

# THE HUMAN FACTOR INFLUENCE ON THE ECOSYSTEM OF BATS

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**ABSTRACT:** European bat populations declined drastically in recent decades due to the reduction of natural habitats, excessive use of insecticides and disturbance of hibernation and breeding sites. Bats use as shelter caves, hollow trees, rock crevices and abandoned bridges. Romania with over 13,000 caves is a refuge for bats population center of Southeastern Europe. Bats of Romania belonging to two families of suborder Microchiroptera.

In Sura Mare Cave - Ohaba Ponor is the largest colony of lily but the Romania, in total over 6 0000 bat. Among them was identified and *Pipistrellus pipistrellus* - the lowest copy bat in Europe.

**KEY WORDS:** ecosystem, bats, hibernation, *Pipistrellus pipistrellus*, Sura Mare.

## 1. INTRODUCTION

Bats are the only representatives of the order of mammals capable of active flight. Member rear wing turned in by elongation and union forearm bones and phalanges and metacarpals elongation supporting a thin membrane of skin richly vascularized and high capacity for regeneration. With nightlife, they have access to basic trophic untapped by other animals.

Some bats (all species and two species Microchiroptere subordinated subordinated Macrochiroptere) using ultrasound to move through overnight flight, they "saw" ears. Given these characteristics, it is easy to understand why a bat has a large number of species (about 980 species belonging to 17 families and two subordinates) and how almost all inhabited continents, with species living and above the Arctic Circle north.

Bats have specialized in many kinds of food for insects, fruit, pollen, fish, frogs, blood. Those in Europe are exclusively insectivorous, numbering 30 species belonging to three families, of which 28 are found in our country. All species in Europe due to the position of the continent are forced to hibernate or migrate long distances. This behavior adaptation to unfavorable period is characteristic only of the temperate zone species, those from Ropice nohibernation.

## 2. THE BATS IN ROMANIA

Bats of Romania belonging to two families of suborder Microchiroptere:

➤ Family Rhinolophidae, horseshoe bats have fleshy growths in the nose, with a role in directing the ultrasound beam emitted through the nostrils. During rest the wings wrap. In Romania this family is represented by five species.

➤ Family espertilionidae is the bat without nasal growths, flat nose. The ears tragus and spur. In Romania this family includes 23 species.

### 2.1. Classification

#### 1. The nasal growths are wrapped in wings

- *Rhinolophus hipposideros*: 37-42 mm;
- *Rhinolophus Euryale* 43 to 51 mm;
- *Rhinolophus ferrumequinum* 53-61 mm;
- *Rhinolophus Blasii* 42-49 mm;
- *Rhinolophus mehelyi* 50 to 55 mm.

#### 2. Tragus different forms. It is not gradually narrow:

- Top silver hairs on the back, neck fur off white
- *Vespertilio murinus*: 40-47 mm
- It has epiblema, almost gray fur
- *Miniopterus schreibersii*: 45-48 mm
- Coat evenly colored, mushroom-shaped tragus
- *Nyctalus leisleri*: 39-46 mm
- *Nyctalus noctula*: 48-58 mm
- *Nyctalus lasiopterus*: 63-69 mm
- Last vertebra is not included in uropatagium
- *Hypsugo SAVI*: 30-38 mm
- *Eptesicus nilsonii*: 38-43 mm
- *Eptesicus serotinus*: 48-58 mm
- Forearm length below 38 mm - distinguish species by dentition

- *Pipistrellus pipistrellus* 28-34 mm
- *Pipistrellus nathusii* 32-37 mm
- *Pipistrellus kuhlii*: 31-36 mm

#### 3. Ears connected by a skin membrane

- *Plecotus auritus*: 37-42 mm; Falanga deg Eulia one over 6 mm
- *Plecotus austriacus*: 37-45 mm Phalanx one finger less than 6 mm
- *Barbastella barbastellus*: 36-44 mm, almost black coat

