

**A final report
on the BP Conservation project**

Bat census in Crimean caves

Project country

Ukraine

Project area

Crimean Mountains and South-Eastern steppe part (the Kerch peninsula) of the Crimea
(Crimean Autonomous Republic)

Project's terms

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BACKGROUND

The Crimea is one of the richest regions of Ukraine on number of bat species. Totally, 20¹ species had been registered here (from 26 bat species of Ukraine's fauna). According to IUCN red list, 3 species have "vulnerable" category and 4 species, "low risk/near threatened" category. All species of the regional bat fauna are target species of the Agreement on Conservation of Bats in Europe (1991), entered into the force in Ukraine in 1999, and included into Appendixes to Bern Convention (Convention on Conservation ..., 1979). Ten species have protection status according to the Red Book of Ukraine (1994).

At the territory of the Crimean peninsula there are more than 1000 known karst caves (98 percent of which are concentrated in The Crimean Mountains) and other natural cavities (Amelychev, 2003). Beside them the territory is rich with exhausted underground limestone quarries, the big part of which is situated at the Kerch peninsula (Subbotkin, 1952; Grek, 1997).

In sum, 14 bat species have been found in cavities of the region. It is known that earlier artificial and natural caves here were used as shelters, winter and summer, by many thousands aggregations of *Rhinolophus ferrumequinum*, *Myotis blythii*, *Miniopterus schreibersii*. Decreasing in number of known bats' colonial aggregations had been marked since the middle of XXth century (Nikolsky, 1891; Flerov, 1928; Konstantinov et al., 1976; Strelkov, 1974; Konstantinov, Dmitrieva, 1962). Selective checking of some known earlier bat underground sites in 2000–2003 demonstrated decreasing of aggregations (in 10-100 times) or their full disappearing (Godlevska, 2003; own data). One of the species (*Miniopterus schreibersii*) has been absent at all since 1950-s (Konstantinov et al., 1976; Strelkov, 1974; Beskaravainyi, 1988).

The situation with decline of cave dwelling bats' aggregations is caused by different reasons, among which two ones are the main. The first one is huge, increasing with each year, scales of organized and not organized speleological tourism. The second reason concerns with direct extermination of bats by local people (Dulitzky, 1974; Konstantinov et al., 1976; Dulitzky, private communication; Godlevska, own data).

By the beginning of the project it had been known about only one winter and four summer underground sites with rather big bat aggregations in the region, presenting two species *Rh. ferrumequinum* and *M. blythii* (Dulitzky, Mikhailova, 2002; Godlevska, 2003; Godlevska, unpublished data).

Obviously, a little quantity of known underground bat sites in a big part reflects a lack of our knowledge about current situation in the region (systematical large-scale survey on the item like proposed here wasn't carried out). It, in its turn, prohibits taking concrete measures on their protection and conservation here.

In view of all pointed above the next **aims** were formulated.

1. To determine cave dwelling bats' status for the region of the Crimean Mountains and South-Eastern steppe part (the Kerch peninsula) of the Crimea (Crimean autonomous republic).
2. To rise attention of local public and reservers (from local NGOs and competent authorities) to the necessity of bats' and bat roosts' protection of the region.

For achieving the aims the next **objectives** are planned to be realized:

- a) to carry out the bat census in underground cavities of the region — potential or known from literary sites of winter and summer bat aggregations — for gathering data on bat species composition, their number and distribution in borders of the region, presence and number of maternity colonies;

¹ Few years ago a presence of two more species in the region was suggested — *R. mehelyi* and *R. euryale*. However, during the work, no reliable evidences on their records in the Crimea were found, that is why we don't consider them.

b) to compile the database on records of bats of the region, using literary data, data received during current survey;

c) to distribute information on the necessity of bats' conservation among target groups (local people, school children, protected areas staff, speleologists);

d) to familiarize target bodies (local authorities, reserves' administration, local NGOs) with results of the survey;

e) to work out recommendations and proposals on bats' and bat sites' protection and to familiarize target bodies with them.

1. DATABASE ON BATS' RECORDS OF THE REGION

1.1. General

The database structure was developed, and filling it with corresponding information on bats' records from the territory of the Crimean peninsula was realized.

Database was filled in standard packet of MS Access.

Its structure includes 22 note fields (Fig. 1 and Table 1).

In sum records included into the base cover period from 1856 till 2004 years. Totally, more than 30 literary sources were processed (look list below). Beside it, there is information on collected specimens of bats from the Crimea in the base (this information is not always duplicated in literary or sometimes is mentioned without exact details on the place, date and circumstances of the record). Totally records on 7 collections, both from Ukraine and Russia, are included into the database: of National Scientific Museum of Natural History (Kyiv), of Zoological Museum of Kyiv National University, of Dybovsky Zoological Museum of Lviv National University (Lviv), of Lviv State Museum of Natural History, of Museum of Zoological Institute of RAS (St. Petersburg), of Zoological Museum of Moscow University and of Zoological Museum of the Crimean State Game-preserve.

The database is also amplified with data recently received by the team during summer and winter field expeditions.

At the moment the base includes about 800 records. One database's record corresponds to a registration of some number of bats (caught/collected/observed) of the same species at one locus in the same time.

Species	Longitude	Latitude	Provinces	District	Locality	Locus	Antrop	Roost	Method	Day	Mo
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	27	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	4	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	9	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	16	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	18	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	5	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	nk	6	
MBLY			Республіка Крим	Бахчисарайський	Бахчисарай	печера Летючих Мишей	ні	natu	sh	15	
MBLY			Республіка Крим	Ленінський	Кам'янське	Ак-Монайські каменоломні	так	quar	sh	17	
MBLY			Республіка Крим	Ленінський	Кам'янське	Ак-Монайські каменоломні	так	quar	sh	17	
MBLY			Республіка Крим	Ленінський	Кам'янське	Ак-Монайські каменоломні	так	quar	sh	18	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот Мишача Щг	ні	grott	sh		
MBLY			Республіка Крим	Судакський	Новий Світ	"Сквозной Грот"	ні	grott	sh		
MBLY			Республіка Крим	Ленінський		каменоломні г. Олук	так	quar	sh		
MBLY			Республіка Крим	Сімферопольський	Сімферополь	"обширный чердак двухэтажного дома"	так	attic	sh		
MBLY			Республіка Крим	Бахчисарайський	Бахчисарай	печера Летючих Мишей	ні	natu	sh		
MBLY			Республіка Крим	Чорноморський	Оленівка	Тарханкут, Джангуль	ні	cavit	sh	28	
MBLY			Республіка Крим	Ленінський			-	not l	nk	2	
MBLY			Республіка Крим	Ленінський			-	not l	nk	2	
MBLY			Республіка Крим	Бахчисарайський	Кудріне	печерне місто Тепе-Кермен	так	othe	sh	25	
MBLY			Республіка Крим	Бахчисарайський	Кудріне	печерне місто Тепе-Кермен	так	othe	sh		
MBLY			Республіка Крим	Ленінський		каменоломні г. Олук	так	quar	sh		
MBLY			Республіка Крим	Бахчисарайський	Родниківське	печера Скельська	ні	natu	sh		
MBLY			Республіка Крим	Кіровський	Старий Крим	г. Агармиш, колодязь	так	well	sh		
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот Голубіна Щг	ні	grott	sh	12	
MBLY			Республіка Крим	Ленінський		каменоломні Керченського півострову	так	quar	sh		
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот Мишача щ	ні	grott	sh	2	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот "Ревущий"	ні	grott	sh	2	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, р-н стін Мертвог	-	not l	ne	26	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, р-н стін Мертвог	-	not l	ne	31	
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник	-	not l	de		
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот Мишача Щг	ні	grott	sh		
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот Мишача Щг	ні	grott	sh		
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, грот Голубіна Щг	ні	grott	sh		
MBLY			Республіка Крим	Сімферопольський	Сімферополь		-	not l	nk		
MBLY			Республіка Крим	Сімферопольський	Перевальне	печера Кизил-Коба	ні	natu	sh		
MBLY			Республіка Крим	Алуштинський горсоє	Малий Маак	"Биок-Ламбат (Южный Берег)"	-	not l	nk		
MBLY			Республіка Крим	Ленінський		"из Темеша (на Керченском полуострове)"	-	not l	nk		
MBLY			Республіка Крим	Феодосійський	Курортне	Карадзький заповідник, "в пещерах и в	ні	grott	sh		

Fig. 1. A fragment of the database (records of *Myotis blythii*)

Table 1. Description of fields of the database on bats of the Crimea

	Name of a field	Description
1.	Species	Acronym name of a bat species
2.	Longitude	Longitude of a record's point (if known)
3.	Latitude	Latitude of a record's point (if known)
4.	Province	Name of an administrative province of Ukraine in which a record's point lies
5.	District	Name of an administrative district of Ukraine in which a record's point lies
6.	Locality	Name of the nearest settlement (village, town, city)
7.	Locus	Name of not administrative unite in which a record was done (f. e., cave, mountain massif, etc.)
8.	Antrop	Origin of a roost concerning a human's activity (anthropogenic / not anthropogenic / not known)
9.	Roost	Type of a roost (cave / grotto / quarries / hollow tree / attic / etc., etc.)
10.	Method	Method of registration (netting / detecting / shelter's examination / visual observation / owl pellets / etc.)
11.	Day	Day of a record
12.	Month	Month of a record
13.	Year	Year of a record
14.	Num	Number of specimens
15.	Sex	Sex of specimens
16.	Details	Additional details on a record
17.	Notes	Notes (by filling person)
18.	OROR	Type of origin of an information on a record (literary / museum / personal communication / own)
19.	Legit	Collector of data on a record
20.	Reference	A reference to an information on a record
21.	Museum	All museum data on a specimen (if we deal with museum collection): name, registration number
22.	Sn/sl	Description of museum collected specimens (presence of skulls/skin, wet collection, etc.)

1.2. List of literary sources used in the database

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2. FIELDWORK

2.1. Methods

Terms and participants. The fieldwork had been carried out from 15 to 30 June, from 28 July to 4 August of 2004 and from 22 February to 03 March, from 03 to 12 April of 2005. Totally, 9 volunteers from Ukraine, Poland, Romania and Russia took part in the fieldwork expeditions on the project.

Transportation. For transportation we used one or two cars.

Bat counting. In summer the work was carried out by a typical scheme: caves were examined in the daytime, netting (with mist-nets or harp-trap) was realized in the night-time at entrances to caves or in some nearness to caves. Estimation of bats in aggregations had been done in shelters during the daytime visually approximately with round up to hundred. Where it was possible it had been done during evening departure of bats. In winter — correspondingly — visual only examination of caves was realized.

Standard datasheets were used for each cavity's examination and for each captured bat. For each cavity examined we registered GPS coordinates, microclimate, measured with thermohygrometer, etc. Contact examination of bats was carried out by a common scheme as well: species, sex, weight, forearm's length, age, reproductive status and ectoparasitic loadness were registered for each specimen. To avoid double counting of netting bats in summer we marked animals with a white text marker. For separate individuals and colonies photographs were made.

Measuring was done with calipers with accuracy up to 0,1 mm. Weighing was done with spring balances ("Pesola" manufacture, Swiss) with accuracy up to 0,25 g and 0,5 g. Polyester and nylon (70d and 75d) mist-nets (Ecotone, Poland) and Konstantine-Tuttle harp-trap (self-made on scheme proposed by A. Gas, T. Postawa (2001)) were used for capturing bats. For installing mist-nets rigid telescopic fishing rods as poles were applied.

