

AGREEMENT ON THE CONSERVATION OF POPULATIONS OF EUROPEAN BATS (EUROBATS)

Report on the implementation of the Agreement's resolutions in Poland in 2010

A. General information

Party:	Poland
Date of report:	February 6, 2010
Reporting period:	January – December 2010
Competent reporting authority:	Ministry of the Environment of the Republic of Poland

B. Status of bat populations on Party's territory

1. Basic information on the composition of the native bat fauna

21 bat species have been confirmed to permanently occur in Poland. Of these, 20 belong to the vesper bats family and one (the lesser horseshoe bat, *Rhinolophus hipposideros*) belongs to the horseshoe bats family. A relatively new species in this group is *Myotis alcaethoe*, whose occurrence in Poland may be relatively frequent. It has been observed a couple of times since 2005. In addition, 4 more bat species have been recorded occasionally: the greater horseshoe bat *R. ferrumequinum*, the Kuhl's pipistrelle *Pipistrellus kuhlii*, the lesser mouse-eared bat *Myotis oxygnathus* (formerly classified as *M. blythii*) and the greater noctule bat *Nyctalus lasiopterus*. These four species have as yet not been proved to breed in Poland.

2. Status and trends

Nine bat species are listed on the Red List of Threatened Animals in Poland (*Czerwona lista zwierząt zagrożonych w Polsce*, Głowaciński 2002). These are:

species	IUCN category
<i>Rhinolophus ferrumequinum</i>	LC
<i>Rh. hipposideros</i>	EN
<i>Myotis bechsteinii</i>	NT
<i>Myotis dasycneme</i>	EN
<i>Myotis emerginatus</i>	EN
<i>Vespertilio murinus</i>	LC
<i>Eptesicus nilssonii</i>	NT

<i>Nyctalus leisleri</i>	VU
<i>Barbastella barbastellus</i>	DD

3. Habitat and roosts

In the recent years, the common noctule *Nyctalus noctula* has been increasingly found to roost in crevices and attics in buildings, especially in blocks of flats constructed from prefabricated panels. This is the prevailing pattern in the southern and western part of Poland, both in summer (breeding colonies) and during hibernation.

4. List of threats

General threats to bats in Poland are similar to those typical of a range of European countries. The threats that have the greatest impact on the Polish bats are: environmental pollution, habitat fragmentation, decrease of suitable roosts and sometimes also direct killing by people. A threat that has been growing in importance in the recent years is development of wind energy. A potential threat, the magnitude of which remains unknown, is the white nose syndrome. In addition, developers have shown a growing interest in utilisation of military structures, which are winter roosts of bats.

In 2010, a number of threats concerning specific structures or areas were identified:

- a) Some important bat winter roosts sites have been increasingly explored, both legally and illegally, in autumn and winter. In the largest known Polish bat winter roost – the underground site *Międzyrzecki Rejon Umocniony* (the Natura 2000 site *Nietoperek*), during the census in January 2011, a few damaged grilles and over 200 dead bats were found (the destruction and killing took place in the winter 2010/11, so potentially in the reporting period). This incidence was reported to law enforcement authorities and currently (February 2011) a police investigation is ongoing.
- b) The growth of knowledge about bats in society has been accompanied by an increasing number of bat collisions with man-made structures, reported to bat experts. For example, many injured, weakened or sick bats are reported. In Poland, there is a network of animal rehabilitation centres (www.gdos.gov.pl/Articles/view/2162/Osrodki_rehabilitacji_zwierzat), operating under licence from the General Directorate for Environmental Protection, in accordance with article 75 of the act on nature conservation. However, a problem with these centres is that many of them refuse to admit bats due to lack of trained staff and suitable conditions. It is necessary that these centres admit bats more often and possess adequate conditions for bat care.

- c) Design and construction of wind turbines in woodland or at wood edges, and in other places with increased bat activity. This threat has been growing in importance due to massive development of wind energy in Poland, however, with regard to specific wind farms it is now decreasing, following the spread of correct practice of assessment of wind turbine impact on bats and application of mitigating activities (such as temporary shutdown). In the future, attention should be given to the issue of the credibility of environmental impact assessments concerning the effect of a wind farm project on bats and to observing post-investment recommendations (e.g. conducting post-investment monitoring).
- d) In 2010, we observed increased bat mortality in winter roosts, probably caused by the severe and long winter 2009/2010 and the early beginning of heavy and persistent frosts in the beginning of winter 2010/2011.

