

11th Meeting of the Advisory Committee

City of Luxembourg, Luxembourg, 8 – 10 May 2006

Implementation Mechanism for the Agreement

Memorandum prepared by the Secretariat



Background:

This Memorandum was in its basic parts already presented to the AC10 Meeting in 2005. The Parties reacted positively on the proposal but requested the Secretariat to further elaborate on how such an implementation mechanism could look like and to give more concrete examples for problems that could be solved this way.

The Secretariat is to a continuously increasing extend addressed in cases where the Agreement (in particular Article III) is not fully implemented or even breached. These cases usually concern important roosting or hibernation sites (e.g. caves or buildings) that are intended to be transformed for other purposes or to be destructed. One very good sample case is here attached as Annex 1, although it is from a Non-Party Range State. Other present cases in Parties to EUROBATS concern e.g.:

- a) Transformation of protected caves known as important habitats for bats into touristic caves.
- b) the extension of an existing airport into a forest where the only known maternity colony of *Barbastella barbastellus* (Western barbastelle bat) in a whole federal country is located.
- c) The planned destruction of old basalt mines dating from Roman times for further exploitation that represent one of the largest hibernation sites in that country and is of transboundary importance for several bat species.
- d) Planned construction of a huge windfarm in an important migration flyway for both bats and birds.

In such cases the Secretariat right now can only refer to either the Bern Convention or the EU Commission. Their procedures are rather lengthy and can be painful for the Parties to the Agreement by causing huge administrative work.

The Secretariat is concerned that the Agreement risks to lose credibility in the future if it only can refer to other international bodies when problems arise.

Furthermore it certainly would be more efficient and convenient if the Parties to the Agreement deal themselves with problem cases and ideally solve them, before they are submitted to other international bodies. Therefore the Secretariat would like to initiate the discussion about an own implementation mechanism for the Agreement which could have the following structure:

1. The Meeting of Parties establishes a EUROBATS Implementation Advisory Board (EIAB) composed by an equal number of each administrative and scientific experts (e.g. a total number of six members) that, assisted by the Secretariat, deals with problem cases in the Agreement Area whenever they arise and gives advice as well as recommendations for possible solutions to the government concerned. This should be done in close consultation with that government and other parties involved, e.g. NGOs or governments of neighbouring countries if affected.
2. The Parties to the Agreement commit themselves to follow the recommendations of the EIAB to the highest possible extent.
3. The EIAB has the mandate to forward cases that could not be satisfactorily solved through the procedure outlined above to other appropriate international bodies (Bern Convention, EU Commission).
4. The EIAB regularly reports to all bodies of the Agreement and aims to compile sample cases that could be successfully solved to be used as guidelines for future cases.

For example the Meeting of Parties could establish a special board through the Advisory Committee that would deal with potential cases and give recommendations. Such a board could meet at the occasion of Advisory Committee Meetings or intersessionally if necessary.

The Secretariat seeks advice from the Advisory Committee concerning the potential usefulness and acceptance of such an implementation mechanism. Depending on the outcomes of the discussion, the Secretariat would then draft terms of reference, rules of procedure and a draft resolution on the establishment of an EIAB for the 5th Session of the Meeting of Parties.

The bat fauna of the caves near Havran in Western Turkey and their importance for bat conservation

by Bernd-Ulrich Rudolph, Alois Liegl and Ahmet Karataş

Abstract. This paper describes the bat fauna of a cave system with three caves in a karst area near Havran in Western Turkey. One of these caves harbours approximately 15-20,000 adult bats of eight species, all of them forming nursery colonies. This represents the second largest summer colony of bats in Turkey. The species richness and the colony sizes qualify the site as an *Important Mammal Area* and would qualify it as a Special Area for Conservation, according to the Habitats Directive of the European Union. The area including the most important bat cave will be partly flooded by a dam which is currently being constructed by the State Water Authority.