Examined caves. During the fieldwork totally 57 underground cavities / cave systems² / grottos had been examined (look list below). 34 objects were checked in summer; 35 ones, in winter; and 12 ones, both in summer and winter. The choice of caves for examination was determined with information on known in the past aggregations of bats in them and with information from speleologists, speleologists and, in some cases, from local people.

2.2. List and short description of examined underground cavities

The target territory is the Crimean Mountains and South-Eastern steppe part (the Kerch peninsula) of the Crimea (Fig. 2).

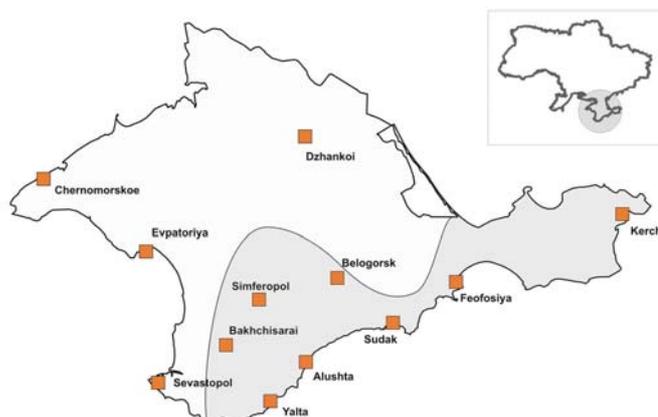


Fig. 2. The borders of the target region inside the Crimean peninsula (marked with dark gray)

² Look "Underground cavities of Kerch peninsula"

Below there is a short description of underground cavities we examined during summer and winter expeditions. Location of all the inspected cavities is shown at Fig. 3.

Ai-Petri mountain massif

Gryphon Cave (Ognennyi Gryphon Cave, P-9). The entrance is situated in so called Karadag'sky Les at the spur of Ai-Petri, in the bank of Chernaya River (near Rodnikovskoe Village of Bakhchisaraisky District), Fig. 3:1. An outflow cave, 17 m depth, has slit-like form and includes a lake at the bottom.

Skelska Cave. The entrance is situated in so called Karadag'sky Les at the spur of Ai-Petri (near Rodnikovskoe Village of Bakhchisaraisky District), Fig. 3:2. An outflow cave, the entrance is a steep sloped siphon channel, leading into the corrosion-gravitation cavity. Length — 670 m, amplitude — 65 m. During spring melting or after rich rains the entrance is flooded with water. The cave was discovered in 1904 (Dublyanski et al., 1987). Now the cave is equipped for excursions. The entrance is locked with doors-grates. The cave has a status of a monument of nature of local significance.

Beshtekne-1, Beshtekne-2, Beshtekne-3 Caves. Caves are situated at the South side of Beshtekne depression of the Ai-Petri plateau (Fig. 3:3-5). All of them are outflow caves. Narrow, not high (about 2 m and less). The length of the biggest one is 150 m.

Geophysical Cave. Situated at the Ai-Petri plateau (Fig. 3:6). Length — 275 m, depth — 80 m. The first 30 m pitch leads to a horizontal passage and to a cascade of three inner pitches. The cave has a status of a monument of nature of local significance.

No name Cave (Ai-Petri-1). Situated at the Ai-Petri plateau (Fig. 3:7). A vertical cave with depth about 30 meters.

Limestone quarries of the Central Crimea

Novoandreevskie Quarries. A system situated near Novoandreevka Village of Simferopolsky District (Fig. 3-8). Length is about 500 m, height — up to 2 meters.

Turgenevskie Quarries. A short system (about 200 meters) situated near Turgenevo Village of Belogorsky District (Fig. 3:9).

Novoaleksandrovskie Quarries. A short system situated between Novozhilovka and Novoaleksandrovka Villages, Belogorsky District (Fig. 3:10). General length is about 300 m.

Chatyr-Dag mountain massif

Trekhlazka Cave (Emine-Bair-Koba Cave). Situated at the Lower Chatyr-Dag plateau (Fig. 3:11). An inflow cave situated in the funnel of the karst hollow. The cave begins with high-angle tunnel with height of about 10-30 m. After, there is a narrow passage that leads to the "new" part which represents a number of narrow passages with small chambers. The cave was planned for excursions but equipping has not been finished.

Emine-Bair-Khosar Cave. The entrance is situated at the northern side of the Lower Chatyr-Dag plateau (Fig. 3:12). One of the three most popular excursion caves of the Crimea. The length is 1460 m, the depth is 125 m. The 12-m pitch opens to the central chamber. A narrow old syphon channel from this chamber leads to the Lower Bair, which is strictly protected now. An equipment of the cave began in 1992. Thus, one of the lateral passages was connected with the surface with a tunnel. The cave is electrified and equipped with concrete paths and stairs.

Baki Cave. Situated at the Lower Chatyr-Dag plateau (Fig. 3:13). A narrow vertical cave. The depth is about 10 m. Ends with a stone plug.

Suuk-Koba Cave (Kholodnaja Cave). Situated at the Lower Chatyr-Dag plateau (Fig. 3:14). Length — 210 m, depth — 43 m. Cave is easily accessible. The entrance is situated at the

slope of the karstic funnel. Begins with a big (length — 60 m, width — 15-20 m, height is till 30 m) sloping chamber; proceeds with a horseshoe passage with a number of sinter pools.

Binbash-Koba Cave (Tysiachegolovaja Cave). Situated at the Lower Catyr-Dag plateau (Fig. 3:15). Length — 150 m, depth — 23 m. Consists of the passage and two chambers.

Gugerdjin Cave. Situated at the Lower Catyr-Dag plateau (Fig. 3:16). Length — 98, depth — 20 m. The cave has an 18-m pitch, which leads to the chamber.

Uchunzhu-Khosar Cave. The cave is situated in the funnel near the Upper Chatyr-Dag plateau (Fig. 3:17). Length — 115 m, depth — 25 m. Begins with a 20-m wide pitch proceeding with a spacious sloping gallery (length — 70 m, width 3-10 m, height — about 10 m).

Dolgorukovsky mountain massif

Kizil-Koba (Krasnaja) Cave. Situated at the western slope of the massif (near Perevalne Village of Simferopolsky District), Fig. 3:18. Length is more than 20 km (the longest cave of Ukraine in limestones). The cave is an outflow cave; the Kizilkobinka river flows in about 360 m from the entrance, getting out from siphons. Nearest (foresiphon) part has a general length of 2,5 km of passages and consists of 6 levels. The difference between levels is from 4-5 to 8-10 meters. During floods first and sometimes second floors of the cave are flooded with water. Kizil-Koba Cave is connected with the inflow cave Golubinaja, forming one system with amplitude in 133 m. The cave is used by humans from 7-6 century BC. Now the cave is one of the three most popular excursion caves of the Crimea. Entrances are equipped with doors-grates. Beside it, the cave is guarded. The cave with surrounding territory of the tuff ravine has a status of a monument of nature of state significance.

Aleshina Voda Cave. Situated at the western slope of the massif (near Perevalne Village of Simferopolsky District), Fig. 3:19. Length — 3200 m, amplitude — 40 m. An entrance is situated under a rock precipice. An outflow cave, from which a left inflow of Kizilkobinka River gets out. The nearest part of the cave (about 40 m) "ends" with siphons. The cave was opened in 1959-1962.

Eni-Sala-1 Cave. Western slope of the massif (the nearest settlement — Perevalne Village of Simferopolsky District), Fig. 3:20. Length — 113 m, depth — 17 m. Cave is easily accessible. Consists of sloping cavity that is divided on two chambers with a stone blocks. An ancient sanctuary was discovered there. As well the cave was used as hunters' and cattlemen' shelter.

Zemlianichnaja Cave. Situated at the Dolgorukovska plateau (Fig. 3:21). Length — 120 m, depth — 90 m. A narrow inclined 5-meter passage leads to the cascade of 5-15-meter-depth pitches.

No name Cave ("Sergeya" Cave). Situated at the north part of the Dolgorukovska plateau (Fig. 3:22). Present a vertical pitch (depth near 30 m) terminating with a small chamber 2x3 m. A vertical entrance is wide, 3x5 m.

Karabi mountain massif

No name Cave (Karabi-1). Situated at the Karabi plateau, in the board of a karst funnel (Fig. 3:23). Vertical, depth is not less than 20 m. An entrance pitch is elongated (10x2 m). Situated at the territory of the botanical reserve "Urochische Karabi Yaila".

Kruberu Cave. Situated at the Karabi plateau (Fig. 3:24). The intake pitch has 50 m in depth and leads to the sloping gallery. In the bottom part of the cave there are some shallow hollows with water. Cave's length — 280 m, depth — 62. The cave has a status of a monument of nature of local significance.

Karani-Koba Cave. Situated at Karabi plateau (Fig. 3:25). A small horizontal passage leads to the ball-shaped chamber, 60-70 m in diameter and with height of 15-20 m.

Tisova Cave (Pasko-Savan-Kharlyh Cave). Situated at the Karabi plateau (Fig. 3:26). Length — 110 m, depth — 60 m. The cave has two parts. One part is a 30-m pitch with a snow. Another part is 35-m narrow hole in the stone blockage at the side of the funnel.

Evrika Cave. Situated at the Karabi plateau (Fig. 3:27). Length — 106 m, depth — 93 m. The cave consists of a series of continuing narrow pitches.

Grottos of Southern Coast of the Crimea

Skvoznoy Grotto. The territory of the botanical reserve “Novyi svet” (near Novyi svet Town of Sudaksky District), Fig. 3:28. The grotto is one of objects of excursion route through the reserve.

No name Grotto (Levinsona-Lessinga Grotto). Sea grotto of Karadag Natural Reserve (Kurortne Village of Feodosiysky District), Fig. 3:29. “Dry” grotto in a coastal rock.

Shaitan-1 and Shaitan-2 Grottos. Sea grottos of Karadag Natural Reserve (Kurortne Village of Feodosiysky District), Fig. 3:30-31. Watered grottos.

Myschinaya Schel Grotto. Sea grotto of Karadag Natural Reserve (Kurortne Village of Feodosiysky District), Fig. 3:32. Watered grotto.

Revuschiy Grotto. Sea grotto of Karadag Natural Reserve (Kurortne Village of Feodosiysky District), Fig. 3:33. Watered grotto.

No name Grotto (Barakhty Grotto). Sea grotto of Karadag Natural Reserve (Kurortne Village of Feodosiysky District), Fig. 3:34. “Dry” grotto in a coastal rock.