5. Collection, analysis, interpretation and dissemination of data

Although a majority of scientific institutions and non-governmental organisations involved in research on and protection of bats have for years been carrying out regular winter monitoring in many important bat winter roosts, there is no central system of collection and analysis of the results of these studies. Considerable part of the results is currently collected only by the Agreement for Bat Conservation (*Porozumienie dla Ochrony Nietoperzy*) – a coalition of 8 organisations, which cooperates with a number of independent experts.

The same holds true for the results of summer monitoring and studies involving bat ringing, although these projects do not cover as large an area as winter bat censuses do. In the reporting period we developed a framework for an internet database for the purposes of collection of and providing access to data on bat ringing. In 2011, we plan to continue work on the creation and launching of this service. Introducing this tool will allow to coordinate, automatically collect, store and provide access to data on bat marking, thus reducing the costs and effort to the level required for current maintenance of the database and periodical generation of automatic reports.

Also, a list of winter bat roost sites and their coordinates was completed and submitted to EUROBATs Secretariat.

Finally, in the reporting period Polish bat researchers published at least 23 papers concerning bats and delivered at least 7 talks on bats at international scientific conferences (see Appendix 1).

C. Actions taken to implement article III of the Agreement

6. Legal actions for bat protection, including implementation of regulations

- A new resolution on species conservation, incorporating amendment to the act on nature conservation, is now under preparation.
- Tenders for creation of conservation plans for Natura 2000 sites protecting bats are under preparation.
- The General Directorate for Environmental Protection commissioned creation of a next version of the national guidelines for assessment of wind farm impact on bats. Currently, work on these guidelines is ongoing. The guidelines will be published and officially recommended probably in the first half of 2011.

7. Areas and structures important for bats which were identified and given protection, and active conservation measures implemented at other sites

1. The following important bat winter roosts were identified:

- *Baszta Michałowska* (Mazowieckie Province) – a maximum of 2,894 individuals of 9 species (observers: G. Lesiński, A. Olszewski),
- *Fort Pomiechowo* (Mazowieckie Province) – more than 80 individuals of 7 species (observers: G. Lesinski, M. Fuszara),
- *Jaskinia Słowiańska-Drwali* (Podkarpackie Province) – approx. 70 individuals (observer: T. Mleczek),
- *Jaskinia Mroczna* (Małopolskie Province) – more than 100 individuals (observer: T. Mleczek),
- Szklary – a railway tunnel (Podkarpackie Province) – approx. 120 individuals of 4 species, the most frequent being *Barbastella barbastellus* (observer: T. Mleczek),
- Prątkowce, *Fort VII* (Podkarpackie Province) – more than 100 individuals (observer: T. Mleczek).

2. The following new important bat summer roosts were identified:

- The attic of the church in Sławków (Śląskie Province, district of Będzin) – the largest known breeding colony of Geoffroy's bat *Myotis emarginatus* in Poland – over 300 individuals (observer: PTPP pro Natura).

3. The NGO *Polskie Towarzystwo Przyjaciół Przyrody „pro Natura”* carried out bat-safe renovation of the roof in the following buildings containing breeding colonies of the lesser horseshoe bat:

- Church in Jaworzna (Małopolskie Province) – additionally a colony of the Geoffroy's bat,
- Church in Kamionka Mała (Małopolskie Province),
- Church in Kamionka Wielka (Małopolskie Province),
- Orthodox church in Śnietnica (Małopolskie Province),
- Mill in Pierściec (Śląskie Province).

The works were financed from Priority Axis 5 of the Operational Programme Infrastructure and the Environment, and by the National Fund for Environmental Protection and Water Management.