#### 4. Tragus gradually narrowed:

*4.1. Ear longer than mid forearm* - Myotis bechsteinii tis: a ntebraul 39-47 mm

*4.2. Ear shorter than mid-forearm:*

a) Forearm length 50 mm:

- Ear longer than 26 mm: Myotis myotis - 56-68 mm

- Ear shorter than 26 mm: Myotis blythii- 50-62 mm

b) Forearm length less than 50 mm:

➤ The lug reaches two thirds of the uropatagi:

- Plagiopatagiul mid-sole inserts-Myotis Daubenton: 33-41mm

- Plagiopatagiul inserts on the shin-Myotis capaccinii: 38-44 mm

- Plagiopatagiul inserts on the heel: Myotis dasycneme: 43-50 mm

➤ Spur not reaching 3.2 in uropatagi:

Ear nose pushed to exceed 1/10 of its length; The two species are differentiated on the basis of dentition:

- Myotis mystacinus: 30-37 mm

- Myotis brandtii: 31-39 mm

Ear nose pushed to exceed 1/4 of its length:

Scarlet coat, ear has a right angle incision epopea:

- Myotis emarginatus: 36-42 m

Uropatagiului edge hairs present in the form of hooks:

- Myotis Natterer: 36-43 mm.

## **2.2. Some habitats of bats Pipistrellus, Hypsugo, Plecotus, Barbastella, Miniopterus**

**Genus Pipistrellus-** about 50 species worldwide, 4 European species have small ears and short, small tragus rounded spur with epiblema, back and belly fur the same color and wing relatively narrow, only one of the four species are found in caves.

### **2.2.1. Bat (Pipistrellus pipistrellus)**

Bat dwarf is the smallest European species of bat, the body length of 36-51 mm and 28-34 mm forearm. Plagiopatagiului edge sometimes has a colored band. Spur reaches 3.1 to uropatagi with epiblema well developed, and two of maxilla incisor tip does not reach the height of the side of one incisor, first premolar partially visible from the outside. It is a common species throughout Europe. Used as shelter structures cracks buildings, rocks, hollows. Wintering colonies are large, copies, often forming the bridges churches, being a species that has adapted to urban life in a very efficient way. A colony of 60,000 individuals described in Sura Mare Cave.

Cave Sura March is known as the Ohaba-Ponor is located in the western mountains Sureanu, on the river meadow Ponor. The cave is located in the village Ohaba-Ponor village chicken in Hunedoara County. The length of the cave is about 4500 meters, the entrance is through a large portal (37 meters high and 12 m wide), the main gallery of 2-3 m width and 30 m height is crossed by the river Ohaba, forming a series of waterfalls and a lake inside. Along the way there are several large rooms of which the largest is 45 m long, 35 m wide and 30 m high. Also on the way visitors can meet a range of 4-5 meters tall stalagmites and collapse blocks.

In Sura Mare Cave is the largest bat colony in Romania, numbering over 60,000 bats. Among them was identified and Pipistrellus pipistrellus - the lowest copy bat in Europe. Colony of bats is interesting in that hibernating during the winter. The landfills results from these bats develop many insects, crustaceans and butterflies. Sura Mare is hardly accessible cave being explored for the first time in 1929.

### **Genus Hypsugo**

New genus, species belonging to the get null Pipistrellus but based on morphological characters was placed in a new genus.

### **2.2.2. Savi's bat (Hypsugo SAVI)**

Savi's bat small species, body length of 40-54 mm, 30-38 mm of forearm. Tragus short end rounded and tilted inside the ear. Coat back yellowish brown or brown-brown, belly whitish gray or yellowish-white. Ears and nose black-brown fur contrasts the conspiracy, spur with your epiblema Ingush, last vertebrae are not included in uropatagi. Two of the maxilla incisor tip does not reach the secondary peak height of one incisor, first premolar is not visible from the outside or missing.