Kurzfassung. In dieser Arbeit wird die Fledermausfauna eines Höhlensystems mit drei Höhlen in einem kleinen Karstgebiet nahe Havran in der Westtürkei beschrieben. Eine dieser Höhlen beherbergt 15-20.000 Fledermäuse in acht Arten. Alle Arten bilden in dieser Höhle Wochenstubkolonien. Diese stellt das zweitgrößte Fledermaus-Sommervorkommen in der Türkei dar. Der Artenreichtum und die Koloniegößen qualifizieren das Gebiet als ein *Important Mammal Area* und würden es als ein Besonderes Schutzgebiet nach der Fauna-Flora-Habitat-Richtlinie der Europäischen Union qualifizieren. Das Gebiet einschließlich der wichtigsten Fledermaushöhle wird teilweise von einem Staudamm überflutet werden, der gegenwärtig von der Staatlichen Wasserbaubehörde errichtet wird.

Key words. Balıkesir, Havran Caves, Turkey, Middle East, bat detector, roosting site.

Introduction

Cave-dwelling bats play an important role in the Turkish bat fauna, since more than one-third of the country consists of Jurassic rock formations containing thousands of caves. The number of caves is estimated at more than 40,000. Studies of bats in Turkey focus mainly on taxonomic, caryological or distribution issues. In most cases, these studies contain no information about bat abundance, but only numbers of collected specimens. Little is known about the importance of certain roosts from a nature conservation point-of-view. However, the assessment and documentation of the most frequented bat sites is one of the urgent tasks for mammalogists in Turkey, since caves are exploited touristically and are threatened by infrastructure projects all over the country. This paper presents recent observations on bats in the Havran Cave System (İnönü Köyü Mağarası), which is under serious threat due to a dam project.

Site description

The study area is a small karst area extending over approximately 350 ha close to the village of İnönü, about 5 km east of Havran, Balıkesir province, Western Turkey (39°34'N, 27°10'E). A

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750 m long canyon of the Havran River called Gelin Deresi (100 m a.s.l.) at the southern part of the area separates two hills of 380 m and 280 m a.s.l. Since most of the hills and mountains around Havran consists of metamorphic rocks, the karstic area is isolated within the wider surroundings. The main part of the landscape for a radius of 5 km around the canyon is under agricultural use (ca. 40% olive groves, ca. 20% crop fields). Steep slopes and the tops of some hills are covered with scrub (10%). Pine forests (*Pinus brutia*) cover about 25% of this region. A few small villages are the only human settlements.

The Turkish State Water Authority DSİ (Devlet Su İşleri) is currently constructing a 72 m high dam for irrigating agricultural fields and for energy production. The dam is situated at the western end of the canyon. The reservoir will extend for more than 5 km and will cover a water surface of more than 300 ha (DSİ 2005). Currently the foundation of the dam is under construction.

There are three caves in the cliffs and the hill north of the canyon:

1. A large cave ruin (>30 m high and around 20 m deep) in the upper part of a more than 100 m high cliff, located in the west at the end of the canyon. It is situated about 80 m above the river and has a narrow 15–20 m long lateral tunnel.
2. In the lower edge of this cliff, around 60 m and 40 m above the river, there is a cave with two entrances, one small and the other medium-sized (2.5 x 3.5 m). This cave, which descends continuously, is easily accessible for at least 350 m in length and is mostly shaped by a 4–8 m wide and 5–10 m high tunnel. The cave, which was created by a former subterranean river, is differentiated into several sections with higher cavities. The largest forms a huge and impressive hall at least 20 m high and 15 m wide. At the rear of the cave, there is a steeply descending tunnel about 10–15 m high and 5–10 m wide that is separated from the hall by a narrow passage. Several branches with narrow entrances disappear collaterally from the main tunnel, and bats were observed flying through them. The cave is humid and water drips from the upper ceiling. Temperatures in the middle and rear part of the cave climbed to 23°C in July 2005.
3. Another cave is situated around 250 m above the bottom of the canyon, on its northern slope. The entrance area is shaped like a semi-circle, reaching dimensions of some 20 x 8 m and a depth of more than 30 m. From this large entrance hall, many interconnected tunnels and chambers branch off as far as 30 m in length, forming a diverse, structured and cleft cave system. However, it is rather bright and dry. Temperatures at the rear reached about 20°C. We found only one narrow branch in this cave, which was accessible for about 70 m. This part of the cave was relatively humid with temperatures that rose to 17°C. It was the only place where specialised cave arthropods (Diplopoda) were observed. By contrast, the cave fauna of Cave 2 consisted of Diplopoda, Isopoda, Asellidae, Coleoptera, Collembola, Orthoptera and others.