4. *Polskie Towarzystwo Przyjaciół Przyrody „pro Natura”* built a grille protection in entrances to underground sites with bat winter roosts in the following structures:

- Disused gallery in Sławniowice (Opolskie Province),
- Disused mine in Czerna, known as *Sztolnia pod Bukami* (Małopolskie Province),
- Cave in Czerna, known as *Jasknia pod bukami* (Małopolskie Province),
- Cave in Ociemne, in the Pieniny National Park, known as *Jaskinia* (Małopolskie Province),
- Krakowska Cave in the Ojców National Park (Małopolskie Province),
- Sąspowska Cave in the Ojców National Park (Małopolskie Province),
- Ciemna Cave in the Ojców National Park (Małopolskie Province),
- Disused mine in Szczawnica, known as *Sztolnia pod Jarmucie* (Małopolskie Province),
- Słowiańska Cave in Lipowica (Podkarpackie Province),
- *Gdzie wpadł grotolaz* Cave (Podkarpackie Province),
- *Czarci Dół* Cave in Łopień (Małopolskie Province).

The works were financed from Priority Axis 5 of the Operational Programme Infrastructure and the Environment, and by the National Fund for Environmental Protection and Water Management.

5. In the autumn of 2010, *Polskie Towarzystwo Przyjaciół Przyrody „pro Natura”* conducted cleaning works, involving removal of excrements and small maintenance activities in a few tens of sites of the lesser horseshoe bat and the greater mouse-eared bat in southern Poland. The works were financed from the Priority Axis 5 of the Operational Programme Infrastructure and the Environment, and by the National Fund for Environmental Protection and Water Management.

6. In the Suwałki Landscape Park, during compensation activities 20 cellars for bats were checked to make them suitable for hibernation; in Świnoujście, a blockhouse was adapted for bats, to compensate for damaging their winter habitats during the construction of a gas harbour.

8. Promoting awareness of the need for bat protection

- Educational actions, aimed at improving the attitude of society to bats and the need for their protection are performed mainly by non-governmental organisations (such as SdN Wilk, PTOPI Salamandra, SOP BIOS, PTPP pro Natura, TP Bocian). Several educational programmes were held in various educational institutions, at universities and even in kindergartens, in a range of regions in Poland. In many cases, these campaigns were supported by the media, to popularise bat conservation activities that were in progress.
- Training is organised for volunteers participating in research programmes and conservation activities. In some cases, these conservation or research projects are also accompanied by activities promoting bats and their protection in local communities.
- On 27.09.2010, a panel meeting was held in Warsaw, “Construction practices and the protection of habitats of swifts, bats and other protected synantropic species – the law from a new perspective” (*Praktyka budowlana a ochrona siedlisk jerzyka, nietoperzy i innych chronionych gatunków synantropijnych – nowe spojrzenie na prawo*) The meeting was addressed to representatives of public administration, developers and constructors of buildings, and especially to institutions and persons involved in insulation of existing buildings. It was attended by approx. 50 people, mainly from self-governmental authorities of Warsaw districts. Following the meeting, information materials were issued on the protection of animals (birds and bats) in renovated buildings, intended for internet distribution. The conference was organised by the University of Natural Sciences and Humanities in Siedlce, the Bioexperts company and the Forestry Research Institute.

- On September 30, 2010, in the seat of the Ojców National Park Educational Centre (*Ośrodek Edukacyjno-Dydaktyczny Ojcowskiego Parku Narodowego*), on the occasion of the XVI International Bat Night a meeting was held regarding evaluation of the current status of bat protection in Poland. The meeting was participated by 30 people, working mainly on research of bats in Poland. It was preceded by a field session, during which a new grille protecting the entrance to the Krakowska Cave, one of the local bat winter roosts, was installed. 7 papers were delivered at the meeting. One of them was a talk by the representative of the Ministry of the Environment, regarding the Polish activity in the EUROBATs Agreement.
- Campaign “The horseshoe bat trail” (*Szlakiem podkowca*) was started. The project involves counting horseshoe bats emerging from the colony – at 10 “stops” of the trail. The results of the counts will be collected and made available at an interactive internet site. A promotion campaign for this project commenced in the autumn 2010, and bat counts will start in the spring of 2011. The organiser is *Polskie Towarzystwo Przyjaciół Przyrody "pro Natura"*.
- In the autumn of 2010, an art competition was launched for elementary school pupils of the Małopolskie Province, “The lesser horseshoe bat – our favourite bat” (*Podkowiec mały - nasz ulubiony nietoperz*). The competition covers the Małopolskie Province. Organisers: Landscape Parks Complex of the Małopolskie Province (*Zespół Parków Krajobrazowych Województwa Małopolskiego*) and *Polskie Towarzystwo Przyjaciół Przyrody "pro Natura"*.
- In the Museum of the Magura National Park a photograph exhibition was set up, concerning implementation of the lesser horseshoe bat protection programme in Poland. The exhibition was organised by *Polskie Towarzystwo Przyjaciół Przyrody „pro Natura”*, as part of a project funded by the EkoFundusz Foundation.
- The NGO *Polski Klub Ekologiczny* carried out an educational campaign. „*Nietoperz – demon czy anioł*” (The bat – a devil or an angel), whose main objective was to make people aware why bats are important for our environment. The project lasted one year and was finished in October 2010.
- Internet sites of national parks contain regular information and special articles on bats.