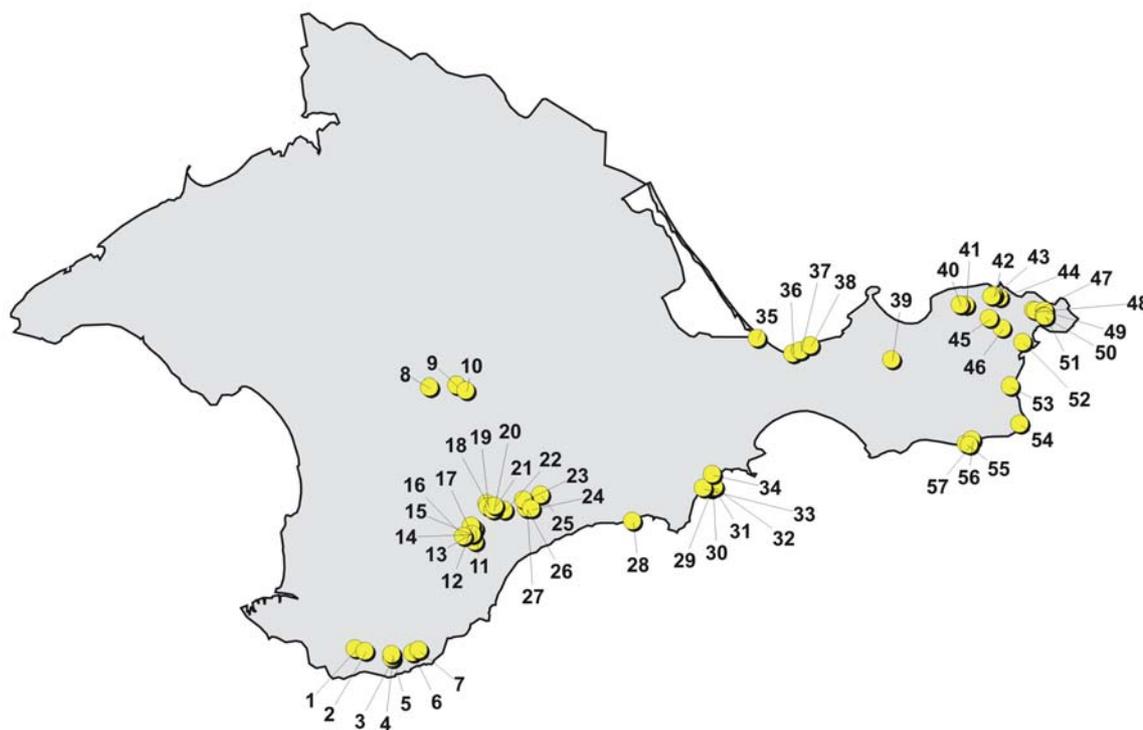


Fig. 3. Location of examined underground cavities (on 15.03.2004)

Underground cavities of the Kerch peninsula

Underground cavities of the Kerch peninsula are presented mostly by limestone underground quarries. They are numerous and present branchy systems sometimes with few levels, with more than few tens of entrances, with general length up to tens of kilometers. For Ukraine they are one of the difficult objects for counting bats in them as well as for mapping and "cadastring" these cavities. (The situation is complicated with numerous collapses of ceilings, that divide one common gallery system into two or three ones, etc.)

Here in naming of such type of underground cavities we follow the next rule: if examined galleries are isolated but situated from each other at the distance of 100-200 meters, we attribute them to the same "system" with, correspondingly, one name. If galleries are situated at more distance, we point them with different names.

At the same time, there is one more difficulty. Sometimes two (or more) clusters of the same bat species use the same continuous system as a roost, but occupy different galleries of it, sometimes at the distance of 200 and more meters from each other. Since we don't know intercluster connections, it's a question whether we should consider these clusters as one colony or as different ones. Relatively, below clusters-colonies, placed at the distance of more than 200 meters, we consider separately.

Arabatska fortress gun-powder (?) cellar. The object is situated at the territory of Arabatska fortress near Kamenskoe Village of Leninsky District (Fig. 3:35). Is presented by a weakly isolated one underground chamber.

System of Ak-Monayskie Quarries (1, 2, 3). Situated near Kamenskoe Village of Leninsky District (Fig. 3:36-38). These quarries represent few long branchy systems; they are one of the longest quarries' systems of the Kerch peninsula. Their general length — more than 50000 m (Grek, 1999), height — different, from 7-8 m to 0,5 m.

System of Petrovskie Quarries. Situated to the north from Leninskoe Village of Leninsky District (Fig. 3:39). Few systems with general length no less than 3000 m, height of corridors — 2-5 m, width — 5-6 m.

Karalarskie Quarries (other name: Bagerovskie–1). Situated to the north from Chistopol'e Village of Leninsky District (Fig. 3:40). A system neighboring with small open-cast mines. General length is about 5000 m, height of galleries — up to 5 m, width 2-5 m. During World War II the system was used by partisans as a shelter (Grek, 1999; Demidenko, 2004).

Chistopol'skie Quarries. Situated to the north from Chistopol'e Village of Leninsky District (Fig. 3:41). Length — about 200 meters, height — 2-3 m, width — 2-3 m.

Tashkalakskie–1 Quarries (other names: Chokrakskie, Kezanskie). Situated at the northern slope of Tashkalak Mountain to the south-west from Kurortnoe Village of Leninsky District (Fig. 3:42). Extension is about 1500 meters. Width of galleries — 3-5 m, height — 1,7-3 m. The quarries were mined from late of 19th century till 30-s years of 20th century. During World War II the quarries were used by Nazi for ammunition dump and for living (Sokhin, Parfionov, 2001).

Tashkalakskie–2 Quarries. Short gallery at the southern slope of Mnt. Tashkalak to the south-west from Kurortnoe Village of Leninsky District (Fig. 3:43). Length is about few tens of meters. Height is 3-4 m.

Quarries to the south from Chokrak Lake. Three short separate galleries to the south from Kurortnoe Village (Fig. 3:44). Length is few tens of meters. Width is 3-4 m, height — about 3 m.

Bagerovskie–2 Quarries. Long system of quarries near Bagerovo Town, Leninsky District (Fig. 3:45). The quarries were mined in 1910-1950 years. Length is about 18000 m (Grek, 1999). Height is 6-7 m, width — 5-6 m.

Oktyabr'skie Quarries. Situated to the south from Oktyabr'ske Village of Leninsky District (Fig. 3:46). Length is about 1500 meters. Average height of galleries is 2 m, width — 3 m.

Bulganakskie–1 Quarries. A separate short gallery system in the wall of Bulganaksky open-cast mine near Bondarenkovo Village of Leninsky District (Fig. 3:47). Length is about 500 m, height — 2-4 m, width — 3-5 m.

Bulganakskie–2 Quarries. Galleries at the left bank of Bulganak river in Bondarenkovo Village (Fig. 3:48). Length is about 1500 m (Grek, 1999), height — 4-5 m, width — 3-4 m.

Bulganakskie–3 Quarries. System of galleries between Bondarenkovo and Adzhimushkai Villages of Leninsky District (Fig. 3:49). Length — ?, height — about 3 m, width — 2-3 m.

Systems of Adzhimushkaiskie Quarries (Malye and Tsentralnye). Branchy system of galleries situated in Adzhimushkai part of Kerch City (Fig. 3:50-51). Two separate systems. Mining was started in 50-s years of 19th century and continued till World War II. During the War quarries were used as underground fortress. Malye Adzhimushkaiskie quarries has a length more than 15 km, Tsentralnye Adzhimushkaiskie — about 9 km. Today, part of Tsentralnye

Adzhimushkaiskie Quarries is Museum of history of defense of Adzhimushkaiske quarries (of Kerch state historical-cultural reserve).

Kerch Fortress. Situated at the south border of Kerch City (Fig. 3:52). Built in 19th century. For today, the Fortress has an official status of a monument of fortification. Includes a big number of underground and semiunderground objects.

(Chelyadinovska) artillery battery # 29-bis. Situated near Chelyadinovo Village of Leninsky District (Fig. 3:53). Artillery complex with 5 gun blocks joined submerged underground gallery, was built in late 1930s.

Zavetrniskie Quarries. Between Zavetnoe Village (of Leninsky District) and Cape Takil' (Fig. 3:54). Short weakly isolated system.

Hydrothermal fissures of Opuk Natural Reserve. Fig. 3:55. Few fissures were checked. The deepest one (from examined) has a depth of about 15 m.

Opukskie Quarries, Upper and Lower. Quarries of Opuk Mountain (Opuk Natural Reserve, Leninsky District), Fig. 3:56-57. Taking into account some data, it's possible to presume that their mining were carried out up to I century A. D. Two separate systems of galleries, each of them has a length about 400 m, height — 1,5-2 m.

2.3. Main results

Bats were found for 34 from 57 underground shelters (immediately in them during visual examination in summer/winter or with netting at entrances in summer), Fig. 4.

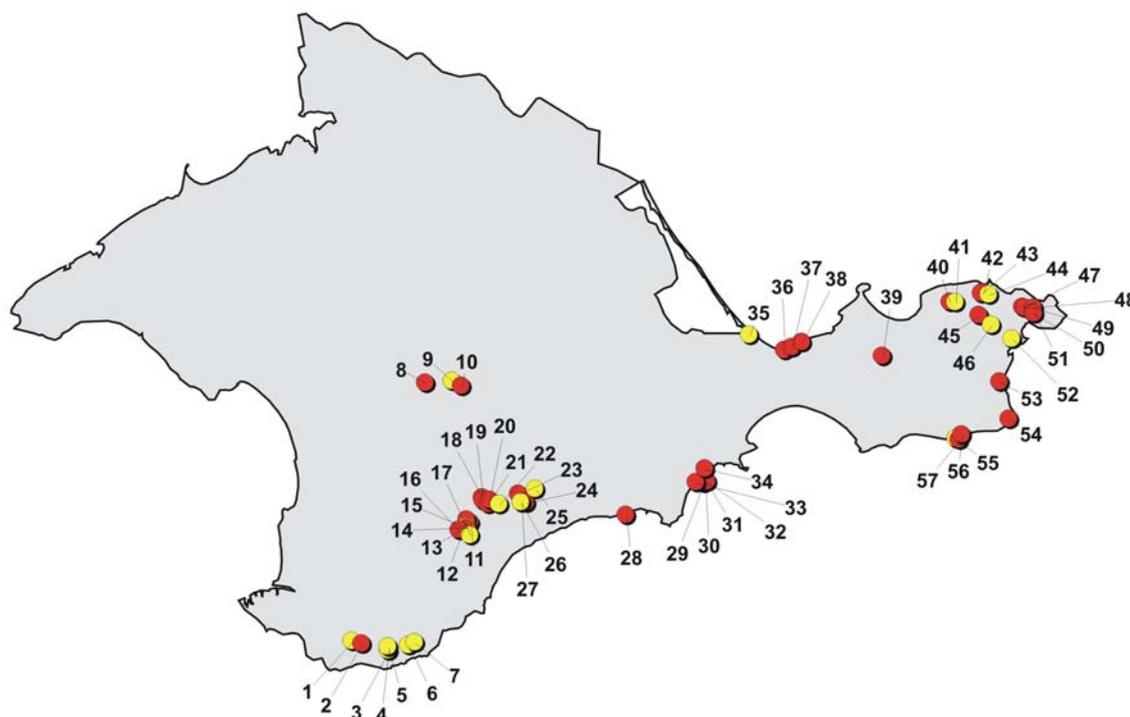


Fig. 4. Location of examined underground cavities, for which bats were found; marked with red

Totally, about 21000 individuals of 14 bat species were found (detector data is not considered): *Rhinolophus hipposideros*, *R. ferrumequinum*, *Myotis blythii*, *Myotis nattereri*, *Myotis emarginatus*, *Myotis mystacinus*, *Plecotus auritus*, *P. austriacus*, *Barbastella barbastellus*, *Nyctalus leisleri*, *Pipistrellus pipistrellus*, *P. pygmaeus*, *Hypsugo savii*, *Eptesicus serotinus*.