While Caves 1 and 3 will be above the water level of the planned reservoir, Cave 2 will be completely flooded.

Methods

The study area was investigated on May 30 and 31, 2004 by A. KARATAŞ (Caves 1 and 2), from May 2 to 6, 2005 by A. LIEGL and B.-U. RUDOLPH (Caves 1 and 2) and again on July 9 and 10, 2005 by B.-U. RUDOLPH (Caves 1–3). Additional data were provided by C. DIETZ and I. SCHÜNGER, who netted and observed emerging bats at Cave 3 on September 10, 2003.

Bats were observed visually and acoustically in the caves with a bat detector (Pettersson D240x). Single specimens were caught with a butterfly net. In addition to the direct counts inside the caves, the estimates of the population sizes in Cave 2 were made by counting emerging bats: Due to the large number of emerging bats, several counts were made for one minute each, every

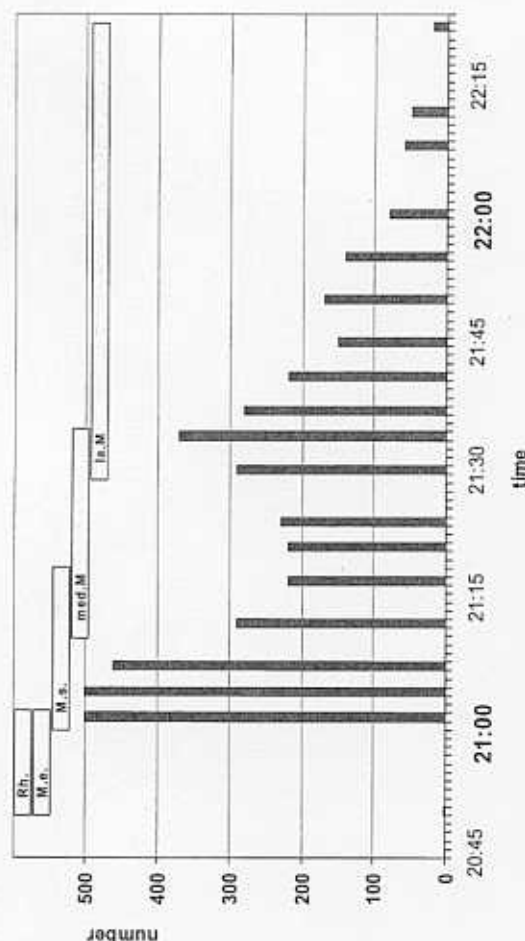


Fig. 1. Phenology of emerging bats at cave no. 2 on 10 July, 2005, according to per minute-counts. Note: the emergence started at 20:50. Between 20:50 and 21:00 around 1,000 bats flew out of the cave. Rh. = Rhinolophidae, M.e. = *Myotis emarginatus*, M.s. = *Minioterus schreibersii*, med.M. = medium-sized *Myotis* (= cf. *Myotis capaccinii*), la.M. = large *Myotis* (= *myotis* & *blythii*).

couple of minutes. This was done on two evenings each in May 2005 and July 2005, until the number of bats declined to only a very few. Per minute-counts of emerging bats based on the field protocol were extrapolated and added (i.e. the numbers of two consecutive counts were averaged, and this average was taken for every minute of the interval). Flying and locating bats were identified using a bat detector (identification to genus and in some cases to species level) and the identification was verified by catching single individuals with a butterfly net.

On May 30, 2005, a mist-net was set up during the emergence of the bats and for most of the time was placed along the lateral wall of the cave entrance. Many bats were caught there. From time to time the net was placed in the cave entrance for just a few seconds to catch certain species. In addition, many emerging specimens were caught using a butterfly net on July 9 and 10, 2005.