9. Authorities in charge, which in accordance with article III, section 5 of the Agreement were designated to provide consulting services in management and protection of bats

The State Council for Nature Conservation (*Państwowa Rada Ochrony Przyrody*) (Wawelska 52/54, 00-922 Warsaw).

10. Other measures for bat protection

- Due to potential occurrence of the white nose syndrome, during the monitoring of wintering bats Polish bat specialists collect dead individuals or fungal mycelia samples from live bats overgrown with fungi, and submit them for analysis. Information is distributed among bat experts and explorers of underground sites. The institution recommended to perform analysis of samples is the State Veterinary Institute (*Państwowy Instytut Weterynaryjny – PIB*) in Puławy. In 2010, there was no mass bat mortality due to the WNS reported.
- A proposal of principles for safe and humane bat handling in research and census was formulated.

11. Research activity

The main bat research programmes commenced in 2010 are as follows:

- A study on the spectrum of changes in animal metabolism rates in response to changing environmental conditions (Nicolaus Copernicus University in Toruń)
- Effects of grilles on the swarming activity of bats (Wrocław University)
- Identification of bat-detering sounds (Wrocław University)
- The sensory basis of prey detection by the brown long-eared bat *Plecotus autirus* (Wrocław University)
- Bat swarming at cave entrances in southern Poland (the Pedagogical University of Kraków)
- Migration behaviours of the common noctule *Nyctalus noctula* (Mammal Research Institute of the Polish Academy of Sciences in Białowieża)

In 2010, the General Directorate for Environmental Protection issued permissions for research on bats which involved:

- 1) Scaring and disturbance of bats in the reserve *Szachownica*, for research purposes - during bat activity / swarming (unidentified number of individuals and species)

- 2) Capture for the purpose of measurement and radio-tracking: 15 females of *M. myotis*, 3 females of *M. dasycneme*, 3 females of *M. bechsteinii*, 4 females of *B. barbastellus*
- 3) Capture for the purpose of measurement and taking samples of the wing membrane for genetic analyses – 40 *M. myotis*
- 4) Capture, deliberate scaring off and disturbance, and temporary detention for the purposes of measurement and hair sampling, for a chemical study of 30 bats of the species *M. myotis*, *M. brandtii*, *M. Mystacinus*, *M. daubentonii*, *M. nattereri*, *P. auritus*, *B. barbastellus*
- 5) Capture, deliberate scaring off and disturbance, and temporary detention for measurement, for census and conservation purposes (without determining numbers and species)
- 6) Capture and temporary detention for research, for the purposes of a Natura 2000 site conservation plan and animal censuses in the Podlaskie, Mazowieckie and Łódzkie Provinces (without determination of numbers and species)
- 7) Capture and temporary detention of 30 individuals of the common noctule *Nyctalus noctula* for the purposes of measurement and radio-tracking
- 8) Scaring off, capture and detention of 50 individuals of *M. daubentonii* in metabolic chambers
- 9) Deliberate scaring off and disturbance, capture and temporary detention of 4,000 bats during swarming (without species determination)
- 10) Capture and temporary detention for collection of parasites and blood samples from 230 individuals of *N. noctula*, *M. myotis*, *M. daubentonii*, *M. nattereri*, *E. serotinus*, *P. auritus*
- 11) Capture, transport and detention of 20 males of *P. auritus*
- 12) Capture, deliberate scaring off and disturbance, temporary detention and transport of an unspecified number and species of bats, for the purposes of conservation and intervention measures, and taking measurement for census and conservation purposes (without determining numbers and species)

No new permissions for bat ringing were issued in the reporting period. No information on bat ringing conducted under the previous permissions or observation of previously ringed bats was obtained.

