

Bats of Poland

By Bronisław W. Wołoszyn,

1. Introduction

The territory of Poland provides a wide range of habitats for its bat fauna. Poland appears to form an important link between the bat population in north-eastern and western and southern Europe. Some species reach the northern or north-eastern limits of their geographical distribution within the country, thus research of Poland's bat fauna is of interest from a geographical stand point.

For many years only a small number of biologists were interested in bats. In the 1980ies more scientists and amateurs started working on bats. In 1987 a major initiative was taken with the founding of the Chiropterological Information Center (CIC) Polish Academy of Sciences in Kraków.

Apart of the CIC there are in Poland several local amateurs organisations (amateur groups) working on bats.

1996 was an exceptional year for Polish chiropterology. In this year Poland became Party-State of the Agreement on the Conservation of Populations of European Bats (EUROBATS Agreement). It doesn't change the legal situation as far as the bat protection is concerned because the animals has been strictly protected in Poland since 1952, but it constitutes basis for the extensive international co-operation. The development of the chiropterological research and active actions undertaken to protect bats were appreciated by the international community. As good examples of such co-operation four international conferences were organised in Kraków: the First International Conference on the Carpathian Bats (1st ICCB, 7-8 Dec 1996), the Second Meeting of the Advisory Committee of the EUROBATS Agreement (28-29 Jan 1997), both organised by Chiropterological Information Center in co-operation with the Ministry of Nature Protection and Polish Academy of Sciences, the VIIth European Bat Research Symposium (23 – 27 Aug 1999), and the 13th International Bat Research Conference (Mikołajki, 23-27 August 2004, Poland), organised by Museum and Institute of Zoology Polish Akademy of Sciences.

2. Bat species.

Of the three families of bats known for Europe, two extend into Poland. Bats form a quarter of the Poland's mammalian fauna. The occurrence of 22 species of bats has been confirmed in the Polish territory so far (for complete list see Polish National Reports, available on the EUROBATS website). There are 2 horseshoe bat species, the greater and the lesser horseshoe bats (*Rhinolophus ferrumequinum* and *Rhinolophus hipposideros*), along with 20 species of vespertilionid bat. The presence of the midge pipistrelle bat (*Pipistrellus pygmaeus*) was confirmed (GAS & POSTAWA 2001, RACHWALD & SKUDLAREK 2001, WOŁOSZYN 2001). The occurrence of *Plecotus alpinus* on Polish territory needs confirmation.

Of the 22 species, eight (*Rhinolophus ferrumequinum*, *Rh. hipposideros*, *Myotis bechsteinii*, *M. emerginatus*, *M. dasycneme*, *Vespertilio murinus*, *Eptesicus nilssonii* and *Nyctalus leisleri*) were listed in the new edition of the Polish Red Data Book of Animals (Vertebrates) (Wołoszyn, in: Głowaciński *et al.* 2001).

Table 1

List of bat species of Poland

Acronyms	Species	Latin name of species
Family: Horseshoe bats (<i>Rhinolophidae</i>)		
RHH	lesser horseshoe bat	<i>Rhinolophus hipposideros</i> (BECHSTEIN, 1800)
RHF	greater horseshoe bat	<i>Rhinolophus ferrumequinum</i> (SCHREBER, 1774)
Family: Common bats (<i>Vespertilionidae</i>)		
MYM	mouse-eared bat	<i>Myotis myotis</i> (BORKHAUSEN, 1797)
MBE	Bechstein's bat	<i>Myotis bechsteinii</i> (KUHHL, 1817)
MYN	Natterer's bat	<i>Myotis nattereri</i> (KUHHL, 1817)
MEM	Geoffroy's bat	<i>Myotis emerginatus</i> (GEOFFROY, 1806)
MYS	whiskered bat	<i>Myotis mystacinus</i> (KUHHL, 1817)
MYB	Brand's bat	<i>Myotis brandtii</i> (EVERSMANN, 1845)
MDS	pond bat	<i>Myotis dasycneme</i> (BOIE, 1825)
MDA	Daubenton's bat	<i>Myotis daubentonii</i> (KUHHL, 1819)
VMU	parti-colored bat	<i>Vespertilio murinus</i> LINNAEUS, 1758
ENI	northern bat	<i>Eptesicus nilssonii</i> (KEYSERLING et BLASIUS, 1839)
ESE	serotine bat	<i>Eptesicus serotinus</i> (SCHREBER, 1774)
PIP	common pipistrelle	<i>Pipistrellus pipistrellus</i> (SCHREBER, 1774)
PPY	midge pipistrelle bat	<i>Pipistrellus pygmaeus</i> (Leach, 1825)
PIN	Nathusius' pipistrelle	<i>Pipistrellus nathusii</i> (KEYSERLING et BLASIUS, 1839)