Netting was also carried out twice in the reservoir area over the Gelin Deresi between Plane trees for about two hours after dusk in May 2005, and once in the canyon in May 2004. Observations with the bat detector were also made along the river.

Results

In total, 16 bat species were recorded in the study area (Tab. 1–2). Eleven of them are cave-dwelling species, the others (*Pipistrellus* sp., *Hypsugo savii*, *Tadarida teniotis*) normally roost in crevices in buildings and cliffs. Most species were recorded as reproducing.



Fig. 2. The cliff at the western part of the study area with the eye-catching cave ruin (Cave 1). The upper entrance of Cave 2 is visible at the foot of the cliff between bushes.

Cave 1

In the small tunnel, three *Rhinolophus ferrumequinum* were observed in May 2005 and one in July 2005.

Cave 2

This cave harbours colonies of eight or nine species (Tab. 1). Based on the counts of emerging bats, we estimated the number of bats as over 11,000 in May and 17,000 in July 2005. The overwhelming majority were adults, according to several dozen individuals caught. The dominant species were large *Myotis* (mainly *Myotis myotis*, to a lesser extent *M. blythii*) and *Miniopterus schreibersii* (Fig. 1).

The emergence lasted from approximately 20.25 to 21.45 hours at the beginning of May and from 20.50 to 22.30 in July (Eastern European Summer Time). The emergence peaked between 20.45 and 21.15 in May with 180–300 bats (mainly large *Myotis*) flying out per minute. In July, there were two peaks of up to 500 out-flying bats per minute at 21.05 and 21.30, belonging to different species (Fig. 1). According to our observations on silhouettes and the catches of several specimens, the first peak belonged to *Miniopterus schreibersii* and the second to large *Myotis* species. In total, the majority of bats consisted of large *Myotis* (approximately 9,000), followed by *Miniopterus schreibersii* (probably over 5,000) and *Rhinolophidae*. The latter totalled several hundred bats. The numbers of *Myotis capaccinii* remain unclear because only single individuals could be caught. However, at the beginning of the emergence of large *Myotis*, we also observed large numbers of out-flying medium-

Tab. 1: Bats in Cave no. 2 (Havran cave). Observation: number according to direct observations inside the cave; estimation: number based on counts of emerging bats. Threat categories according to IUCN (2004): LR = lower risk, NT = near threatened, VU = vulnerable. Note: the roosting site of the colony of large *Myotis* was not known in May 2005, because we had failed to find the passage to the hindmost parts of the cave.

	IUCN	30/31.5.04	2-6.5.05	2-6.5.05	9/10.7.05	9/10.7.05	Comments
<i>Rhinolophus ferrumequinum</i>	LR/NT	20-30	110	> 110	50	> 50	nursery colony (pregnant ♀ in May 2005, adult and young in July)
<i>Rhinolophus blasii</i>	NT	several	250	> 250	1	many	nursery colony (4 pregnant ♀s netted in May 2005)
<i>Rhinolophus euryale</i>	VU	single	2	several dozens	-	several	nursery colony (1 pregnant ♀, 1 ♂ captured in May 2005, several individuals recognised acoustically in May and July 2005)
<i>Rhinolophus mehelyi</i>	VU	about 100	-	-	-	-	nursery colony (pregnant ♀ in May 2004)
<i>Myotis myotis</i>	LR/NT	colony with several hundreds	4	several thousands	several thousands	several thousands	nursery colony, several dozen pregnant and lactating ♀ caught
<i>Myotis blythii</i>	-	-	-	several	-	several	nursery colony, several lactating ♀ caught in July
<i>Myotis capaccinii</i>	VU	several	-	several dozens to hundreds	-	several hundreds	nursery colony, 1 pregnant ♀ netted in May 2005, 1 ♂ caught in July 2005
<i>Myotis emarginatus</i>	VU	30-40	-	several dozens to hundreds	300	300	nursery colony, ♀ and young
<i>Miniopterus schreibersii</i>	VU	large colony	110	several thousands	> 1000	several thousands	nursery colony, females and young
Bent-winged Bat							

sized *Myotis*, altogether probably several hundred individuals. These bats may have been mainly *capaccinii*, because *M. emarginatus* flew out earlier in the evening.