12. Method of taking into account the potential effect of pesticides on bats and their foraging resources, and efforts taken to replace timber treatment chemicals that are highly toxic to bats

In 2010, no new needs concerning this issue were reported and no special measures were taken. A summary of information by the Forestry Research Institute is available, concerning timber treatment products that are non-toxic to bats.

D. Operation of the Agreement

13. Cooperation with other states, located within the scope of interest of the Agreement

a. In January 2010, in the Natura 2000 site *Nietoperek* a bat survey was conducted, with the participation of several tens of bat experts from Poland, the UK, Germany, Holland and Belgium.

b. During the second Yearly Zoological Congress of the Grigore Antipa Museum, 17–19 Nov. 2010, two photographic exhibitions were held

- Wojciech GUBAŁA, Krzysztof SKROK and Bronisław W. WOŁOSZYN: “Bats of the Carpathians”
- Bronisław W. WOŁOSZYN: “Protected and unprotected landscapes of Romania”.

c. Between 20-22 September 2010 two Polish representatives took part in the MOP6 EUROBATS in the Czech Prague.

d. In the reporting period, two bat experts from Poland (Dr K. Sachanowicz and Dr M. Ciechanowski) participated in a project financed from EUROBATS resources (programme European Projects Initiative, EPI), concerning protection of bats in Albania, in cooperation with Albanian authorities and researchers.

14. Actions taken to implement the resolutions approved by Conferences of Parties

Resolution 4.4 Regarding protection of bats in forests – the EUROBATS flyer “Bats and forestry” was translated to Polish.

Resolution 6.11 In 2010, development of official guidelines for the assessment of wind farm impact on bats was commissioned.

Other resolutions. Secretariat EUROBATS publication series No. 2-4 were translated to Polish.

The report was prepared by Dr Andrzej Kepel, Dr Mateusz Ciechanowski and Dr Alek Rachwald, on the basis of information submitted by bat experts from across Poland, the General Directorate for Environmental Protection (GDOŚ) and the Ministry of the Environment. Translation: Justyna Kubacka (PTOP “Salamandra”).

Annex I to the Report

Publications issued in 2010 (irrespective of date on cover) and publications issued in 2008-2009 but not listed in the previous EUROBATS report

A. Publications in specialist journals and book publications

- Bachanek J.** 2008. The northern distribution limits of the lesser mouse-eared bat *Myotis oxygnathus* (Tomes, 1857) (Chiroptera: *Vespertilionidae*) in Central Europe. *Acta zoologica cracoviensia* 51A (1-2): 59-64.
- Bachanek J., Postawa T.** 2010. Morphological evidence for hybridization in the sister species *Myotis myotis* and *Myotis oxygnathus* (Chiroptera: *Vespertilionidae*) in the Carpathian Basin. *Acta Chiropterologica* 12: 439-448.
- Ciechanowski M., Jarzembowski T.** 2010. Dynamics of social organization and phenology of Nathusius' pipistrelle *Pipistrellus nathusii* (Keyserling and Blasius, 1839) (Chiroptera: *Vespertilionidae*) occupying bird and bat boxes – interseasonal approach. *Le Rhinolophe* 18: 1-6
- Ciechanowski M., Kubic W., Rynkiewicz A., Zwolicki A.** 2010. Reintroduction of beavers *Castor fiber* may improve habitat quality for vespertilionid bats foraging in small river valleys. *European Journal of Wildlife Research*. doi: 10.1007/s10344-010-0481-y
- Ciechanowski M., Zając T., Zielińska A., Dunajski R.** 2010. Seasonal activity patterns of seven vespertilionid bat species in Polish lowlands. *Acta Theriologica* 55 (4): 301–314.
- Domagała M., Karwowska B.** 2009. Ochrona nietoperzy w Drawieńskim Parku Narodowym (1999 – 2008). *Studia Chiropterologica* 6: 29-42.
- Furman A., Öztunç T., Postawa T., Çoraman E.** 2010. Shallow genetic differentiation in *Miniopterus schreibersii* (Chiroptera: *Vespertilionidae*) indicates a relatively recent re-colonization of Europe from a single glacial refugium. *Acta Chiropterologica* 12 (1): 51-59.
- Furman A., Postawa T., Öztunç T., Çoraman E.** 2010. Cryptic diversity of the bent-wing bat *Miniopterus schreibersii* (Chiroptera: *Vespertilionidae*) in Asia Minor. *BMC Evolutionary Biology*, 10: 121.
- Fuszara E., Fuszara M., Kowalski M., Lesiński G., Cygan J. P., Krasnodębski I., Nitkiewicz T., Szarlik A., Wojtowicz B.** 2010. Population changes in Natterer's bat