### **Genus Plecotus**

7 species worldwide of which three are found in Europe, two in Romania. Have ears more than 30 mm long at the base joined by a membrane of skin, without epiblema spur can emit ultrasound and nose. It is rarely found in caves are forest species, hide in the crevices of the rocks, hollows of trees, cracks in the walls.

### **2.2.3. Brown long-eared bat (Plecotus auritus)**

Sized brown long-eared bat, body length of 42-53 mm, 37-42 mm and forearm of the ear of 31-41 mm, spur reach about half uropatagi, one wing of the phalanx finger longer than 6 mm, penis thins the end, brownish gray back, yellow belly light gray shades. Rare species is found mainly in hollows of trees or buildings in the mountains, often in caves.

### **2.2.4. Gray long-eared bat (Plecotus austriacus)**

Bat-eared gray midsize but bigger than the previous species, the body length of 41-58 mm, forearm of 37 to 44.5 mm, 31-41 mm ear, May 1st phalanx finger shorter than 6mm penis expands to end behind gray tinged with brown minimal, light gray belly. Species widespread as the previous one being in the abandoned bridges and hollows in the hills, often in caves.

### **Genus Barbastella**

2 species in the world, one in Europe and in Romania:

### **2.2.5. Bat Meat (Barbastella barbastellus)**

Bat meat medium size, body length of 45-58 mm, the forearm of 36.5 to 43.5 mm, flattened nose, ears Overgrown based, tragus long and sharp triangular peak, almost black coat with shades of gray and brown spur up to half uropatagi has a barely sketched epiblema, long and narrow wings. Rare species endangered throughout Europe, is found in old forests in hollows, caves in winter and fish in rock crevices.

### **The genus Miniopterus**

Includes at least 19 species of which one in Europe and in Romania:

### **2.2.6 Winged bat (Miniopterus schreibersii)**

Bat wings medium size, body length of 50-62 mm, the forearm of 45.4 to 48 mm, short muzzle, domed skull, short ears, triangular outline does not protrude from the head, short tags bent inwards tip rounded, brownish gray fur back or gray, lighter gray belly, spur up to a third or half the maximum the uropatagi, no edible. Endangered species worldwide, sometime colonies over ten thousand individuals, today their number has decreased drastically in Romania there is a breeding population of about 20000 thousand individuals exclusively cave species migrate long distances up to hundreds of kilometers.

### **3. THE BAT SPECIES THREATENED BY HUMAN FACTOR IN ROSIA MONTANA**

A group of specialists of the Romanian Association for the Protection Bats (RBPA) conducted a field research in the Rosia Montana mining galleries (9 to 11 September 2003), identifying new species of bats. These bats were netted Special, identified, weighed and released.

Underground systems dimension of Rosia Montana and their surroundings provide proper shelter for a large number of bats. These data will be completed after a more extensive research in winter when dormant groups will be identified.

We believe that mining galleries are especially important as winter shelters many endangered species of bats that inhabit the caves. The lack of natural cavities in the region makes these galleries mining to be a unique shelter for bats.

All bat species are protected under the Berne Convention (ratified by Romania by Law 13/1993), the Bonn Convention (ratified by Romania by Law 13/1998) and according to the Understanding on the Conservation of Populations of Bats (London, 1991), adopted by Law 90/2000. Law 462 of 18 July 2001 approved the Government Emergency Ordinance no.236 / 2000 on the regime of protected natural areas, conservation of natural habitats, wild flora and fauna. This law transposed into national legislation the provisions of the European Directives 92/43 / EEC and Directive 79/409 / EEC. According to these provisions, 13 bat species need protection and designation of Special Protection Areas. Up to the moment two of these species have been identified in the project impact area (Myotisotis, Mlythii) According to the International Union for Conservation of Nature, of the other six species (LR:lc) are low-risk categories and one is less threatened (LR:nt).

After further investigation it is hoped to appoint reus EASC in the Special Protection Areas threatened species in the region.