Besides nursery colonies, the cave also serves as a roost for some male bats. All the males we caught inside the cave were hanging alone. Males of the following species were recorded: *Rhinolophus blasii*, *R. euryale*, *Myotis myotis*, and *Miniopterus schreibersii*.

Each time we visited the cave, we recorded a lower number of species and a remarkably lower number of bats compared to the number of bats flying out. For example, five bat species could be observed in the cave in May 2005 and in July 2005, whereas eight species were observed flying out (Tab. 1). The colony of *Rhinolophus blasii* could not be found in July 2005 (although many individuals emerged), whereas it was easily seen in May 2005, on a ceiling about 150–200 m inside the cave. Although it was certainly permanently present, *Myotis emarginatus* was only recorded in May 2004 and July 2005 around 40 m to the rear of the entrance (under relatively dry and bright conditions, like the preferred roosts of nursery colonies in Germany, see ZAHN & FRIEMEL 2004). The colony of *Rhinolophus euryale*, which is probably small, was never found, and the colony of *R. mehelyi* only in 2004. These observations show that the cave system contains many places where bats can hide and which are inaccessible for us.

Cave 3

DIETZ and SCHUNGER (unpubl. data) mist-netted the following animals in September 2003: *Rhinolophus ferrumequinum* (2 ♀), *R. hipposideros* (1 ♂, 1 ♀, plus several further specimens observed), *R. blasii* (1 ♂), *R. euryale* (3 ♂), *Myotis myotis* (1 ♂, 1 ♀), *M. blythii* (1 ♂), *M. emarginatus* (6 ♀), *M. capaccinii* (9 ♂, 12 ♀), and *Miniopterus schreibersii* (4 ♂). In total, 500–1000 bats flew out of the cave on one evening, most of them being *Rhinolophus* sp.

In July 2005, we observed one adult and one young *Rhinolophus hipposideros* in the front part of the cave, and a small colony of about 30 adult and young *Myotis nattereri* in the longest branch, some 100 m within the cave. Other than in Cave 2, no substantial amount of bat droppings could be seen. Faeces were found only at the roost of Natterer's Bats.

Observations outside the caves

Bat observations outside the caves are summarised in Tab. 2. Six species were observed or caught, of which *Myotis capaccinii* might roost in the caves and *Hypsugo savii* as well as *Tadarida teniotis* might roost in the cliffs above the canyon.

Discussion

Dam projects seem to have the most deleterious influence on Turkey's bat fauna. In recent decades many rivers have been dammed with a total of 555 large dams, many of them in karst areas. A further 221 dams are currently under construction or in the planning stage (DSİ 2005). Most of the dam projects were carried out without prior assessment of their environmental impact on the fauna and flora. One cave near Kuşçu on the Kızılirmak River (Sarıağaç Cave, Kayseri province), with several thousands of bats belonging to five species, was submerged in the water when a reservoir was constructed a few years ago (KARATAŞ, unpubl.).

Tab. 2: Bats observed while hunting in the canyon, and those mist-netted over the Gelin Deresi two kilometres east of the canyon. Observations on 10.9.2003 provided by C. DIETZ and I. SCHUNGER.

	10.9.2003	30./31.5.2004	2.-6.5.2005
<i>Myotis capaccinii</i> Long-fingered Bat	-	ad. ♂ netted	ad. ♂ netted
<i>Hypsugo savii</i> Savi's Bat	ad. ♂ and ♀ netted	ad. ♂ and ♀ netted	ad. ♂ netted
<i>Pipistrellus pipistrellus</i> Common Pipistrelle	-	ad. ♀ netted	ad. ♂, 2 pregnant ♀ netted
<i>Pipistrellus pygmaeus</i> Soprano Pipistrelle	-	-	ad. ♂ netted
<i>Pipistrellus kuhlii</i> Kuhl's Bat	-	-	5-10 individuals hunting
<i>Tadarida teniotis</i> European Free-tailed Bat	several individuals hunting	several individuals hunting	1 individual hunting

In 1984, Turkey joined the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The member states of this convention committed themselves to the strict protection of all Microchiroptera (except for *Pipistrellus pipistrellus*) as well as their habitats, in particular threatened habitats such as caves (see recommendation No. 36 (1992) of the Bern Convention).