NLA	giant noctule	<i>Nyctalus lasiopterus</i> (SCHREBER, 1780)
NYN	common noctule	<i>Nyctalus noctula</i> (SCHREBER, 1774)
NYL	lesser noctule	<i>Nyctalus leisleri</i> (KUHLMANN, 1818)
PAR	common long-eared bat	<i>Plecotus auritus</i> (LINNAEUS, 1758)
PAS	grey long-eared bat	<i>Plecotus austriacus</i> (FISCHER, 1829)
BAR	barbastelle	<i>Barbastella barbastellus</i> (SCHREBER, 1774)

3. Protection of Bats

During the last 50 years the number of most bat species has seriously decreased in the Holarctic temperate zone. This phenomenon was mainly caused by the influence of pesticides and changes of environment as the results of man activity and by purposeful and unintentional extermination by man.

3.1. Historical background

Discussions about the conservation of bats started at the end of the 18th century. In Europe, the first legal protection of bats was put into force in Germany. On 21 May 1798 a law was passed in Hesse-Cassel for protection of insect eating birds and bats (Hinkel & Matz, 1998). In 1868, a draft law which included the conservation of bats was promulgated in Galicia (Poland) but was never put into force. Legal protection of bats was put into force also in the Netherlands in 1880 (Lina, 1986). At present bats are legally protected in most European countries. There are also some international conventions and agreements in which the conservation of bats is included. Governments are also primarily responsible for the implementation of these legislations but their initiatives on bat conservation are still leaving much to desire. At present, most bat conservation actions in Europe are initiated by NGOs.

3.2. Legislation in Poland

In Poland bats have been legally protected since 1952. Now all bat species are under the protection of the Decree of the Minister of the Environment concerning the species protection of animals as signed on 26.09.2001. This implements provisions of the Nature Conservation Act passed on 16.10.1991, with subsequent amendments (main text and texts of amendments are available in the *Dziennik Ustaw* Official Journal of Laws – see: *Dz. U.* 1991 No 114 item 492, *Dz. U.* 2001 No 99 item 1079, *Dz. U.* 2001 No 100 item 1085, and *Dz. U.* 2001 No 145 item 1623).

The Decree of the Minister of the Environment concerning the species protection of animals prohibits:

- The intentional killing, injuring, catching, possessing or keeping of live bats, as well as the possession of dead bats or parts thereof;
- The frightening, disturbing, photographing, filming and observing of bats from a distance where this causes disturbance during hibernation, breeding or the birth of offspring, without permission from the Governor of the Province (Voivod);
- The intentional destruction of bat habitats;
- The stuffing of dead bats (whole or parts) and the keeping of stuffed bats or their parts without permission from the Governor of the Province;
- The moving of bats from the places where they occur naturally to other places (as well the release to nature of bats that were born and brought up in the captivity);
- The purchasing, offer for sale, exchange, giving as a present, import or export of bats, either alive or dead, including entire stuffed specimens, their parts or derivatives.

