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Кажани Карпатського регіону
Bats of the Carpathian Region

Novitates Theriologicae Pars 3

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(8–12 вересня 2000 р., Рахів)

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general information

This issue of the bulletin of the Ukrainian Theriological Society *Novitates Theriologicae* is dedicated to the proceedings of the 3rd International Conference on bats of the Carpathians "*State and Prospects of Investigations of Carpathian Bats on the Verge of the Millennium*" held in the Carpathian Biosphere Reserve (Rakhiv, Ukraine), September 8 to 12, 2000.

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Електронна версія підготовлена Ігорем Загороднюком
Electronic version prepared by Igor Zagorodniuk
English proofreading by Zoltán Barkaszi

e-mail: mammalia@ukr.net

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Третя Міжнародна конференція «Кажани Карпатського регіону» (передмова редактора)

Цикл наукових конференцій «Кажани Карпатського регіону» започатковано 1996 року зустріччю в Кракові, проведеною за ініціативою Центру Хіроптерологічної інформації, що діє при Інституті систематики тварин Польської Академії наук, та його голови проф. *Броніслава Волошина*.

Попередня (II) зустріч відбулася 1998 року в Словаччині дякуючи Словацькій групі з охорони кажанів та її лідеру *Марцела Угріна*.

Зустріч у Рахові ініційовано Українським центром з охорони кажанів і проведено дякуючи великій організаційній роботі всього колективу Карпатського біосферного заповідника, а надто директора *Федора Гамора* та співробітника *Василя Покиньчереди*.

Логотип Рахівської конференції.

Logo of the Rakhiv conference.

Співорганізаторами Рахівської зустрічі стали: Ужгородський державний університет, Інститут екології Карпат НАН України, Українська теріологічна школа, Екоцентр «Дельта», Екологічний клуб «Карпати». Конференція проходила на центральній садибі Карпатського біосферного заповідника, розташованій у місті Рахові Закарпатської обл. України, протягом трьох днів — від 8 до 12 вересня 2000 року.

Це видання було підготовлене у двох версіях: 1) як препринт з програмою конференції та тезами доповідей її учасників (близько 40 сторінок і стільки ж примірників), розданих учасникам зустрічі і поширених в бібліотеках установ-організаторів; 2) як збірник наукових публікацій, впорядкованих за підсумками конференції протягом наступного року як повновагоме електронне видання. Конференція стала потужним поштовхом для подальшої активації хіроптерологічних досліджень у Карпатському регіоні та в Україні. Дякую всім авторам та редколегії цього збірника за активну участь у його підготовці.

Ігор Загороднюк

Novitates Theriologicae, Pars 3, 2003: 5–6
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

The Third International Conference "Bats of the Carpathian Region" (editor's foreword)

The series of conferences "Bats of the Carpathian Region" was established in 1996 in Krakow by the Chiropterological Information Centre and its head Prof. *Bronislaw Woloszyn*. The previous (second) meeting was held in 1998 in Slovakia thanks to the Slovak Bat Protection Group and its head Dr. *Marcel Uhrin*.

The meeting in Rakhiv was initiated by the Ukrainian Centre for Bat Protection and organised by the whole staff of the Carpathian Biosphere Reserve, particularly by director Dr. *Fedir Hamor* and research fellow *Vasyl Pokynchereda*. Co-organisers of the Conference were Uzhhorod State University, Institute of Ecology of the Carpathians NAS of Ukraine, Ukrainian Theriological School, Ecocentre "Delta", Ecoclub "Carpathians".

The conference was held the Central Office of the Carpathian Biosphere Reserve located in Rakhiv city, Zakarpattia Oblast, Ukraine during 3 days from 8 to 12 September 2000.

This issue was prepared in two versions: 1) a preprint with the conference program and abstracts of the participants' reports (about 40 pages and the same number of copies), distributed among the participants of the meeting and libraries of organising institutions; 2) a collection of scientific publications compiled by the results of the conference in the following year as a fully fledged electronic publication. The conference was a powerful impetus for further revitalisation of chiropterological research in the Carpathian region and Ukraine. Thanks all of the authors and members of the editorial board for their active participation on the preparation of this edition.

Igor Zagorodniuk

Учасники: Пітер Ліна, Андрій-Тарас Башта, Василь Покиньчереда, Ігор Загороднюк.

Participants: Peter Lina, Andriy-Taras Bashta, Vasyl Pokynchereda, Igor Zagorodniuk.

Bat investigations in the Carpathian Biosphere Reserve

Yaroslav DOVHANYCH, Vasyl POKYNCHEREDA

Carpathian Biosphere Reserve (Rakhiv, Ukraine); e-mail: pokynchereda@ukr.net

In the Carpathian Biosphere Reserve, the main underground bat hibernation shelters are karst and pseudokarst (tectonic) caves and, to a lesser extent, mine shafts. Though bat fauna investigations of these hibernation sites had been initiated long before the reserve's establishment, they were carried out episodically. Regular observations of bats started in 1983 in the frames of Chronicle of Nature programme. The regular bat observations during the hibernation period were started in 1983 in caves Druzhba, Hrebin, and Molochny Kamin.

In 1983–1985, ringing of bats with bird rings* was carried out, but complete information on bat ringing is absent since the first journal of registration was lost. The marked animals belonged to 4 species: *Rhinolophus ferrumequinum, R. hipposideros, Myotis myotis*, and *Barbastella barbastellus*. In 1988, ringing of bats in the reserve was renewed and such questions as spatial, age and sex structures of hibernating bat populations began to be studied. Since 1988, a stable tendency of increase was noted in the number of *M. myotis*, *M. blythii*, *R. ferrumequinum*, and *R. hipposideros*, sometimes accompanied by sharp temporary decreases. For instance, a significant fluctuation in the number of *Myotis myotis* and *M. blythii* was revealed in the cave Hrebin from a sharp decrease in 1998 (about 50 %) to practically a total recovery of abundance in 1999. Other bat species did not change their number considerably in the past 50–90 years.