### **4. USES UNDERGROUND SITES**

Before starting to use buildings, bats used two kinds of shelters: hollow trees and caves, including cracks in the rocks. While the shelter of trees have a short life, probably shorter than the longevity of most bats, caves provide shelter permanently, which can be used by

several generations of bats. This difference in the duration of availability is reflected in how bats use roosts, even if today were accustomed to use the buildings. Arboreal species (eg., *Nyctalus noctula*) tend to go for short periods of time between multiple shelters, while cave species (eg., *Rhinolofidele*) tend to stick to the same sites, all their lives.

Surrounding vegetation and topography are also very important as coverage requirement bat neighborhood access site. Non-dynamic systems without air movements tend to be too hot to sleep, but can be used as temporary shelters, summer.

### **5. FAULTS EXCESSIVE**

Although bats can tolerate a small degree of disruption during maternal colonies and the organization of hibernation and at least apparently were accustomed to human activity with loud noises, however, excessive disturbance causes them to abandon the site or may be due to increased mortality. Complex karsts systems in some colonies of hibernation and reproduction can coexist with cave explorers who care for vulnerable bat and take care not to disturb them. However, in many other sites, bats were seriously disturbed, therefore, some important refuges were abandoned. Increasing the use of a growing number of sites with activities leisure centers in nature, celebrations and group adventure tour is irregular because of concerns that members of such parties to understand less human impact on these sites and on their fauna than members clubs specialists. One problem is the frequency of visits; recreation centers generally operate during the week, so visit sites of relatively large groups of inexperienced people can be frequent.

Some sites are easily accessible and to enter them need training or equipment. Here disturbance the occasional curious tourists can become a problem by vandalism, lighting with torches, abandonment of toxic waste or even deliberate killing bats.

### **6. LEGAL PROTECTION**

Every country in Europe, bats enjoy a degree of protection, although the details of this protection and support of the legislation is variable.

In the European Union, both bats and their breeding and resting places are protected by Council Directive 92/43 / EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. All bat species are listed in Annex IV species Plants and Animals of Community Interest in need of Strict Preservation. Other bat species are listed in Appendix II, and it requires Special Areas of Conservation. Member States are required to implement these requirements in their national legislation consenting to the Directive.

Many European countries are signatories of the Berne Convention, which requires strict protection measures for the species in Appendix II. This includes all bats, except *Pipistrellus pipistrellus* (sensu lato),

which is passed Anexa III. Details can be found on the website of the Berne Convention.

Those countries that are members of the Convention on the Conservation of Populations of European Bats (UNEP / EUROBATS) assumed specific obligations for the protection of bats and their habitats. This included the recognition that the protection of important sites and groundwater monitoring are essential for the protection of bats.

Most members of EUROBATS also joined the Bonn Convention (UNEP / CMS). This Convention Appendix II includes all species of bats are indicating that migratory species that may be subject to the Convention.

Many bat species are on the IUCN red list's because their precarious conservation status. Although red-lists assume no legal requirements for the protection, they are used by many countries as a criterion when deciding which species to be protected.

## 7. CODE OF CONSERVATION

An important step in developing relations with other visitors is to establish a conservation code that includes the reasons why bats need protection and how to behave underground site visitors. It is also important to respect other specialists bats protected interests, such as rocks, sediments, limestone formations and historical artifacts of me and other artificial sites. An instance of conservation code based on that used in England is shown on page 12 It can be adapted to local conditions, but most of the main elements on connection with bats should be preserved.

## 8. SAMPLE CODE FOR BAT CONSERVATION

Caves and mines, their formations, artifacts and fauna, all are part of our national heritage. All underground site visitors will have to act to preserve these sites for current and future generations.

Always follow safety codes and conservation organizations published by cavers and mining history and contact with local groups on access and safety requirements.

Also remember that bats need your help to survive the winter. Most bats hibernate are hard to see because refuge in the cracks of rocks. Just because you can not see, does not mean they are not there!