In accordance with the same Decree, the aforementioned prohibitions do not apply to:

- The photographing or filming of bats in buildings and in places accessible to the public;
- The catching of stray bats in housing areas by an authorised person or institution, and their subsequent removal to places of regular occurrence;
- The catching of injured or weak bats in order to give them veterinary help or their delivery to a rehabilitation centre;
- Actions taken within the confines of rational human management, especially that concerning agriculture, forestry and fisheries.

4. Monitoring of bat population

The earliest quantitative data about the population of bats in Poland come from the middle of the 19th century. Taczanowski, the eminent zoologist of that time, reported (1854) about a huge summer colony of Large mouse-eared bats in the Bat Cave near Kraków: " Six years ago Count Wodzicki...found enormous mass of bats fixed to the ceiling (of the cave). In order to find out how difficult they were to frighten he fired three shots in one direction... As a result three baskets were filled with dead bats". Taczanowski, a prominent polish naturalist of the 19th century, concluded this story appealing to the visitors to the cave for "not killing these innocent animals without an apparent reason". It was perhaps the first vote in Poland on bat protection.

The first reliable, quantitative data concerning the bat populations in Poland come from the 1950s and was published by prominent Polish chiropterologist Kazimierz Kowalski. Since that time the populations of bats hibernating in caves and cave-like shelters have undergone considerable fluctuation, and as a result of anthropogenic factors their numbers diminished drastically in the next decades. Since the second half of the 1980s, when the use of many harmful substances was stopped, we could observe a slow increase of bat populations.

Since 1988 every year national wide bat censuses have been organised in Poland. "Winter Bat Census" (DSN) is the name which the whole action received. Its organisation undertook the Chiropterological Information Center, operating at the Institute of Animal Systematics and Evolution Polish Academy of Sciences in Kraków. At the start of the Winter Bat Census in 1988 this was the first action of this type in Poland and one of a few in the World.

The DSN had at least two goals: The first aim was to assess the condition of the bat populations and if possible study the tendencies in their changes. The second purpose of the action was to gather as accurate data as possible about the places of bat shelters.

Since 1997 the monitoring was organised by the Chiropterological Information Centre PAS and also by regional centres, mainly by non-governmental organisations and Universities.

4.1. Winter shelters identified as important for the conservation of bats.

In Poland there are only four known winter shelters where more than a thousand hibernating bats have been observed. There are another 19 localities where the number of wintering bats ranges from 201 to 1,000 individuals, 33 where numbers of bats range from 101 to 200 and 63 with numbers between 50 and 100 hibernating animals (see Polish National Report 2001, available on the EUROBATS website). There are also some other winter shelters with smaller number of animals, but identified as important to the conservation of bats in Poland – for instance on account of the presence of rare species.

The identification and proper protection of winter bat shelters needs greater efforts at national level. Some new projects in this field have already been initiated in Poland (mostly by local groups), but they need some legislative and financial support.

The most important bat hibernacula plus some bat summer roosts were proposed as object for protection within the Polish part of the NATURA 2000 network.