Totally 221 bats were netted and examined closely. (We didn't stay nets at sites with maternity colonies.)

Immediately at entrances of caves bats of 12 species were caught (all enumerated above beside *Nyctalus leisleri* and *P. pygmaeus*).

Among found species there are such rare for Ukraine ones as *Myotis nattereri*, *Myotis emarginatus*, *Barbastella barbastellus*, *Hypsugo savii*, *Nyctalus leisleri* (last one was captured outside of caves).

Though all found species were known earlier for the region, some of them were registered here for first time after long time interval: *M. emarginatus* was found for first time after 29 years, *Hypsugo savii* — after 14 years, *Nyctalus leisleri* — after 28 (34) years.

Generally, two species compose the base of the species list in terms of a general number of individuals and a number of inhabited sites — *M. blythii* (65,61% and 58,82%) and *R. ferrumequinum* (32,65% and 70,59%, correspondingly), both in summer and winter (Fig. 5).

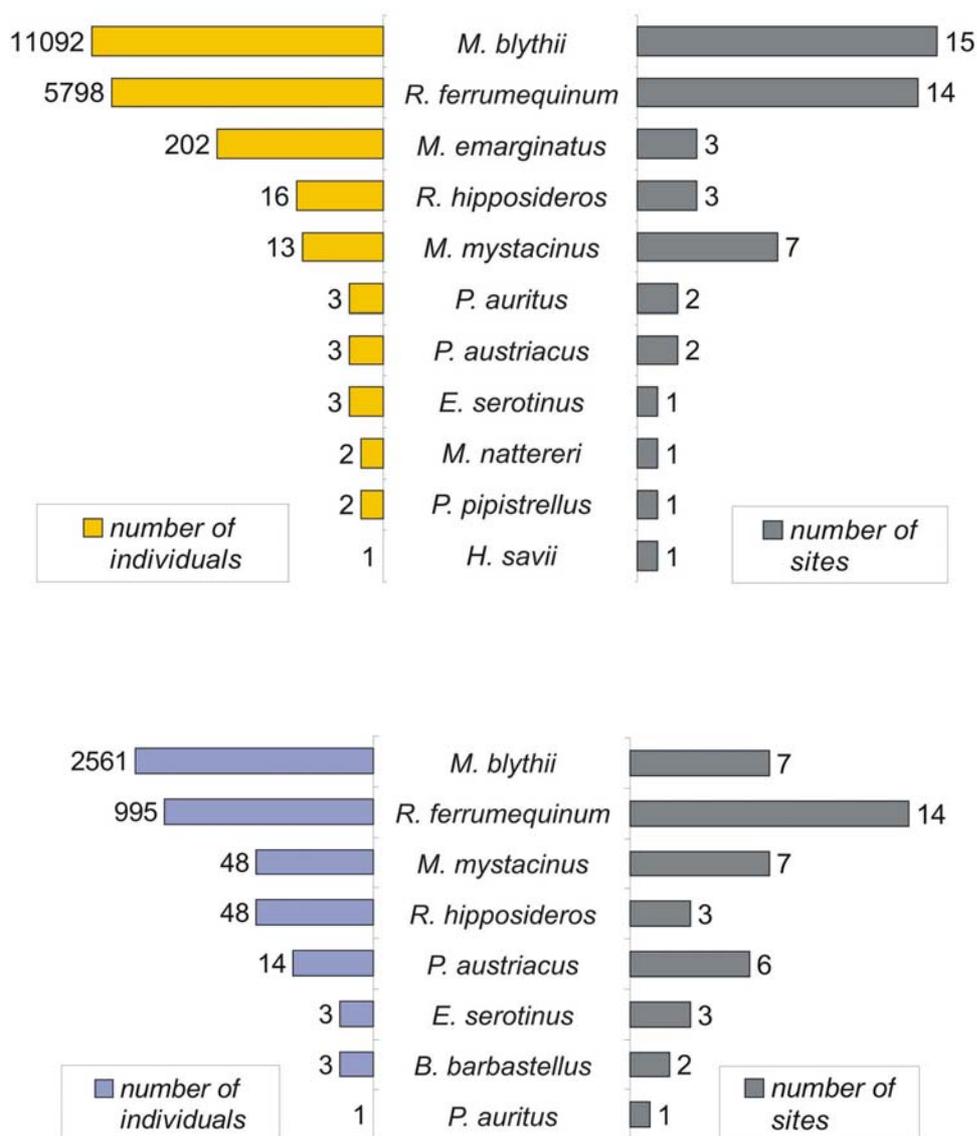


Fig. 5. Rating of found species by number of individuals and registrations in the summer 2004 (upper figure) and in the winter 2005 (lower figure)

In checked caves we found maternity colonies of three species (*R. ferrumequinum*, *M. blythii*, *M. emarginatus*); although single pregnant females of three more species (*R. hipposideros*, *P. auritus* and *P. austriacus*) were netted as well.

The biggest number for colonies of *R. ferrumequinum* (from 6 ones found) is no less than 3050 specimens (with offspring), for colonies of *M. blythii* (from 9 ones found) — more than 4000 specimens (with offspring), for only colony of *M. emarginatus* — about 200 adult females. The record of the colony of *M. emarginatus* is the third for the Crimea and for Ukraine.

For two species — *R. ferrumequinum* and *M. blythii* — few only male summer aggregations were found. For first species there were two big enough aggregations with number in about 200 and 100 specimens. For the second species two aggregations with number of about 100 and 200 individuals were revealed.

In winter in quarries of the Kerch peninsula comparatively big aggregations were found for two species — *R. ferrumequinum* and *M. blythii*. The first — no less than 1426 specimens of *M. blythii*, the second — no less than 978 specimens of *M. blythii*, the third — 509 specimens of *R. ferrumequinum* and the fourth one — more than 200 specimens of *M. blythii* and *R. ferrumequinum*. The first, second and third ones take first places among known for today winter aggregations of a corresponding species by number of individuals in Ukraine. In addition, such rather big winter aggregations of *M. blythii* as found ones hadn't been mentioned before for the Crimea.

Generally, a big difference between general quantities of bats encountered in summer (17135 ind.) and in winter (3673 ind.) allows us to presume an existence in the region more hibernacula not known for now.

3. ANNOTATED LIST OF CAVE DWELLING BAT SPECIES OF THE REGION

3.1. Registered species

According to literary data, 14 bat species were found in different underground shelters of the target region. They are: *R. hipposideros*, *R. ferrumequinum*, *M. blythii*, *M. nattereri*, *M. emarginatus*, *M. mystacinus*, *M. schreibersii*, *B. barbastellus*, *P. auritus*, *P. austriacus*, *N. noctula*, *P. pipistrellus*, *H. savii* and *E. serotinus*.

Below, there is an annotated list of bat species found in cavities of the Crimea and netted in some nearness from caves during the project. "Bat-detector" data concerning immediate observations near caves' entrances are given only. All annotations are arranged by the next scheme: a) national and international conservation status; b) distribution and status of the species in Ukraine; c) status of the species for the target region; d) map with points of registrations of a species during the project work with the cadastre of records.

Lesser horseshoe bat ***Rhinolophus hipposideros***

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. II; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LC (had VU A2c cat.); EU Habitat and Species Directive: Ann. II, IV.

Found in the Crimea, Carpathian regions and Podillya.

According to the previous data, in the Crimea the species is quite usual but not numerous. In winter the species hibernates in warm underground cavities of the Mountain Crimea. In summer the species uses attics and space under bridges. All winter records are presented by few tens of individuals (maximum) for one cave. Number of females in maternity colonies doesn't exceed 40 individuals.

During the fieldwork few individuals of the species were registered for three caves (Fig. 5.)



Fig. 6. Points of registration of *R. hipposideros*

Summer:³ • Kizil-Koba Cave, 15.06.2004, 1 ind. (1m), net.; • Skelskaya Cave, 16.06.2004, 2 ind. (2u), net.; • Kizil-Koba Cave, 18.06.2004, 2 ind. (2m), net.; • Kizil-Koba Cave, 10 ind. (u), exam; • Aleshina Voda Cave, 19.06.2004, 3 ind., (u), exam; • Aleshina Voda Cave, 19.06.2004, 4 ind. (3m, 1f-preg), net.

³ Abridgements in the text: f — female, m — male, u — sex unknown, ad — adultus, sad — subadultus, preg. — pregnant, ind. — individuals, net. — netted, exam. — counted during daytime examination or during evening departure.

Winter: • Aleshina Voda Cave, 05.04.2005, 3 ind., exam.; • Kizil-Koba Cave, 07.04.2005, 43 ind. (during evening departure with 5 ind. during daytime examination); • Skelska Cave, 10.04.2005, 2 ind., exam.

Greater horseshoe bat ***Rhinolophus ferrumequinum***

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. II; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/nt; EU Habitat and Species Directive: Ann. II, IV. In borders of Bern Convention a special action plan for the conservation of the species was worked out (Action plan ...). The Standing Committee of the Bern Convention adopted Recommendation No. 72 on 3 December 1999 on the implementation of the action plan for conservation of the greater horseshoe bat in the territories covered by the Convention.

Records of the species cover the territory of the Transcarpathian region and the Crimea.

One of the most usual species found to form big nursery and rather big winter aggregations in underground cavities of the Crimea.

During the work the species was registered in 24 objects (Fig. 6). Six maternity colonies were found (about 50 adult females with young; two colonies in about 200 adult females with offspring; about 750 individuals, including offspring; no less than 3050 and 1200 individuals, including offspring). Two big only male summer colonies with number of about 200 and 100 individuals were found. One big winter aggregation with number of 509 individuals was found.

List of found nursery colonies includes all known for today nursery colonies of the species for Ukraine. Found winter aggregation is the biggest from known ones in Ukraine.

It's quite difficult to make estimation of changes in number of the species population in the region, because in the literary exact information on number of individuals in aggregations and on points of their records is almost absent.

In summer of 2005 *R. ferrumequinum* was also revealed in Ak-Monaiskie–2 Quarries (look chapter 4.2; here in the cadastre data of 2005 were not included).



Fig. 7. Points of registration of *R. ferrumequinum*

Summer: • Kizil-Koba Cave, 15.06.2004, 19 ind. (19m), net.; • Skelskaya Cave, 16.06.2004, 2 ind. (u), det.; • Kizil-Koba Cave, 18.06.2004, 15 ind. (15m), netted from ~ 200 counted during evening departure; • Krubera Cave, 21.06.2004, 1 ind. (u), exam.; • Shaitan-1 Grotto, 24.06.2004, ~ 20 ind. (u), exam.; • Barakhty Grotto, 24.06.2004, ~ 200 ind. (~200 adults, maternity colony), exam.; • Levinsona Lessinga Grotto, 25.06.2004, ~ 200 ind. (~200 adults, maternity colony), exam.; • Karadag Natural Reserve, 25.06.2004, 3 ind. (3f), net.; • Petrovskie Quarries, 29.06.2004, no less than 50 ind. (50 adults, maternity colony), exam.; • Petrovskie Quarries, 29.06.2004, 4 ind. (4f), net.; • Petrovskie Quarries, 28.07.2004, no less than 750 ind. (incl. youngs, maternity colony), exam.; • Karalarskie Quarries, 29.07.2004, 3050 ind. (1f-ad, 1f-sad), exam.; • Karalarskie Quarries (1), 30.04.2004, > 1200 ind. (adults with youngs), exam.; • Tashkalakskie–1 Quarries, 30.07.2004, 1 ind. (u), exam.; • Bulganakskie–2 Quarries, 31.07.2004, ~ 100

ind. (m), exam.; • Zavetninskie Quarries, 02.08.2004, ~ 20 ind. (u), exam.; • (Chelyadinovska) Artillery coast battery # 29, 1 ind. (1f-sad), net.; • Upper Opukskie Quarries, 03.08.2004, 2 ind. (u), exam.; • Lower Opukskie Quarries, 03.08.2004, 1 ind. (u), exam.