- Myotis nattereri* and Daubenton's bat *M. daubentonii* in winter roosts of central Poland. Polish Journal of Ecology 58: 673-685.
- Kaleta E., Klys G.** 2009. Nietoperze (*Chiroptera*) w zrzutkach płomykówki (*Tyto alba*) na Wyżynie Krakowsko-Wieluńskiej i wschodniej części Górnego Śląska. Studia Chiropterologica 6: 101-108.
- Klys G., Hebda M.** 2009. Effect of type of wood used to construct bat boxes. Studia Chiropterologica 6: 127-136.
- Lesiński G.** 2009 (published in 2010). Stanowiska nietoperzy (*Chiroptera*) na Mazowszu i Podlasiu wykryte w wyniku analizy zrzutek puszczyka *Strix aluco*. [Localities of bats (*Chiroptera*) in Mazovia and Podlasie Lowlands revealed by analysis of the tawny owls' *Strix aluco* pellets] Nietoperze 10: 55-63.
- Lesiński G.** 2010. Long-term changes in abundance of bats as revealed by their frequency in tawny owls' diet. Biologia 65: 749-753.
- Lesiński G., Gryz J., Krauze D.** 2009 (published in 2010). Nietoperze ginące na drodze w okolicy Rogowa (województwo łódzkie). [Bats as road kills in the vicinity of Rogow (Lodz voivodship)] Nietoperze 10: 70-72.
- Lesiński G., Sikora A., Olszewski A.** 2010. Bat casualties on a road crossing a mosaic landscape. European Journal of Wildlife Research. doi: 10.1007/s10344-010-0414-9.
- Łupicki D., Cichocki J., Szkudlarek R., Ważna A.** 2010. Cannibalism in maternity colonies of the greater mouse-eared bat *Myotis myotis* Mammalia 74: 339-341.
- Mysłajek R. W., Jonderko T.** 2010. Najliczniejsza kolonia rozrodcza podkowca małego w Beskidzie Śląskim. Przyroda Górnego Śląska 62: 6-7.
- Mysłajek R. W., Szura C.** 2008. Bats of the Jaskinia Miecharska cave. Zacisk (special issue): 13.
- Ruczyński I., Nicholls B., MacLeod C.D., Racey P.A.** 2010. Selection of roosting habitats by *Nyctalus noctula* and *Nyctalus leisleri* in Białowieża Forest – Adaptive response to forest management? Forest Ecology and Management 259 (2010) 1633–1641.
- Ruczyński I., Siemers BM.** 2010. Hibernation does not affect memory retention in bats. Biology Letters. doi:10.1098/rsbl.2010.0585
- Sachanowicz K.** 2010. Nietoperze Europy Centralnej i Bałkanów. Przewodnik fotograficzny. Nyctalus, Wrocław 123 pp.
- Wojtaszyn G.** 2009. Nietoperze (Mammalia, Chiroptera) rezerwatu przyrody „Kuźnik” i Rynny Jezior Kuźnickich. [W:] Owsiany P. M. (red.). Rynna Jezior Kuźnickich i rezerwat przyrody Kuźnik. Muzeum Stanisława Staszica, Piła: 209-215.

