained. The presence of a new area for specified species was identified. The obtained results were confirmed by conducted craniological and genetic analysis.

**Keywords:** *Chiroptera*, *Rodentia*, *Insectivora*, distribution of small mammals, fauna of South Armenia.

**Introduction.** Armenia is a biodiversity hot spot in the Caucasus [1–4]. That is why it is extremely important to identify rare species, describe their distribution, identify key habitat, evaluate the level of anthropogenic pressure, and recommend measures to protect Armenian biodiversity. Southern Armenia is like *terra incognita* and can provide relevant novelties. The list of rare and endangered species undoubtedly may be extended as Southern Armenia's fauna was systematically studied long ago [5]. Unfortunately, the nature of Southern Armenia is undergoing intensive exploitation that threatens its biodiversity and some unstudied populations are at risk of being decimated before their taxonomy and genetic affinities can be studied. It is very important to research all taxonomical patterns of small mammals.

On the territory of Armenia the representatives of small mammals, to which the orders of *Insectivora*, *Rodentia* *Chiroptera* belong, are represented accordingly by 11, 34 and 30 species. Among them in the Red Book of Armenia 3 species of *Insectivorous*, 6 species of *Rodents* and 10 species of *Chiroptera* are included [8].

The aim of our study is to gather all existed and collected data on small mammals distribution for the last 4 years.

**Materials and Methods.** The objective of our study was to find out the distribution, abundance and conservation status of small mammals of South Armenia and 17 trips were conducted to the South of Armenia during May–October 2010–2014. The field research was focused on documenting the distribution and abundance of species of small mammals and gathering the requisite data and materials for morphological and genetic analyses. Data collection and analysis will comprise the following components recorded in the standard field protocol [6].

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To find out the species composition and number of small mammals we used some models of traps. About the whole territory traps were allocated and placed, as well as hunting cylinders. As a bait pieces of bread, moistened with sunflower-seed oil, seeds of cereals or pieces of meat were served. The traps were placed by the following two methods.

*Method of Calculation with Trapping-Lines (Rodents).* Now it is the main and the most widely spread method of estimating the number (abundance) of small mammals. Besides, with the help of this method the territorial and biotopic distribution of animals in natural areas is studied. Accounting line consists of a number of traps from 25 to 70. Each trap was charged by a bait and placed in the studied biotope. The traps were installed in the second half of the day. Each of them was put at a distance of 3–5 m from each other in a straight line. The places for traps were selected taking into account the most probable places to capture the animals. Both the trajectory of the calculated line routes and stationary platforms for catching small animals were selected, so, that they cover the slopes both from southern and northern positions. The places for setting the traps were marked by two signs, the upper one (where the direction of the line was shown) and lower sign (where the trap was situated). As marks flags were used. The traps were checked several times during the night. The period of leaving of traps in the biotope usually was equal to two days.

*Method of Calculation with Hunting Ditches and (or) Cylinders (Insectivora).* Some small mammals and, in the first place, the shrews, inhabiting in natural shelters, seldom dig holes and poorly or not at all, get into traps with a bait. Therefore, to account the number of animals moving on the surface of the ground, trapping ditches and trapping cylinders were applied. The cylinders were arranged at intervals of 5–10 m. The cylinders were dug into ground, so that their edges were closely adjoined the vertical walls of the ditch, and upper edge of the cylinder was 0.5–1.0 cm lower from the bottom of the ditch. The ditches were checked each day early in the morning [7].

During the whole time of the work on each site we used 70 traps, 25 live traps and 10 trapping cylinders. Though, at the end of the season this number was changed. More than 10 traps were lost, obviously the animals captured in them during the night attracted the carnivores, probably jackals and forest cats and 13 trapping cylinders were damaged. More than once we noted in other regions of the Republic that captured trapping cylinders' animal material also attract the carnivores, in particular bears.

The observations were carried out also on the territory between the four sites during the pedestrian trips. Pellets of bread and droppings of large mammals found on the territory were investigated searching the remains of small animals.

To study the fauna of *Chiroptera* the following methods are used.

Researches have been done in caves, mines and also near the feeding places (near water), as well as abounded buildings. Caves were selected according to the following criteria: length, entrance dimension, number of large chambers, corridors and available literature data on bats. At each cave we filled out a standard data sheet, with the following summary: cave name, geographical position (using GPS), cave escription (number of entrances, altitude, length, scanned map) and general habitat description of the surrounding area. During daylight, roosts (nursery/summer roosts)

were observed visually with electric lamps. In some cases we used also binoculars. For counting large clusters, we used photographs, to reduce disturbance and obtain a more accurate image. For dense and large hibernating clusters, using the size of the covered area and counting the bats of one unit area, the density was established and used for estimating the number of bats. During the summer period, mist netting was used in the front of the caves and on the potential flight corridors. If caves had more than one exit, simultaneous counting was made. Mist nets used for capturing bats are of 7 m long and 3 m wide, they have five shelves and were made of Ecotone, Poland. During nighttime, nets were checked continuously. For each captured specimen the following standard values were noted: emergence time, body mass (measured with portable Pesola spring scale), forearm length (using calipers), gender, age and reproductive assessment. Bats were marked with impermanent markers to avoid recapturing. Returning individuals were also recorded; otherwise, some may be recorded twice. License for catching bats was obtained from competent authorities. Acoustic detection was used in front of the caves with large colonies (over 1.500–2.000 individuals), where mist netting might be difficult, because of the large number of bats. Simultaneous detection with Pettersson D240× and earphones was done. The number of bat passing was recorded, per unit time basis. We also used bat detectors and recorders (Batbox Duet, Tranquility III and Sony Minidisc) for recording bat sounds in further research with BatSound software.