Winter: • Ak-Monaiskie–1 Quarries, 22.02.2005, 13 ind., exam.; • Ak-Monaiskie–2 Quarries, 23.02.2005, 13 ind., exam.; • Ak-Monaiskie–3 Quarries, 23.02.2005, 6 ind., exam.; • Karalarskie Quarries, 25.02.2005, 509 ind., exam.; • Bagerovskie–2 Quarries, 25.02.2005, 27 ind., exam.; • Malye Adzhimushkaiskie, 26.02.2005, 93 ind., exam.; • Museum "Adzhimushkai", 26.02.2005, 2 ind., exam.; • Tsentral'nye Adzhimushkaiskie Quarries, 27.02.2005, 77 ind., exam.; • Tashkalakskie–1 Quarries, 01.03.2005, 4 ind., exam.; • Bulganakskie–1 Quarries, 01.03.2005, 21 ind., exam.; • Bulganakskie–2 Quarries, 9 ind., exam. • Novoandreevskie Quarries, 04.04.2005, 1 ind., exam.; • Eni-Sala – 1 Cave, 07.04.2005, 3 ind., exam.; • Kizil-Koba Cave, 07.04.2005, 215 ind. (during evening departure with 209 ind. during daytime examination); • Bair-Khosar Cave, 08.04.2005, 2 ind., exam.

Lesser mouse-eared bat

Myotis blythii

A conservation status is defined by: EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. II, IV.

The species was found at the territory of the Transcarpathian region, Podillya and the Crimea. In borders of its distribution the species is quite usual.

The species forms big summer and winter aggregations in underground shelters of the Crimea.

In the literary there are exact mentions of sites with big maternity colonies of the species in underground cavities. We checked four from them: Kizil-Koba Cave, Skvoznoy Grotto, Myshinaya Schel Grotto and Opukskie quarries. One of colonies doesn't exist now, others decreased in number greatly (Table 2).

Table 2. Change in number of maternity colonies of *M. blythii*

	Year of observation					
	1850-s	1920-s	1930-s	1960-s	1970-s	2004
Kizil-Koba Cave	"a great many" (Nikolsky, 1891)	no data	few thousands (Konstantinov et al., 1976)	no data	0 (Konstantinov et al., 1976)	0 (own data)
Skvoznoy Grotto	no data	no data	no data	4-5000 ind. (Konstantinov et al., 1976)	500 ind. (Konstantinov et al., 1976)	300 adults (own data)
Myshinaya Schel Grotto	no data	40000 ind. (Konstantinov et al., 1976)	no data	6-7000 ind. (Konstantinov et al., 1976)	500-700 ind. (Konstantinov et al., 1976)	300 adults (own data)
Opukskie Quarries	no data	no data	no data	3000 adult females (Konstantinov et al., 1976)	no data	1000 females and young (own data)

Totally, during the work the species had been registered for 20 objects (Fig. 7). Nine maternity colonies were found (two ones with about 300 adult females; 200 females; 200 individuals including offspring; about 1000 and 2000 adult females; 4000 and two ones with 1000 individuals including offspring). Two big only male summer colonies with number in about 100 and 200 individuals were found. Three underground shelters with big (or rather big) winter aggregations were found (the biggest is 1426, others — 978 and 127 individuals).

In summer of 2005, after finishing the project, but basing on observations carried out in winter 2005, one more maternity colony of *M. blythii* with a number of about 1000 adult females

was found. It was revealed in Ak-Monaiskie–2 Quarries (look chapter 4.2; here in cadastre data of 2005 are not included).



Fig. 8. Points of registration of *M. blythii*

Summer: • Krubera Cave, 21.06.2004, 3 ind. (3m), net.; • Skvoznoi Grotto, 22.06.2004, 5 ind. (5f), netted from ~ 300 ind. counted in the maternity colony; • Shaitan -2 Grotto, 24.06.2004, ~ 200 ind. (mat. col.), exam.; • Myshinaya Schel' Grotto, 25.06.2004, ~300 ind. (mat. col.), exam.; • Karadag Natural Reserve, 25.06.2004, 5 ind. (3m, 2f), net.; • Ak-Monaiskie–1 Quarries, 28.06.2004, 7 ind. (3m, 4f), net.; • Petrovskie Quarries, 29.06.2004, 1 ind. (u), exam.; • Petrovskie Quarries, 29.06.2004, ~ 1000 + ~ 2000 ind. (mat. col.); • Petrovskie Quarries, 28.07.2004, ~1200 ind. (mat. col., incl. youngs; repeated count of one of "previous" colonies) + 30 ind. (3m), exam.; • Petrovskie Quarries, 28.07.2004, ~1000 ind. (mat. col., incl. youngs), exam.; • Karalarskie Quarries, 29.07.2004, ~ 4000 ind. (mat. col., incl. young) + 280 + 30x2 ind., exam.; • Karalarskie Quarries, 30.07.2004, ~ 200 ind., exam.; • Tashkalakskie–2 Quarries, 30.07.2004, 12 ind., exam.; • Tashkalskie–1 Quarries, 30.07.2004, 34 ind., exam.; • Bulganakskie–2 Quarries, 31.07.2004, ~100 ind. (m), exam. • Bulganakskies–3 Quarries, 31.07.2004, 2 ind. (u), exam.; • (Chelyadinovska) Artillery coast battery # 29, 54 ind. (54m-ad), netted from ~ 200 counted during daytime examination; • Zavetninskie Quarries, 02.08.2004, 14 ind. (5m), exam.; • Upper Opukskie Quarries, 03.08.2004, ~ 1000 ind. (mat. col., incl. youngs; examined 9f-ad, 3m-sad, 3f-sad) + 60 ind. (8m-ad), exam.; • Lower Opukskie Quarries, 04.08.2004, 50 ind. (5m-ad), exam.

Winter: • Ak-Monaiskie–1 Quarries, 22.02.2005, 5 ind., exam.; • Ak-Monaiskie–2 Quarries, 23.02.2005, 1426 ind., exam.; • Ak-Monaiskie–3 Quarries, 23.02.2005, 23 ind., exam.; • Petrovskie Quarries, 24.02.2005, 1 ind., exam.; • Bagerovskie–2 Quarries, 25.02.2005, 978 ind., exam.; • Malye Adzhimushkaiskie, 26.02.2005, 127 ind., exam. • Zemlyanichnaya Cave, 06.04.2005, 1 ind., exam.

Natterer's bat *Myotis nattereri*

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. III; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. IV.

The species is sporadically distributed through the biggest part of Ukraine. However, the species is rather rare: about 40 records are known only.

All previous records (14 ones) of the species in the Crimea are presented only by single individuals.

We registered the species only for one underground cavity (Fig. 8).



Fig. 9. Points of registration of *M. nattereri*

Summer. • Aleshina Voda Cave, 19.06.2004, 2 ind. (2m), net.

Geoffroy's bat
Myotis emarginatus

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. III; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): VU A2c; EU Habitat and Species Directive: Ann. II, IV.

Records of the species are bordered with Mountain Crimea, Transcarpathian region and south of Podillya. For Ukraine the species is very rare: about 30 records are known.

Last record of the species had been pointed for summer (3/06) of 1975 (Dulitsky, Kovalenko, 2003). Although records of single breeding females were marked both for the Crimea and for Ukraine, two nursery colonies of the species were registered for all the time of zoological investigations at Ukraine⁴. First one including about 50 females was found in summer (25/06) of 1938 (Abelentsev, Popov, 1956), the second was found in summer (22/05) of 1969 and included 50 females as well (Konstantinov et al., 1976); both colonies occupied grottos (Belogorsky District). Because of absence of a mention at exact places of records, it's not possible to check the status of these two colonies now.

We registered the species for three underground cavities. In one of them a maternity colony in about of 200 females was found. Additionally two individuals were caught with mist-nets in some nearness from Karadag grottos (Fig. 9).



Fig. 10. Points of registration of *M. emarginatus*

⁴ We should point at our mistake got into brief reports, in which we pointed found in Karadag Reserve colony as second one.

Summer: • Kizil-Koba Cave, 15.06.2004, 1 ind. (1m), net; • No name Cave (Karabi-1 Cave), 20.06.2004, 1 ind. (1m), net.; • Levinsona-Lessinga Grotto, 25.06.2004, ~ 200 (~200 adults, mat. col.), exam.; • Karadag Natural Reserve, 25.06.2004, 2 ind. (1m, 1f), net.

Whiskered bat *Myotis mystacinus*

Note. Presence of *M. aurescens* in the Crimea was shown by P. Benda and K. Tsytsulina (2000). However, its status in the Crimea (and, generally, in Ukraine) needs more precise definition, so we considered whiskered bats of the region in previous species status.

A conservation status is defined by: EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. IV.

Records of the species cover territory of Carpathian region, Podillya and Bukovyna, steppe part of Ukraine and the Crimea.

The species is quite usual throughout the entire territory of the Crimean peninsula.

We registered the species for 12 cavities (Fig. 10). The biggest winter "aggregation" was presented by 31 individuals.



Fig. 11. Points of registration of *M. mystacinus*

Summer: • Kizil-Koba Cave, 15.06.2004, 1 ind. (1m), net; • No name Cave (Karabi-1 Cave), 20.06.2004, 3 ind. (3m), net.; • Krubera Cave, 21.06.2004, 1 ind. (1m), net.; • Ak-Monaiskie-1 Quarries, 28.06.2004, 2 (2m), net.; • Petrovskie Quarries, 28.07.2004, 2 ind. (2m), exam.; • Karalarskie Quarries, 30.07.2004, 3 ind. (u), exam.; • Bulganakskie-1 Quarries, 31.07.2004, 1 ind., exam.

Winter: • Ak-Monaiskie-1 Quarries, 22.02.2005, 2 ind., exam.; • Ak-Monaiskie-2 Quarries, 23.02.2005, 2 ind., exam.; • Ak-Monaiskie-3 Quarries, 23.02.2005, 6 ind., exam.; • Bagerovskie-2 Quarries, 25.02.2005, 3 ind., exam.; • Malye Adzhimushkaiskie Quarries, 26.02.2005, 31 ind., exam.; • Kizil-Koba Cave, 07.04.2005, 3 ind., exam.; • Gugerdzhin Cave, 08.04.2005, 1 ind., exam.

Brown long-eared bat *Plecotus auritus*

A conservation status is defined by: EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. IV.

The usual but not very numerous species for caves of Ukraine.

All (less than 10) records of the species belong to the territory of Mountain Crimea.