4.2. Areas of particular importance to the maintenance of the current state of bat populations in Poland.

The "Nietoperek" and "Nietoperek II" bat reserves are underground fortifications of the Międzyrzecz Fortified Front (MFF), which form the largest bat hibernaculum in Poland. The maximal number of hibernating bats, 29,493 individuals, was observed in February 1991 (Urbańczyk, in Wołoszyn 1994). 12 bat species (*Myotis bechsteinii*, *M. brandtii*, *M. dasycneme*, *M. daubentonii*, *M. myotis*, *M. mystacinus*, *M. nattereri*, *Pipistrellus pipistrellus*, *Eptesicus serotinus*, *Barbastella barbastellus*, *Plecotus auritus* and *P. austriacus*) have been found hibernating there, and a further one, the northern bat (*Eptesicus nilssonii*), has been observed in the area of MFF, but not yet in the main underground system. In 1980, approximately one-third of the surface area of corridors was embraced by protection as the "Nietoperek" Bat Reserve. On account of increased tourist traffic in this area in the early 1990s as well as of the small area covered by the Reserve, the protection afforded to bats began to look insufficient. Thus in September 1997 an area of 5,117.72 ha surrounding the underground fortifications became constituted as a "Natural-Landscape Complex" to protect the bats' maternity colonies, feeding grounds and migratory routes. In October 1998, the National Foundation for Environmental Protection from Warsaw started work on the preparation of a "Nietoperek Management Plan". As a consequence, in December of the same year the remaining 67% of the underground corridors were embraced by protection as the "Nietoperek II" Bat Reserve. The Plan was finally accepted into local law in June 2000, and will remain in force until 2019. In line with the Plan, the local nature conservancy authorities are obliged to undertake several protection activities, e.g. to keep the whole system gated in winter, to increase the number of microhabitats available for hibernating bats and, in co-operation with local forestry managers, to commence with changes in forest structure that could be favourable to bats. The Plan also provides that tourist movement is to be forbidden in both bat reserves from 1st November to 31st March, while an increase in the summer months, except places occupied by summer colonies of bats, is recommended.

The main threats to the winter colony of bats in MFF are the tourist industry, changes in micro-climatic conditions (esp. water level) and the building of the A3 motorway.

Other areas of a particular importance are caves of the Kraków-Częstochowa Upland, the Polish Carpathians, and the Polish Sudety Mountains, as well as variously located old fortifications and summer roosts in churches and the attics of private houses.

5. Chiropterological Information Center (CIC).

As mentioned above the Chiropterological Information Center (CIC) was established in May 1987 and is now located as a department in the Institute of Animal Systematics and Evolution Polish Academy of Sciences in Kraków. The main goal of the CIC is to put on line all information on bats in Poland, to promote systematic and biogeographical study on bats, to consult and co-operate with the government and to be the scientific institution on

protection of bats in Poland. The CIC organised ten winter bat censuses (DSN) in Poland. One important area of CIC activity is the yearly organisation of a chiropterological school for the government agencies' personnel and non-government organisations involved in environmental protection as well as for amateur chiropterologists in order to distribute practical knowledge about bats and the ways of their protection. During the past 15 years over 400 naturalists, students and bat watchers have participated in these courses.

6. Non-Governmental Organisations involved in bat conservation.

The more important Polish non-governmental organisations (NGOs) concerned with the monitoring and conservation of bats and with the education in regard to this group of animals are the following:

- *Centrum Dziedzictwa Przyrody Górnego Śląska [The Center for the Natural Heritage of Upper Silesia] (Katowice)
- *Fundacja Ekologiczna Ziemi Legnickiej "Zielona Akcja" [Ecological Foundation "Green Action"] (Legnica)
- *Mazowieckie Towarzystwo Ochrony Fauny (MTOF) [Mazovian Society for the Protection of Fauna] (Siedlce)
- *Ogólnopolskie Towarzystwo Ochrony Nietoperzy (OTON) [The Polish Society for Bat Protection] (Warsaw)
- *Polskie Towarzystwo Ochrony Przyrody „Salamandra” [The Polish Society for Nature Protection "Salamandra"] (Poznań, Gdańsk, Łódź, Olsztyn, Szczecin)
- *Polskie Towarzystwo Przyjaciół Przyrody "pro Natura" (PTOP "pro Natura") [The Polish Society of Wildlife Friends "pro Natura"] (Wrocław)
- Radomsko-Kieleckie Towarzystwo Przyrodnicze [The Nature Society of Radom and Kielce Region]
- *Stowarzyszenie dla Natury "Wilk" [The Association for Nature "WOLF"] (Godziszka)
- Sekcja Chiropterologiczna Towarzystwa Przyrodników im. M. Kopernika [The Chiropterological Section of the N. Copernicus Naturalists Society] (Kraków)
- Wrocławska Grupa Chiropterologiczna [Wrocław Chiropterological Group] (Wrocław)

The asterisk * means organisation belonging to Porozumienie dla Ochrony Nietoperzy (PON) - *The Agreement for Bat Conservation* - the union of organisations and institutions which commenced with its activity in the years 2000-2004.