Wojtaszyn G., Ruta R. 2009. Wybrane walory faunistyczne (Coleoptera, Chiroptera) ruin browaru przy rezerwacie przyrody „Kuźnik”. [W:] Owsiany P. M. (red.). Rynna Jezior Kuźnickich i rezerwat przyrody Kuźnik. Muzeum Stanisława Staszica, Piła: 234-240.

B. Published summaries of papers delivered at conferences and seminars

Furman A., **Postawa T.**, Coraman E. 2010. *Miniopterus schreibersii pallidus* or *Miniopterus pallidus*: the current evidence. 15th International bat Research Congerence, Prague, 23-27 Aug. 2010. Abstracts.

Furmankiewicz J. Ruczyński I., Jones G. 2010. Social calls are sufficient for locating conspecifics at roosts in a tree-dwelling bat *Nyctalus noctula*. 15th International bat Research Congerence, Prague, 23-27 Aug. 2010. Abstracts.

Gubala, W.J., Wołoszyn, B.W. 2010. Bats hibernating in underground shelters of Mała Pieniny mountains (the Carpathian Mountains , Southern Poland). *Travaux du Museum National d’Histoire Naturelle “Grigore Antipa”*, 53: 347-350, Bucuresti, Romania, 17 -19 Nov. 2010.

Klys, G., Wołoszyn, B.W. 2010. **Air flow as a crucial factor for choosing a place of hibernation. pp: 66-67. [in:] Murariu,D., C.Adam, G. Chisamera, E.Iorgu, L.O.Popa, O.P.Popa (eds.) 2010. Annual Zoological Congress of „Grigore Antipa” Museum – book of abstracts, „Grigore Antipa National Museum of Natural History, Bucharest, Romania, 17 -19 Nov. 2010.**

Klys, G., Wołoszyn, B.W. 2010. Ecological aspects of bat hibernacula in temperate climate zone of Central Europe. *Travaux du Museum National d’Histoire Naturelle “Grigore Antipa”*, 53: 489-497, Bucuresti, Romania, 17 -19 Nov. 2010.

Mika-Olszewska, D., Wołoszyn, B.W., Smyła , A. 2010. Occurence of selected gram-negative bacteria in bats faeces. p. 76 [in:] Murariu,D., C.Adam, G. Chisamera, E.Iorgu, L.O.Popa, O.P.Popa (eds.) 2010. Annual Zoological Congress of „Grigore Antipa” Museum – book of abstracts, „Grigore Antipa National Museum of Natural History, Bucharest, Romania, 17 -19 Nov. 2010.

Piksa K., Bojar A., Niedośpiał K. 2010 Prevalence of Spinturnicidae, Ixodidae and Argasidae in bats during spring and fall swarming (southern Poland) . 15th International bat Research Congerence, Prague, 23-27 Aug. 2010. Abstracts.

Piksa K., Nowak J. 2010 Postawa T., Furman A., Tunc O. Çoraman E. 2010. Patterns of ectoparasite abundance infecting distinct Asia Minor. 15th International bat Research Congerence, Prague, 23-27 Aug. 2010. Abstracts.

- Ruczyński I., Siemers B.** 2010 Does hibernation affect memory retention for a spatial foraging task in bats? 15th International bat Research Congerence, Prague, 23-27 Aug. 2010. Abstracts.
- Sachanowicz K., Ciechanowski M.** 2010. Bats of Albania: distribution and conservation status. 15th International bat Research Congerence, Prague, 23-27 Aug. 2010. Abstracts.
- Stanik, K., Wołoszyn, B.W.** 2010. Variety of environmental factors determining morphology of Holocene bat populations in Polish mountains and upland areas, p.: 62. [in:] Murariu, D., C. Adam, G. Chisamera, E. Iorgu, L. O. Popa, O. P. Popa (eds..) 2010. Annual Zoological Congress of „Grigore Antipa” Museum – book of abstracts, „Grigore Antipa National Museum of Natural History, Bucharest, Romania, 17 -19 Nov. 2010.
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