We registered the species for three caves of Mountain Crimea (Fig. 11). One of records was done with bat detector; this sound was referred to *P. auritus* taking into account the fact of belonging of all the species' records to Mountain Crimea; see also *P. austriacus* below).



Fig. 12. Points of registration of *P. auritus*

Summer: • Skelska Cave, 16.06.2004, 1 ind. (u), det.; • Aleshina Voda Cave, 19.06.2004, 2 ind. (2m), net.; • Krubera Cave, 21.06.2004, 1 ind. (1f-preg.).

Winter: • Aleshina Voda Cave, 05.04.2005, 1 ind., exam.

Grey long-eared bat *Plecotus austriacus*

A conservation status is defined by: EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. IV.

Quite usual but not numerous species, known for Carpathian regions, Podillya, south of steppe part of Ukraine and for the Crimea.

Few species' records mentioned for the Crimea belong to its steppe part, and specially, to the territory of the Kerch peninsula.

We found single individuals of the species for 7 objects examined (Fig. 12).



Fig. 13. Points of registration of *P. austriacus*

Summer: • Ak-Monaiskie-1 Quarries, 28.06.2004, 2 ind. (1m-ad, 1f-preg), net.; • Petrovskie Quarries, 28.07.2004, 1 ind. (1m), exam.;

Winter: • Ak-Monaiskie-3 Quarries, 23.02.2005, 7 ind., exam.; • Petrovskie Quarries, 24.02.2005, 2 ind., exam.; • Karalarskie Quarries, 25.02.2005, 2 ind., exam.; • Lower Opukskie Quarries, 28.02.2005, 1 ind., exam.; • Tashkalakskie-1 Quarries, 01.03.2005, 1 ind., exam.; • Bulganakskie-1 Quarries, 01.03.2005, 1 ind., exam.

Western barbastelle
Barbastella barbastellus

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. III; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): VU A2c; EU Habitat and Species Directive: Ann. II, IV.

Records of the species are known from the Dnieper River right bank part of Ukraine, excluding its steppe part, and from the Crimea. Rather rare and not numerous species.

All previous records are from Mountain Crimea. Here it had been found in winter hibernating in small number (no more than 10 individuals for one cave). Few summer records of the species are known as well.

We found the species only in two cavities (Fig. 13). One of them presents the first registration of the species at the Kerch peninsula and in Steppe Crimea generally.

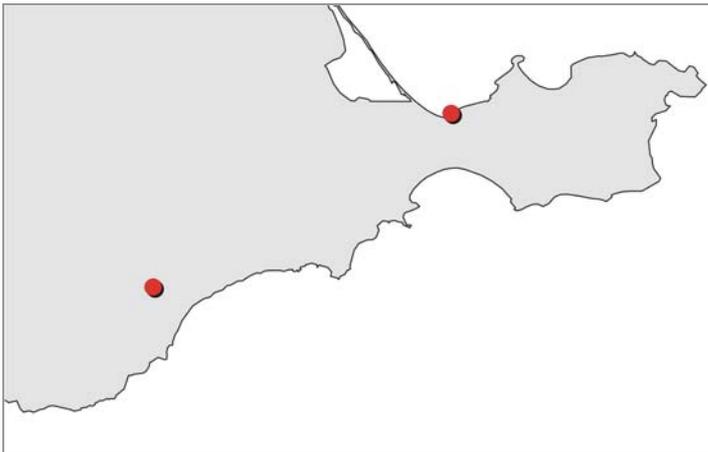


Fig. 14. Points of registration of *B. barbastellus*

Winter: • Ak-Monaiskie–2 Quarries, 23.02.2005, 1 ind., exam.; • Uchundzhu Cave, 09.04.2005, 2 ind., exam.

Hypsugo bat
Hypsugo savii

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. III; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. IV.

The species is very rare for Ukraine. There are only six records known. All of them are from the south coast of the Crimea.

The last record was marked in summer (15/08) of 1990 in Karadagsky Natural Reserve (collection of National Scientific Museum of Natural history, Kyiv).

We registered a species only for one object (Fig. 14).

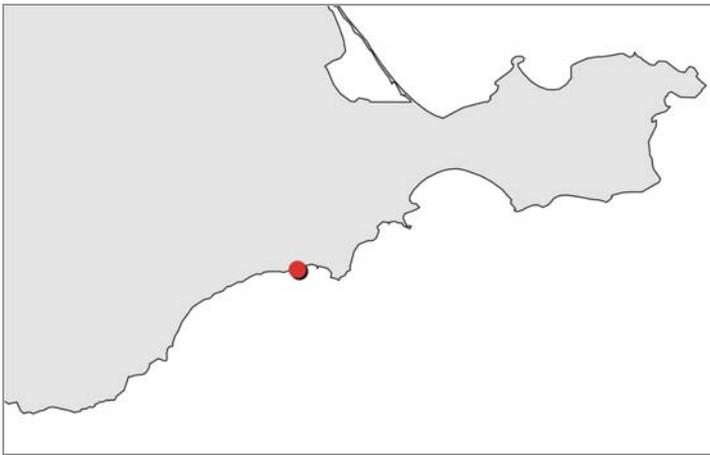


Fig. 15. Points of registration of *H. savii*

Summer: • Skvoznoy Grotto, 22.06.2004, 1 ind. (1m), net.

Common and pygmy pipistrelle bats
Pipistrellus pipistrellus* and *Pipistrellus pygmaeus

A conservation status is defined by: EUROBATS; Bern Convention: App. III; Bonn Convention: App. II; IUCN (2004): LC (had LR/lc cat.); EU Habitat and Species Directive: Ann. IV.

Two cryptic species are known for the Ukrainian territory. Common pipistrelle bat is usual and abundant species distributed throughout the entire territory of Ukraine. Here the species is dendrophile / synanthropic. Distribution and biology of pygmy pipistrelle bat are less known. It seems to have the less number than common pipistrelle and to occur more sporadically. Here we give information on these species together.

The species are numerous throughout the target region.

The species were found (caught) at 4 points, but only once it was mist-netted at a cavity's entrance (*P. pipistrellus*).



Fig. 16. Points of registration of *Pipistrellus pipistrellus* and *P. pygmaeus*

Summer: • Kizil-Kobinka River, 19.06.2004, 1 ind. (1u), net.; • Lis'ya Bukhta Bay, settling tank, 24.06.2004, 1 ind. (1f), net.; • Karadag Natural Reserve, 25.06.2004, 1 (1m), net.; • Karadag Natural Reserve, 26.06.2004, 2 (2u), net.; • Ak-Monaiskie-1 Quarries, 28.06.2004, 2 (2m), net.

Serotine bat
Eptesicus serotinus

A conservation status is defined by: EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/lc; EU Habitat and Species Directive: Ann. IV.

Distributed throughout all the territory of Ukraine; usual and numerous species.

Usual and abundant species.

Found for three underground objects. Few individuals were mist-netted out of caves in two points.



Fig. 17. Points of registration of *E. serotinus*

Summer: • Pond in Beshtekne depression, 17.06.2004, 1 ind. (1m), net.; • Karadag Natural Reserve, 24.06.2004, 1 ind. (1m), net.; • Karadag Natural Reserve, 25.06.2004, 2 ind. (2m), net.; • Ak-Monaiskie–1 Quarries, 28.06.2004, 3 ind. (3m), net.

Winter: • Ak-Monaiskie–1 Quarries, 22.02.2005, 1 ind., exam.; • Petrovskie Quarries, 24.02.2005, 1 ind., exam.; • Karalarskie Quarries, 25.02.2005, 1 ind., exam.

Lesser noctule bat
Nyctalus leisleri

A conservation status is defined by: Red Data Book of Ukraine (1994): Cat. III; EUROBATS; Bern Convention: App. II; Bonn Convention: App. II; IUCN (2004): LR/nt; EU Habitat and Species Directive: Ann. IV.

Sporadically distributed throughout all the territory of Ukraine. Known to be a typical migrating dendrophile.

Rare for the Crimea species, near 10 records are presented only by single specimens. Last registrations were pointed for late winter and spring of 1976 and considered as evidence of wintering of this species in the Crimea (Dulitsky, 1979). Last summer record was marked in 1970 (Konstantinov et al., 1976).

Six individuals were caught with mist-net outside of caves.



Fig. 18. Points of registration of *N. leisleri*

Summer: • Kizil-Kobinka River, 19.06.2004, 6 ind. (2m, 1f, 3f-preg), net.

3.2. Not registered species

From known earlier cave dwelling bats for the region we had not revealed *Miniopterus schreibersii*. Maternity colonies of the species with number of few thousands females were known in the first half of the XXth century. Last record was made in 1947; since then the species had not been registered at all in the Crimea.

As well we couldn't confirm being at the Crimea two more species of horseshoe bats — *Rhinolophus euryale*, *Rhinolophus mehelyi*.

Nyctalus noctula — the species found in caves of the Crimea only one time (Godlevska, 2004) — wasn't found too.

4. A LIST OF IMPORTANT BAT SITES

At the base of received results we composed a list of key bat underground sites for the territory of the target region. Number of species, their conservation status, and number of specimens using a site throughout a year, a presence of maternity colonies were used as criteria for forming a list.

4.1. Mountain and Central Plain Crimea

Bats were found for 17 from 34 examined cavities (Table 3.).

Table 3. Presence of bats in examined underground cavities of Mountain Crimea*

	Name of cavity	Summer census	Species found	Winter census	Species found
1.	Gryphon Cave	no	—	—	—
2.	Skelska Cave	yes (+)	RHIP, RFER, PAUR	yes (+)	RHIP
3.	Beshtekne-1 Cave	no	—	—	—
4.	Beshtekne-2 Cave	no	—	—	—
5.	Beshtekne-3 Cave	no	—	—	—
6.	Geophysical Cave	no	—	—	—
7.	Ai-Petri-1 Cave	no	—	—	—
8.	Novoandreevskie Quar.	—	—	yes (+)	RFER
9.	Turgenevskie Quar.	—	—	no	—
10.	Novoalekseevskie Quar.	—	—	no	—
11.	Trekhlazka Cave	—	—	no	—
12.	Emine-Bait-Khosar Cave	—	—	yes (+)	RFER
13.	Baki Cave	—	—	no	—
14.	Kholodnaya Cave	—	—	no	—
15.	Tsyachegolovaya Cave	—	—	no	—
16.	Gugerdzhin Cave	—	—	yes (+)	MMYS
17.	Uchundzhu Cave	—	—	yes (+)	BBAR
18.	Kizil-Koba Cave	yes (+++)	RHIP, RFER, MEMA, MMYs	yes (+++)	RHIP, RFER, MMYs
19.	Aleshina Voda Cave	yes (+)	RHIP, MNAT, PAUR	yes (+)	RHIP, PAUR
20.	Eni-Sala -1 Cave	—	—	yes (+)	RFER
21.	Zemlyanichnaya Cave	—	—	yes (+)	MBLY
22.	“Sergeya” Cave	no	—	—	—

Table 3. (continuation)

	Name of cavity	Summer census	Species found	Winter census	Species found
23.	Karabi-1 Cave	yes (+)	MEMA, MMYS	—	—
24.	Krubera Cave	yes (+)	RFER, MBLY, MMYS, PAUR	—	—
25.	Karani-Koba Cave	no	—	—	—
26.	Tisovaya Cave	—	—	no	—
27.	Evrika Cave	—	—	no	—
28.	Skvoznyy Grotto	yes (+++)	MBLY, HSAV	—	—
29.	Levinsona-Lessinga Grotto	yes (+++)	RFER, MEMA	—	—
30.	Shaitan-1 Grotto	yes (++)	RFER	—	—
31.	Shaitan-2 Grotto	yes (+++)	MBLY	—	—
32.	Myschinaya Schel Grotto	yes (+++)	MBLY	—	—
33.	Revuschiy Grotto	no	—	—	—
34.	Barakhty Grotto	yes (+++)	RFER	—	—

* Note. Number of individuals: “+” — 1-10 individuals; “++” — 10-100 individuals; “+++” — 100-1000 individuals; “++++” — more than 1000 individuals. Species’ acronyms used: RFER — *R. ferrumequinum*, RHIP — *R. hipposideros*, MBLY — *M. blythii*, MNAT — *M. nattereri*, MEMA — *M. emarginatus*, MMYS — *M. mystacinus*, BBAR — *B. barbastellus*, PAUR — *P. auritus*, PAUS — *P. austriacus*, PPIP — *P. pipistrellus*, HSAV — *H. savii*, ESER — *E. serotinus*.