**Results and Discussion.** New data have received during our researches. They data are presented in the following Table.

Family	Genus	Species	IUCN	RA Red Book data [8]
1	2	3	4	5
<i>Erinaceidae</i>	<i>Erinaceus</i>	<i>concolor</i>		
<i>Talpidae</i>	<i>Talpa</i>	<i>levantis</i>		
<i>Soricidae</i>	<i>Crocidura</i>	<i>suaveolens</i>		
	<i>Crocidura</i>	<i>gueldenstaedti</i>		
	<i>Crocidura</i>	<i>leucodon</i>		
	<i>Sorex</i>	<i>volnuchini</i>		
	<i>Sorex</i>	<i>satunini</i>		
	<i>Crocidura</i>	<i>pergrisea =armenica</i>		
<i>Rhinolophidae</i>	<i>Rhinolophus</i>	<i>mehelyi</i>	+	+
	<i>Rhinolophus</i>	<i>euryale</i>	+	+
	<i>Rhinolophus</i>	<i>ferrumeguinum</i>	+	
	<i>Rhinolophus</i>	<i>hipposideros</i>	+	
<i>Vespertilionidae</i>	<i>Myotis</i>	<i>blythi</i>	+	
	<i>Myotis</i>	<i>emarginatus</i>	+	
	<i>Myotis</i>	<i>nattereri</i>	+	
	<i>Myotis</i>	<i>mystacinus</i>	+	
	<i>Myotis</i>	<i>aurascense</i>	+	

1	2	3	4	5
	<i>Miniopterus</i>	<i>schreibersi</i>	+	+
	<i>Plecotus</i>	<i>macrobullaris</i>	+	
	<i>Plecotus</i>	<i>austriacus</i>	+	+
	<i>Plecotus</i>	<i>auritus</i>	+	
	<i>Nyctalus</i>	<i>noctula</i>	+	
	<i>Nyctalus</i>	<i>leisleri</i>	+	
	<i>Hypsugo</i>	<i>savii</i>	+	
	<i>Pipistrellus</i>	<i>kuhli</i>	+	
	<i>Pipistrellus</i>	<i>nathusii</i>	+	
	<i>Pipistrellus</i>	<i>pipistrellus</i>	+	
	<i>Pipistrellus</i>	<i>pygmaeus</i>	+	
	<i>Eptesicus</i>	<i>serotinus</i>	+	
<i>Gliridae</i>	<i>Myoxus</i>	<i>glis</i>		
	<i>Dryomys</i>	<i>nitedula</i>		
<i>Hystricidae</i>	<i>Hystrix</i>	<i>indica</i>		+
<i>Myocastoridae</i>	<i>Myocastor</i>	<i>coypus</i>		
<i>Allactagidae</i>	<i>Allactaga</i>	<i>euphratica</i>		
<i>Cricetidae</i>	<i>Cricetulus</i>	<i>migratorius</i>		
	<i>Mezocricetus</i>	<i>brandti</i>		
	<i>Arvicola</i>	<i>terrestris</i>		
	<i>Chionomys</i>	<i>nivalis</i>		
	<i>Microtus</i>	<i>daghestanicus</i>		
	<i>Microtus</i>	<i>nazarovi</i>		
	<i>Microtus</i>	<i>majori</i>		
	<i>Microtus</i>	<i>socialis</i>		
	<i>Microtus</i>	<i>arvalis</i>		
	<i>Microtus</i>	<i>rossiaemerdionalis</i>		
<i>Gerbillidae</i>	<i>Meriones</i>	<i>persicus</i>		
<i>Muridae</i>	<i>Sylvaemus</i>	<i>uralensis</i>		
	<i>Sylvaemus</i>	<i>ponticus</i>		
	<i>Sylvaemus</i>	<i>witherby</i>		
	<i>Mus</i>	<i>macedonicus</i>		
	<i>Mus</i>	<i>abbott</i>		
	<i>Rattus</i>	<i>norvegicus</i>		

New habitats identified for all species of small mammals distributed in South Armenia. *Apodemus sylvaticus* species is presented by Dahl [4], in the South of Armenia. Cariological and morphological studies showed that there are three species of genus *Sylvaemus* dwelling in the South of Armenia: *S. ponticus*, *S. uralensis*, *S. witherbyi*. Maternity colony of *Rhinolophus hipposideras* has been

identified near Shikahogh State Reserve [9]. Two big wintering colonies common bent-wing bats and less mouse-eared bats were found in a mine. Males of lesser mouse-eared bats created a separate colony from females in hibernating place from May to September. New habitats of lesser horseshoe bats were identified in Nerqin Hand, Shikahogh State Reserve and in Geghi Village. *Myotis alcathoe* species were recorded for the first time in Armenia. Most of the collected data were analysed genetically and morphologically.

*Received 17.05.2014*

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