The following seven bat species had previously been recorded in the Havran caves (see overview in BENDA & HORÁČEK 1998): *Rhinolophus blasii*, *R. euryale*, *R. ferrumequinum*, *R. mehelyi*, *R. blasii*, *Myotis myotis*, and *Miniopterus schreibersii*. Most authors did not differentiate between the three caves. They are named either Havran Cave, İnönü Köyü Cave or İnboğazı Cave. Only SPITZENBERGER (1971) mentioned Cave 1 and found three *Rhinolophus ferrumequinum* there. The other cave that she visited was probably Cave 3 where she did not observe any bats in March 1973. However, because of the species spectrum and the ease with which bats can be collected there, most publications may refer to Cave 2.

With our estimate of 17,000 bats in July 2005, Cave 2 represents the second biggest known summer roost of bats in Turkey, the biggest one being Koyunbaba Cave in Thrace, where approximately 23,000 bats were recorded on 28 April, 2001 (FURMAN & ÖZGÜL 2004). Our numbers indicate minimum values, due to a probable underestimate of emerging bats in peak situations and because of an unknown number of bats using the small upper cave entrance. Control samples showed that this entrance was mainly used by *Rhinolophidae* and probably also by *Myotis emarginatus* (which roosted near the entrance), but not by *Miniopterus* and large *Myotis*. Taking these uncertainties into account as well as the possibility that some of the 17,000 bats could already have been young bats, we estimate the number of adult bats in Cave 2 to be around 15,000–20,000.

FURMAN & ÖZGÜL (2002, 2004) were the first who assessed the importance of sites (caves) for bat conservation in Turkey. Based on MITCHELL-JONES et al. (2000), they proposed a four-stage classification system combining colony sizes and global threat status of the species. In spring and summer, the four most important sites in a total of 45 underground sites in Northwestern Turkey (without taking Koyunbaba Cave with some 23,000 bats into account) harboured between 3,000 and 4,000 bats, and the richness of species per cave was five to six species at a maximum (FURMAN & ÖZGÜL 2002, 2004). The authors assigned the highest level of conservation importance to all these caves. Compared with these caves, the Havran Cave (no. 2) must also be considered to belong to the highest category of conservation importance. This is justified not only by the high numbers, but also by the threatened status of several species (Tab. 1).

According to the data compilation of underground bat habitats in Europe (MITCHELL-JONES et al. 2005), maternity roosts of over 5,000 bats in the Mediterranean Region should be considered as internationally important. We propose also to consider maternity roosts of over 1,000 bats as nationally important in terms of bat conservation. However, to validate this method of evaluation of bat roosts, more data from other Mediterranean countries should be taken into account.

From a faunistic point of view, some of our observations merit special attention: The colony of *Rhinolophus blasii* is one of three known colonies in Turkey. Although the species is considered fairly abundant in Western and Southern Turkey (ALBAYRAK & AŞAN 1999), BENDA & HORÁČEK (1998) mention only two colonies in Thrace with several hundreds or ca. 300 individuals. The size of the colony of the Havran cave (250 individuals, see Tab. 1) matches these numbers. *Rhinolophus mehelyi* is considered to be rare in Western and Central Turkey (ALBAYRAK & AŞAN 1999), and no colonies were previously known. Nursery colonies of *Rhinolophus euryale*, which is relatively widespread in Turkey have been observed in Thrace, with up to 3,500 animals (FURMAN & ÖZGÜL 2002, 2004). Compared to these numbers, the colony in our study area seems to be less important. *Myotis emarginatus* is known from the western and southern parts of Turkey. Colony sizes usually seem to lie below 100 adults (KARATAŞ & ÖZGÜL 2003, FURMAN & ÖZGÜL 2004). The colony in the Havran Cave therefore represents a relatively large one. *Myotis nattereri* occurs in Turkey in two distinct populations in the western and southern part of the country and in the northeast (BENDA & HORÁČEK 1998). So far, four nursery colonies have been reported, including one in an ancient building and another in the crevices of a cave (BENDA & HORÁČEK 1998, HELVERSEN 1989, KARATAŞ 2000). With less than 50 individuals (including young), the colony sizes of this species are small.