The next cavities should be named as key sites: Kizil-Koba Cave, Skvoznyy Grotto and complex of coastal grottos of Karadag Natural Reserve. Below there is an annotated list of them (number in gaps corresponds number of a cavity in the list).

Kizil-Koba Cave (№ 18)

In summer of 2004 4 species were found here (*R. ferrumequinum*, *R. hipposideros*, *M. emarginatus* and *M. mystacinus*) with a general number of not less than 212 specimens. The majority is presented by a male only colony of *R. ferrumequinum* (about 200 specimens).

In winter period, during the project census 3 species were revealed — *R. ferrumequinum*, *R. hipposideros* and *M. mystacinus*. (Counting was realized in early April.) The biggest part is presented by *R. ferrumequinum*: during evening departure in April of 2005 year 215 specimens were counted. (As well 43 individuals of lesser horseshoe bat were counted during evening departure; *M. mystacinus* was presented by single specimens.) During winter bat census in 2001–2003 single specimens of *B. barbastellus* had been registered regularly in the cave.

The cave is the second by a number of hibernating *R. ferrumequinum* in Ukraine. At the same time, this winter species aggregation in the cave is an only known one in the Mountain Crimea.

Kizil-Koba Cave had been mentioned in zoological literature as a bat roost since the XIX century [Nordmann, 1840; Кецлер, 1860; Никольский, 1891]. Totally, for all the period of observations in Kizil-koba Cave 9 species had been registered. At least till 1938 the cave was a shelter for many thousands maternity colony of *M. blythii*. In the beginning of XX century in the cave a colony of *M. schreibersii* existed (its number is unknown). In the middle of XX century the cave became a very popular object of speleological tourism. In this period colonies of *M. blythii* and *M. schreibersii* were already absent. Apparently, number of hibernating bats decreased as well.

In 1990 a control over visiting the cave was established after equipping it for organized tourist excursions. Since then, a number of bats had increased. In fact, today the cave represents an only example with some positive dynamics in number of bats for last 20 years (Fig. 19). Although, observed today increasing of bats' number is not significant at a background of a general decline of bats' number for the cave during XX century.

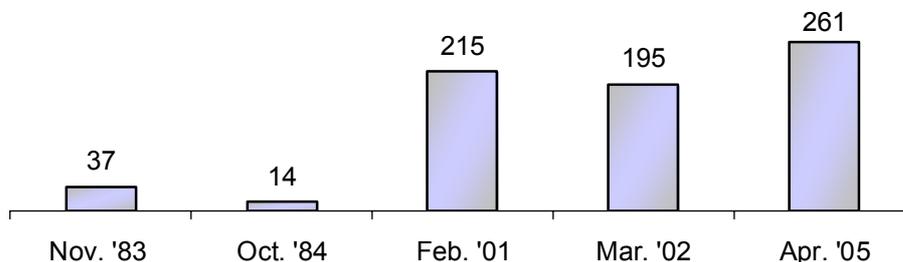


Fig. 19. Changing of number of bats (presented by *R. ferrumequinum* for 90,4%) hibernating in Kizil-Koba Cave for last 20 years (Черемисов, 1986; Черемисов, 1990; recent data)

We think that today a certain balance was established between a potential of the cave for bats and using the cave as a touristical object. However, it seems that recovery of maternity colony of *M. blythii* is not real.

Skvoznoy Grotto (№ 28)

In summer the grotto is a shelter of a maternity colony of *M. blythii* with a general number of about 300 adult females (counted in June 2004). Beside *M. blythii* a single specimen of *H. savii* was trapped inside it. Since 1960-s a number of *M. blythii* colony has decreased significantly (from 4–5000, look chapter 3.1).

In winter the grotto was not checked as, obviously, it is too cold for hibernation of bats in it.

The main threat is a disturbance caused by a big number of tourists as, in fact, it is a final point of excursion pass through "Novyi Svet" botanical reserve. According to our estimation, during July–August period, not less than 1000 tourists visit this site daily.

Complex of coastal grottos of Karadag Natural Reserve (№ 29–34)

Grottoes are shelters for maternity colonies of three species — *R. ferrumequinum*, *M. blythii* and *M. emarginatus*. During summer census of 2004 (24.06), in total, 420 adult specimens of *R. ferrumequinum*, about 500, of *M. blythii* and about 200, of *M. emarginatus*, were counted here.

Maternity colony of the third species — *M. emarginatus* — is the only one known for Ukraine nowadays.

In literature there are mentions about registrations of three more species in coastal grottoes of Karadag — *R. hipposideros*, *M. mystacinus* and *H. savii* (Константинов и др., 1976; Дулицкий, Коваленко, 2003).

In winter grottoes were not checked because of the fact that temperature inside them depends on outside temperature.

The main threat is visiting the grottoes by vacationists.

4.2. The Kerch peninsula

Bats were found for 17 from 23 examined cavities (Table 4.).

Table 4. Presence of bats in examined underground cavities of the Kerch Peninsula*

	Name of cavity	Summer census	Species found	Winter census	Species found
35.	Arabatska fortress's powder (?) cellar	—	—	no	—
36.	Ak-Monayskie–1 Quar.	yes (++)	MBLY, MMYS, PAUS, PPIP, ESER	yes (++)	RFER, MBLY, MMYS, ESER
37.	Ak-Monayskie–2 Quar.**	yes (++++)	MBLY, RFER	yes (++++)	RFER, MBLY, MMYS, BBAR
38.	Ak-Monayskie–3 Quar.	—	—	yes (++)	RFER, MBLY, MMYS, PAUS
39.	Petrovskie Quar.	yes (++++)	RFER, MBLY, MMYS, PAUS	yes (+)	MBLY, PAUS, ESER
40.	Karalarskie Quar.	yes (++++)	RFER, MBLY, MMYS	yes (+++)	RFER, PAUS, ESER
41.	Chistopolskie Quar.	—	—	no	—
42.	Tashkalakskie–1 Quar.	yes (++)	RFER, MBLY	yes (+)	RFER, PAUS
43.	Tashkalakskie–2 Quar.	yes (++)	MBLY	—	—
44.	Quar. to the south from Chokrak Lake	no	—	—	—
45.	Bagerovskie–2 Quar.	—	—	yes (++++)	RFER, MBLY, MMYS
46.	Oktyabr'skie Quar.	—	—	no	—
47.	Bulganakskie–1 Quar.	yes (+)	MMYS	yes (+)	RFER
48.	Bulganakskie–2 Quar.	yes (+++)	RFER, MBLY	yes (++)	RFER, PAUS
49.	Bulganakskie–3 Quar.	yes (+)	MBLY	—	—
50.	Malye Adzhimushkaiskie Quar.	—	—	yes (+++)	RFER, MBLY, MMYS
51.	Tsentral'nye Adzhimushkaiskie Quar.	no	—	yes (++)	RFER
52.	Kerch Fortress	—	—	no	—
53.	(Chelyadinovska) coast artillery battery № 29	yes (+++)	RFER, MBLY	—	—
54.	Zavetninskie Quar.	yes (++)	RFER, MBLY	—	—
55.	Hydrothermal fissures of Opuk	—	—	no	—
56.	Upper Opukskie Quar.	yes (++++)	RFER, MBLY	no	—
57.	Lower Opukskie Quar.	yes (++)	RFER, MBLY	yes (+)	PAUS

* Number of individuals: “+” — 1-10 individuals; “++” — 10-100 individuals; “+++” — 100-1000 individuals; “++++” — more than 1000 individuals. Species' acronyms used: RFER — *R. ferrumequinum*, RHIP — *R. hipposideros*, MBLY — *M. blythii*, MNAT — *M. nattereri*, MEMA — *M. emarginatus*, MMYS — *M. mystacinus*, BBAR — *B. barbastellus*, PAUR — *P. auritus*, PAUS — *P. austriacus*, PPIP — *P. pipistrellus*, HSAV — *H. savii*, ESER — *E. serotinus*.

** Summer results for Ak-Monayskie–2 Quarries are given on observations of June 2005 (look annotation of the site).

The next cavities should be named as key sites: Ak-Monaiskie–2 Quarries, Petrovskie Quarries, Karalarskie Quarries, Bagerovskie–2 Quarries, Adzhimushkaiskie, Malye and Tsentralnye, Quarries, Opukskie Quarries.

Ak-Monaiskie Quarries (№ 36–38)

Note. Here we consider all the complex of Ak-Monaiskie Quarries (–1, –2, –3).

On results of summer census carried out in 2004 the quarries are used by 5 bat species. But, as it was mentioned above, in June 2005 we examined some unchecked in 2004 parts of the quarries and found, beside a big maternity colony of *M. blythii* (about 1000 ad. ind), few tens of *R. ferrumequinum* as well. Thus, a number of bat species amounts to 6. They are *R. ferrumequinum*, *M. blythii*, *M. mystacinus*, *P. austriacus*, *P. pipistrellus*, *E. serotinus*.

In winter Ak-Monaiskie quarries are a shelter for 6 species. In February 2005 1505 specimens of *R. ferrumequinum*, *M. blythii*, *M. mystacinus*, *P. austriacus*, *B. barbastellus* and *E. serotinus* were counted here. Dominant is *M. blythii*: its number — 1454 individuals. For today Ak-Monaiskie Quarries represent a shelter for the biggest hibernation aggregation of *M. blythii* in Ukraine.

Threats are: disturbance and dispersing of bats by local people, vacationists and tourists; besides, during last years orienteering competitions are carried out here; natural destruction of the cavities.

Petrovskie Quarries (№ 39)

Summer census of 2004 revealed that Petrovskie Quarries are a shelter for, at least, 4 bat species (*R. ferrumequinum*, *M. blythii*, *M. mystacinus* and *P. austriacus*). For two of these species big maternity colonies were revealed in the quarries: for *R. ferrumequinum* — two colonies with a number of not less than 800 specimens (including offspring), for *M. blythii* — three colonies/clusters with a general number of 4320 specimens (including offspring). Two other species were represented by single individuals.