7. Examples of projects carried out recently.

7.1. "ABC - project" - Atlas of Bats of the Carpathians.

This international project is co-ordinated by the Chiropterological Information Center PAS, Kraków. Chiropterologists from the Czech Republic, Hungary, Romania, Slovakia, Poland and Ukraine participate in it.

Studies of the bat fauna of the Carpathian Region have a long tradition reaching back to the first half of the 19th century. The Carpathians territory is of considerable significance to the analysis of the extension and ranges of bats in Europe. Several bat species have a range limited to different parts of the mountains; as the ranges of these species have not been thoroughly studied, the boundaries of their distribution in Europe have been freely interpolated in relations to their real limits.

Therefore, regarding the necessity for obtaining the most accurate knowledge possible of species and their distribution over the Carpathian Region, the ABC Project has two main goals:

- Recording the state of bat fauna in a definite time interval, as a starting point for tracing further changes in the fauna and as an indicator of environmental changes.
- To fill the gaps in our knowledge of the distribution and ranges of different species of bats in the Carpathian Region.

The "Atlas" will include maps of the distribution of all species of bats currently occurring in the Carpathians.

7.2. Activity of bats at the entrance of underground shelters out of the winter season.

The project is co-ordinated by R. Szkudlarek (PTPP „pro Natura”)

7.3. Bats migrations to the "Nietoperek" Bat Reserve.

The project is being undertaken in co-operation with German chiropterologists. On the Polish side it is co-ordinated by Tomasz Kokurewicz PhD (Department of Zoology and Ecology, Agricultural University of Wrocław).

7.4.. Habitat use, distribution and diversity of bats in northern Poland.

The project is being undertaken by Mateusz Ciechanowski, M.Sc. (Gdańsk University, Department of Ecology and Vertebrate Zoology).

7.5. Monitoring of populations number and long term population trends of *M. daubentonii*, *M. myotis*, *M. nattereri*, *Barbastella barbastellus*, *Plecotus auritus* in "Nietoperek" bat reserve. The project is being carried out in co-operation with non-governmental organisations and is co-ordinated by Tomasz Kokurewicz PhD (Department of Zoology and Ecology Agricultural University of Wrocław).

7.6. Monitoring of bat population sizes and long-term population trends on the Śnieżnik Massif (Sudety Mountains).

This Czech-Polish project is being carried out in co-operation with non-governmental organisations, the "Wrocław Chiropterological Group", Czech Speleological Society, section „Barbastellus” and Speleological Section in Stronie Śląskie. The project is co-ordinated by Joanna Furmankiewicz M.Sc. (Institute of Zoology, University of Wrocław) and Tomasz Kokurewicz PhD (Department of Zoology and Ecology, Agricultural University of Wrocław).

7.7. Natural and anthropogenic factors affecting bat mortality.

The project is being implemented by M. Kowalski and G. Lesiński (MTOF, OTON)

7.8. Social vocalisation in Nathusius's pipistrelle bat (*Pipistrellus nathusii*)

The project is being realised by R. Szkudlarek (PTPP „pro Natura”)

7.9. Summer activity of bats in the area surrounding the "Nietoperek" bat reserve.

The project is carried out in co-operation with non-governmental organisations, namely the Polish Society for Nature Protection "Salamandra" and "Wrocław Chiropterological Group". The project is co-ordinated by Alek Rachwałd PhD (Forest Research Institute, Ecology and Nature Protection Department, Warszawa) and Tomasz Kokurewicz PhD (Department of Zoology and Ecology Agricultural University of Wrocław).

7.10. The bacterial flora of the alimentary tract of vespertilionid bats.

The project has now been completed and a paper summarising the results is in preparation. The project was realised by Tomasz Jarzembowski PhD at the Department of Microbiology, Gdańsk Medical University.