Myotis capaccinii often forms mixed clusters with *Myotis myotis* and *blythii* and also with *Miniopterus schreibersii* (KARATAŞ et al. 2003). This may be the reason why we failed to detect the colony in Cave 2. Compared to observed colony sizes in Turkey, which normally constitute less than 300 individuals, the colony in Havran cave is probably one of the larger ones. The largest colony of *M. capaccinii* in Turkey was observed in Koyunbaba Cave in Thrace in late April 2001 (4,000 individuals, FURMAN & ÖZGÜL 2004).

Since our visits were confined to the time of reproduction, we have no information about the other ecological functions of the caves for bats, e.g. for wintering, swarming or mating. We suggest that mating takes place in the caves, since the mist-netting by DIETZ & SCHUNGER in September 2003 in Cave 3 showed a high proportion of males of several species. Furthermore, on 10 July, 2005, three males of *Myotis myotis* with already enlarged testes were caught in Cave 2, indicating the beginning of the mating season. At least Cave 2 and

also the rear parts of Cave 3 might serve as wintering grounds. Cave 1 does not seem to be important for bats, due to its short length.

Conclusions and recommendations for conservation

As already mentioned, the State Water Works (DSİ) is constructing a dam in the canyon. While Caves 1 and 3 are located above the future water level, Cave 2 will be completely flooded when the dam is realised. In this case, not only the roosts, but also the bat colonies living in the cave will be destroyed, because the cave slopes continuously downhill and most bats roost in the lower sections of the cave.

Except for *Myotis nattereri*, all ten cave-dwelling species are listed in Annex II of the Habitats Directive of the European Union. The cave system would accordingly qualify as a Special Area of Conservation and, if Turkey had joined the EU, the Government would have been obliged to give it legal protection.

1. As a roost for thousands of bats, Cave 2 represents an irreplaceable and vulnerable habitat. Due to the very limited karstic rocks in the wider area, there are apparently no other suitable caves for large numbers of bats within a radius of 30 km. This isolated position could be an explanation for the large aggregation of bats and it could mean that the bats are unable to move to an alternative roost. Other caves in the study area cannot replace the most important Cave 2. The study site can therefore be regarded as an Important Mammal Area (KARATAŞ 2004).

2. The only way to save this internationally important bat population appears to be to stop the dam construction work immediately and to relocate the dam to the start of the canyon. Geological conditions seem to be similar there.

3. The long construction period of the dam project may require a new Environmental Impact Assessment (EIA) which takes particular account of the biodiversity concerns.

4. The area would fulfill the requirements of a NATURA 2000 site under the EU Habitats Directive because of the high number of Annex II species occurring in large numbers.

5. The phenology of bats in the caves (including wintering bats) should be studied to obtain a better understanding of the caves' functions for different species and to gather additional information about population sizes and roosting behaviour. A professional speleological investigation of the cave including precise mapping of all the tunnels, branches and halls is recommended.

6. The main cave also harbours a rich invertebrate cave fauna such as Collembola, Orthoptera, Isopoda, Coleoptera, Diplopoda, and Arachnida. Because of the unique and isolated habitat conditions in caves, this fauna should also be investigated and preserved.

7. The Turkish Government should be encouraged to join the Eurobats Agreement (Agreement on the Conservation of Populations of European Bats) under the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals). This would contribute to a better protection of Turkish bat populations and their habitats.

8. The Havran cave case is probably only one example of an impending destruction of caves in Turkey. To improve knowledge and the protection of important bat colonies, an inventory of all bat colonies in caves (wintering and maternity colonies) should be compiled and permanently updated. The data should be passed on to the relevant authorities to facilitate the implementation of the legal protection of bats in Turkey. A national inventory of under-

ground habitats of high biological value and an assessment of the most endangered sites combined with protection programmes is also recommended by Recommendation No. 36 (1992) of the Bern Convention.

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