In winter 2005 (February) in the quarries single hibernating individuals of 3 species were found (*M. blythii*, *P. austriacus* and *E. serotinus*). A low number of bats in winter is caused by a significant cooling of the quarries in winter.

Threats are: possible visiting and disturbance by local people (children); possible popularity of the systems among "diggers" and tourists in future, possible restoration of the territory for farming, natural destruction of the cavities.

Karalarskie (Bagerovskie–1) Quarries (№ 40)

The quarries are a roost for big maternity colonies of two species. In summer 2004 (29.07) 4250 specimens of *R. ferrumequinum* (including offspring) and 4540 specimens of *M. blythii* (including offspring as well) were counted here. For today, the quarries are completely unique shelters of maternity colonies of these species. In total, it's a biggest bat aggregation known for the territory of Ukraine. According to data available for us the colony of *R. ferrumequinum* is the biggest for all the territory of Europe.

Beside these species, single individuals of *M. mystacinus* were revealed here in summer 2004 and in previous years. In 2002, *P. austriacus* (Godlevskaya, 2003) were found here.

In winter the biggest part of the system is characterized by low temperatures. During winter census (25.02.2005) a big aggregation of *R. ferrumequinum* with a general number of 509 individuals was found hibernating here. Beside it, single specimens of *P. austriacus* and *E. serotinus* were counted here in winter as well. Single specimens of one more species — *M. mystacinus* — were found here during a partial winter examination of the quarries in 2001 (Godlevskaya, 2003). According to all available data, today the quarries are a roost for the biggest winter aggregation of the greater horseshoe bat in Ukraine.

Main threats are: visiting and disturbance of bats by people (although for today the threat seems not to be very significant; but in future it might increase significantly due to general mastering of the territory by man); natural destruction of the quarries.

Bagerovskie– 2 Quarries (№ 45)

In summer the quarries are too cold for bats (+10°C) as there is only one narrow exit remained. Although in 2002 some *R. ferrumequinum* were present immediately near the entrance (Godlevskaya, 2003).

In winter these quarries are a roost for a big enough quantity of 3 species. In February 2005 978 specimens of *M. blythii*, 27 *R. ferrumequinum* and 3 *M. mystacinus* were counted here. According to all available data, Bagerovskie–2 Quarries represent a shelter for the second by quantity winter aggregation of *M. blythii* in Ukraine.

Main threats are: visiting and disturbance of bats by local people and tourists, possible mastering of the cavity for some practical needs in future, possible blockage of the only entrance.

Malye and Tsentralnye Adzhimushkaiskie Quarries (№ 50–51)

In summer, the biggest part of the systems is quite good isolated from outside temperature. Thus, they seem to be too cold for bats in summer (+10+11°C).

In February 2005 in these quarries 330 individuals of 3 species were counted: 172 *R. ferrumequinum*, 127 *M. blythii* and 31 *M. mystacinus*.

Main threats are: disturbance and visiting by "diggers", tourists, speleologists, black archeologists; possible mastering of Malye Adzhimushkaiskie Quarries by man for his practical needs; etc.

Lower and Upper Opukskie Quarries (№ 56–57)

In summer 2004 three species were found in the quarries. One of them — *M. blythii* — is represented here by a maternity colony with a number of about number about 1000 individuals including offspring. Two others were presented by single individuals of *R. ferrumequinum* and *P. austriacus*.

In winter the quarries are too cold for bats' hibernation as they are not deep. In fact, the temperature inside depends greatly on an external temperature. Thus, in February 2005 a single specimen of *P. austriacus* was found in the quarries.

The main threat is visiting the grottoes by local people and tourists.

5. PUBLIC AWARENESS AND EDUCATION

5.1. Web-site

We worked out a new conception and a new structure for our web-site (<http://kazhan.org.ua>), Fig. 19. The main accent is transferred from our activities to bats. Filling of it is partly realized. For today we continue to develop it with new information. An URL of the site is pointed at all printed production. Open line for questions and fast connection is opened.

A summary on the project was placed at http://kazhan.org.ua/eng/projects/pr_krym.htm.

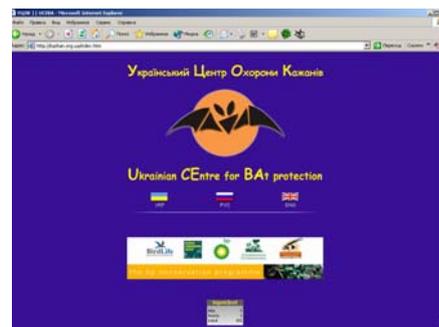


Fig. 19. Front-page of the website

5.2. Printed information

We prepared a colorful pocket calendar (70x90 mm, 1000 copies) for distribution with pretty image of one of the Crimean bat species — *Rhinolophus ferrumequinum* and with an inscription "Bats of the Crimea need protection" (Fig. 20). Calendars are distributed among local public, speleologists, etc. We hope that the calendar had reminded to receivers about bats and necessity of their conservation at least during of one year. (JPG version of the calendar is attached to the report in a separate file Annex1.)



Fig. 20. Front-page of the pocket calendar "Bats of the Crimea need protection"

Also we prepared a colorful booklet under a title "Cave inhabitants of the Crimea need protection" (8 pages A5, 1000 copies, in Russian), Fig. 21. The booklet is distributed among different groups of people which visit or may visit Crimean underground cavities (local children, speleologists, staff of natural reserves, etc). Because of "heterogeneity" of receiving people (both children and adults) we intended to make text easy for understanding.

The booklet includes five text blocks:

- 1) "Some facts" — main facts about bats;
- 2) "Home for bats" — why bats need caves;

3) "Sad history" — information about current state of cave dwelling bats of the Crimea (decreasing of colonies, disappearing of the species);

4) "Protect!" — rules of being in caves for bipedal explorers (what we should remember not to disturb bats in caves);

5) "Protection status of bats" — information about protection status of bats of the region according Red Book of Ukraine, Red List of IUCN, EUROBATs Agreement, Bonn and Bern Conventions.

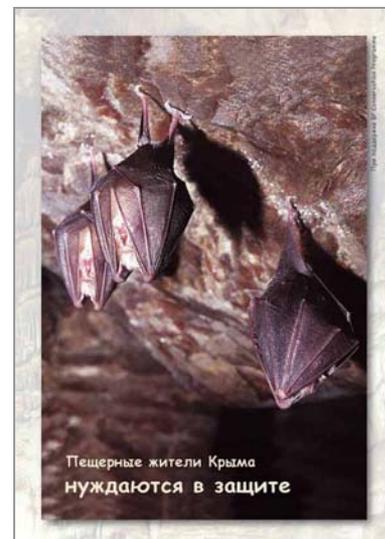


Fig. 21. Front-page of the booklet "Cave inhabitants of the Crimea need protection"

Beside it, address for electronical and paper mail is pointed with proposition to apply with any questions and propositions concerning bats of the Crimea.

The booklet is illustrated with colorful images of bats of the Crimea — totally 11 original photos. (A JPG version of the booklet is attached in a separate file Annex2).

For today, the booklet was received by schoolchildren of few schools of the Kerch peninsula, by speleologists, by local people of the Kerch peninsula, by theriologists of the Crimea, etc. As well full booklet text was hang out at the web site (<http://kazhan.org.ua>) in the "library".

Note. Because we didn't have a specialized "Crimean" booklet for the time of summer field work yet, we distributed a booklet "Be friendly to bats" devoted to bats of Ukraine, which was prepared by Ukrainian CEntre for BAt Protection a year ago.

5.3. Other printed information

An article for the newsletter of the Ukrainian Speleological Association "Svet" was written (Ghazali et al., 2005). It was published in the newsletter's issue of 2005. The title of the article — "Upside-down, or caves for bats". Reading audience of the magazine is presented by speleologists and spelestologists of Ukraine, Russia and some other adjacent to Ukraine countries. Thus, by those who deal and could deal with bats in Crimean caves.

The article is written in popularly style. An aim of article is to pay speleologists' and spelestologists' attention to vulnerability of bats and to point at the tragic decreasing of populations of cave dwelling bats and, in particular, cave dwelling bats of the Crimea.

The article includes three main text blocks ("Bats and man", "Home for bats", "Drama or tragedy?") and two additional ones ("Who they are" and "Protection status of bats").

Full version of the article is attached with file Annex3.

5.4. Public lectures

We prepared and gave a lecture-presentation "Cave dwelling bats of the Crimea: a current status" in borders of 13th Conference of Ukrainian Speleological Association (Ukraine, Poltava, 10-13 March). The conference accepted about 120 participants (both speleologists and speleostologists) from different parts of Ukraine as well from Russia and Moldova (it's possible to say for sure that overwhelming majority of participants visited caves of the Crimea). Printed booklets and calendars were distributed among participants of the Conference as well. The presentation found an active response from the side of speleologists.

6. DISSEMINATION OF RECEIVED RESULTS

6.1. "Special" dissemination

Detailed reports on bat census carried out at the territory of Opuk Natural Reserve and Karadag Natural Reserve in summer were prepared and given to their scientific departments for including data into Natural History Books of these reserves.

A report on results received was presented at the session of the Department of fauna and systematics of vertebrates of Schmalhausen Institute of Zoology of NAS of Ukraine (Kyiv) and at the seminar of young scientists.

Results of the project were included into National Report of Ukraine '2005 for EUROBATS. As well information on the project was presented at 10th meeting of Advisory Committee of EUROBATS in Bratislava, Slovakia (25-28 April. 2005).

Results of the work were presented with a poster "A current state of cave dwelling bat species of the Crimea (Southern Ukraine)" at the 10th European Bat Research Symposium (Ireland, Galway, 22-26 August, 2005). Authors: L. Godlevska, M. Ghazali, T. Postawa, Z. Nagy, Ya. Petrushenko. (PDF version of the poster is attached as a separate file Annex 4.) Participation of Lena Godlevska in the Symposium was supported by BP Alumni grant.

6.2. Application of results for bat conservation

Results of the projects' work were presented with oral presentation at the meeting devoted to conservation of the Crimean biodiversity — the 3rd conference "Reserves of the Crimea: management, biodiversity, ecoeducation" ("Заповідники Крима: заповідне дело, біорізноманітність, екоосвіта"), 22 April of 2005. A proposition about implementation of urgent measures of protection for a row of cavities of the Crimea was approved by participants of the Conference and was included into the Conference resolution.

The results concerning one of the key underground shelters (Karalarskie (Bagerovskie–1) Quarries) were included into the proposal on the creation of Karalarska Steppe National Park applied in 2006 to the Ministry of environmental protection of Ukraine.

Report on determined key bat underground sites were submitted for consideration of the Scientific Advisory Council on Bats at the Ministry of Ministry of environmental protection of Ukraine. After consideration, the council made a decision to include the objects into the list of the key sites of Ukraine. On results an expert conclusion was compiled and sent to the Ministry.

Information letters for administrators (directions of reserves, local authorities, and to others) of all determined key underground sites were prepared and sent with copies to the Republic committee on the environment and natural resources of the Crimea and to the Ministry of environmental protection of Ukraine. Each letter includes a detailed information about general number of bats used the site as a shelter, about importance of the cavity and about protection status of the species. Each letter is attached with a two page instruction concerning responsibility on a site and a list of activities which should be prohibited to save a site and bats in it. The letters are signed by director of Schmalhausen Institute of Zoology and members of the Scientific Advisory Council on Bats.

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