7.11. The importance of small cellars for bat hibernation in Poland.

The project is being realised by The Polish Society for Bat Protection, Mazovian Society for Fauna Protection, and the Polish Society for Nature Protection „Salamandra” (as co-ordinated by G. Lesiński PhD)

7.12. The vertical differentiation of bat groupings in Tatra Mountain Caves.

The project is being implemented by K. Piksa (Pedagogical University of Kraków)

8. Publications

Three journals exclusively devoted to bat biology are published in Poland.

8.1. *Acta Chiropterologica* (International Journal of Chiropterology). ISSN 1508-1109

Editor-in-chief: Wiesław Bogdanowicz

Museum and Institute of Zoology, Polish Academy of Sciences, Warszawa

8.2. *Nietoperze* (The Bats). ISSN 1640-2677

Editor-in-chief: Rafał Szkudlarek

The Journal is published by the Agreement for Bat Conservation in Poland.

8.3. *Studia Chiropterologica* (Annals of the Chiropterological Information Center in Kraków). No ISSN, in 2001 – ISBN 83-85222-96-0

Editor-in-chief: Bronisław W. Wołoszyn

Institute of Animal Systematics and Evolution PAS, Kraków

Apart of three journals mentioned above several publications in other scientific and popular journals and also in book form were published.

9. Activities pursued to promote awareness of the importance of bat conservation.

9.1. International Bat Nights.

Since of 1995 the CIC organise every 21 September the International Bat Night - IBN. A lot of chiropterologists from some European countries took part in the IBN. This idea was adopted by Eurobats and since 1997 is organised as European Bat Nights.

During last three years Bat Nights were organised by Chiropterological Information Centre and the HQ of the Board of the Carpathian Landscape Parks (Zarząd Karpackich Parków Krajobrazowych) in Krosno.

9.2. Bat Education Centre in Poznań

The Polish Society for Nature Protection "Salamandra" organised the Education Centre located at Fort IIa in Poznań. The educational programme of the Centre is oriented mainly towards bats and their conservation.

9.3. Bat Hospital in Poznań

The hospital was created by the Polish Society for Nature Protection "Salamandra"

9.4. Bat Observatory "Batmanówka"

The observatory is located in the loft of the school in the village of Kopanki near Poznań. Due to the installation of a transparent cupola and red light, the maternity colony of greater mouse-eared bats (*Myotis myotis*) situated in the loft can be observed without disturbance. The observatory was made by the Polish Society for Nature Protection "Salamandra". 2000 was the second year in which it was open to the public. During this time it was visited by over a thousand schoolchildren, students and tourists.

9.5. Education in the mass-media.

Hundreds of articles in newspapers, programmes on regional and national TV, and broadcasts on many radio stations were prepared by all the organisations and institutions working with bat protection.

9.6. Education of foresters

The Chiropterological Information Centre PAS joined the General Directorate of the State Forests in developing a programme of education for foresters in bat biology and conservation.

9.7. Exhibitions "Face to face with bats"

This was prepared by the Chiropterological Information Centre (Krzysztof Skrok – photographs and Bronisław W. Wołoszyn – text) and presented in the Ministry of the Environment from December 2001 to January 2002 and at the Silesian University in Katowice (January – February 2002), in autumn 2002 it was presented during the 11th Meeting of the Scientific Council of the CMS Convention and during Seventh Meeting of the Conference of the Parties of the CMS in Bonn from 14 to 24 Sept 2003.

9.8. Monographic lectures "Natural History of Bats"

These are delivered for students of biology and earth sciences at the Jagiellonian University in Kraków by Prof. Bronisław W. Wołoszyn. The course takes place during the winter semester and finishes with a test exam.

9.9. Since 1988 every year the **Polish National Bat Conference** are organised by different chiropterological local groups.

10. Bibliography

For extensive publication lists see the Polish National Reports on the EUROBATS website.

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