Those who visit the famous sites of Lile, recreational purposes, are required to observe a voluntary code of conservation and respect any special restriction that is placed on a special importance for bats sites. Because disturbance can be dangerous, study bats in underground sites may only properly trained and authorized persons. Such permits are issued to control, baseline study done with care, occasional monitoring and scientific research.

Contact with bats:

➤Do not touch or handle bats (except specialists and then only when extremely necessary). Take care of bats displaced from their housing, especially when you move the lower galleries.

➤Do not use shelters bats. The flash can be very damaging.

➤Do not heat hibernating bats. I can wake up. Try not to stand under them or in a close, for even heat your body is enough to arouse.

➤Do not point bright lights on bats. Both light and heat can awaken.

➤The bat houses do not use carbide lamps or other open flames. Carbide lamps are harmful because of the heat and fumes.

➤Do not smoke or make excessive noise in underground shelters. Any strong stimulus, including cosmetic odors countries can arouse bats.

➤Do not go in large groups, in winter, bat roosts. Violent practices will be avoided when bats are present.

➤Not light torches at the entrances to underground sites for bats can wake smoke.

➤Have an opinion before blasting or excavation. Explosive substances can cause problems, so by blasting itself and the smoke arising. The sites known to have bats, flares required will be limited to the period when bats are not present or in areas where bats are known to exist. Digging operations may damage the micro bat roosts.

## 9. WIND TURBINES AFFECT BATS

For nearly a decade, researchers advertise on victims farms products worldwide.

A new study recently released, advertise the higher number of dead bats around turbines than birds.

Erin Baerwald, an ecologist at the University of Calgary, Canada, studied 75 specimens, found dead near a wind farm in Alberta, Canada. Bats study showed no external injuries that would have been produced by the turbine, like birds found dead in the wind farms. Sixty-nine of the seventy-five dissects bats showed internal bleeding. The official diagnosis team led by Erin Baerwald was barotraumas, a condition caused by a decrease in ambient pressure.

Wind turbines produce a drop in air pressure, especially around their blades, and thus approaching bats less than a meter from the blades undergo a lung injury, which causes their death. The birds do not suffer such accidents because their lungs are more rigid and more resistant to lower air pressure.

## 10. CONCLUSIONS

➤ In the last half century has been consistently observed that both the number of bats, their habitats and feeding areas quality suffered considerable damage serious. They have surpassed alarm and protection of non-involvement in their immediate future will bring extinction accept mammals considered until recently the many in Europe and the world.

➤Bat protection is needed not only in wildlife and biodiversity protection the enofond have, a true national treasure, but for maintaining ecological balance without which we risk caused during real disasters, some track irreversible and can endanger the very existence Our.

➤ How bats food reported as 1.5 hours a Pipistrellus pipistrellus consume 71 Diptera and wasps, and a serotinus Eptesicus 36 beetles.

➤ The only vertebrate insects that feed on bats and night Caprimulgus bird.

➤ Climate change may also lead to elimination of known bat colonies as if Cave Tismana that once flowed a river. Works hydropower system Motru-Tismana Cerna led to interception river cave by gallery manufacturers. This has led to changes climate regime provides up when the temperature balance of the river also was modified and the degree high humidity so necessary for bats preventing perspiration during hibernation.

➤ Each year in October, the European countries are celebrating "European Night of the Bat" event which aims to draw public attention to the disastrous situation in which continued where there are these little animals.

➤ European Bat Night is organized in all European countries signed the Convention on the protection of bats. These include Germany, France, Belgium, Italy, Switzerland and Hungary. Romania signed the act in 1999, the more because in our country there are the largest colonies of bats in Europe.

➤ Measure much needed protection Obie bats tested station will continue this work in the future. When implementing protective masurio hopefully will have a major role Romanian Federation Chiropterologie whose purpose is the protection of bats. In this regard we that all those who feel involved in environmental protection,

the caves and the bats directly join Federation, both individually and through clubs and associations they belong.

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