Based on results of more than 15 years of investigations and on survey of other existing data, 16 bat species were recorded in underground cavities of the Ukrainian Carpathians, such as *Rhinolophus ferrumequinum, R. hipposideros, Miniopterus shreibersi, Myotis blythii, M. myotis, M. bechsteini, M. nattereri, M. mystacinus, M. brandtii, M. emarginatus, M. daubentonii, Plecotus auritus, P. austriacus, Barbastella barbastellus, Eptesicus serotinus*, and *E. nilssonii*. The dominant species during the hibernation period are *Myotis myotis* and *M. blythii*, subdominant species are *Rhinolophus ferrumequinum* and *R. hipposideros*. The others belong to rare but regularly hibernating species. *Eptesicus serotinus* and *E. nilssonii* were identified during hibernation in caves of this region only twice and once, respectively. Since 1993, *Miniopterus shreibersi* has not been recorded here.

* Rings of the series "Moskva XB 3960**, 3966** and 3967**".

Доповіді учасників конференції
Кажани Карпатського регіону III (Рахів)

Logo of the conference

Novitates Theriologicae, Pars 3, 2003: 9–12
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Migration of *Pipistrellus nathusii*: a transboundary European project

Dorothea Barre

Team of Bat Protection Schleswig-Holstein — Germany (Melsdorf, Germany)
e-mail: Barre@juedes-ultraschall.de

Barre D. Migration of Pipistrellus nathusii: a transboundary European project. — From the Atlantic Ocean to the Ural, data on the migratory routes of *Pipistrellus nathusii* have been collected with the help of a questionnaire. The majority of recordings indicate that *P. nathusii* is a migratory species and its migration takes place over long distances (1 760 km between Lithuania and Rhone delta, France). The species flies across the Baltic Sea and the North Sea, as proved by remarkable observations on oil-platforms and islands. Migration preferentially takes place along large rivers or coastlines; here, near waterbodies mating-roosts and songflying males have been registered. Information and knowledge about the migration of this species is sufficient and relatively complete only in Estonia, some regions of Germany, Great Britain, Latvia, Netherlands, and Poland.

Introduction

Some years ago, the Advisory Committee of the European Bats Agreement decided to work out Action Plans for different bat species. One of them was *Pipistrellus nathusii*. Two years ago, bat specialists of several European countries met in Germany and decided to sum up the knowledge of *Pipistrellus nathusii* and *Myotis dasycneme*, in order to pave the way for developing international action plans. This work was done by Herman Limpens et al. (1999) for *Myotis dasycneme*. Lothar Bach and Dorothea Barre collected all available data of *Pipistrellus nathusii*. Nearly 160 questionnaires were sent to all people, who are known to be interested in *Pipistrellus nathusii*. About 40 answers came back.

What has been the primary goal of this survey?

Pipistrellus nathusii is a migrating species but there is only very little knowledge about the migratory routes.

A survey by questionnaire implies some methodological problems. The first problem is the use of different methods to get data. It is difficult to compare them to get a unified picture.

Using the various data, we could prepared one map for the spring and one for the autumn. The intention was to show: Where is the majority of *Pipistrellus nathusii* during April, during May etc.? Therefore, it would be possible to *get an idea of their migration routes* (The map is available by D. Barre, Germany).

Places of remarkable observations of *Pipistrellus nathusii* are:

1. Islands between Estonia and Sweden in May in a box

2. Aland-Island between Sweden and Norway

3. Oil Platforms in the North Sea

4. Jersey (Channel Islands)

5. Shetland Islands in autumn and winter

These reports are a sign for the migration across the sea.

We know very little about the ways that *Pipistrellus nathusii* takes between maternity time and the winter. However, many people contributed to getting an idea of migration routes in different countries.

Table 1. Summaries on the migratory status of *Pipistrellus nathusii* in different regions

Country	Dates and results	Completeness of information
Russia	Borisenko confirmed signs of migration. Transitory and mating colonies are reported from presumed flyways along large river valleys (Volga, Don). Ringed bats are found as far as the Balkans. Chistyakov: assumed, that migration takes place from Northwest-Russia along the coast of the Baltic Sea, or that a part of the population migrates to the Balkans. There are signs of migration along a frontier line. It is obviously at 42nd longitude.	—
Belarus	No contact.	
Ukraine	Bashta: autumn migration starts at the beginning of August and lasts to the beginning of November gathering in the south of Ukraine. There are perhaps migration paths through the Carpathians. Probable hibernation in the Crimea peninsula, Carpathians, Black Sea coast, and the Balkans.	rather incomplete
Moldavia	Limpens – Workshop in July 2000. Some reports at Dnjestr river	
Romania	no contact until Congress in the Carpathians	
Finland	Stjernberg: Apparently migrations between Finland and Estonia (one specimen found in late May in a nest box on an island in the Gulf of Finland east of Helsinki). This species might also migrate between Sweden and Finland, via Aland Islands, but this is not confirmed.	incomplete
Estonia	Masing: In August-September, groups and even larger flocks of P.n. migrate through Estonia. Regular, seasonal flights happen on the SW coast of Estonia. Mating roosts are unknown, but may occur.	relatively complete
Latvia	Petersons: Migration takes place from August to September along the SW coast of Latvia. Migration was studied in 1986–92 (capture and banding). In 1992–99 only by detector work. No hibernation roosts! but all other roost-types.	relatively complete
Lithuania	Mickevicius: only little data on migrations paths, because nobody did scientific investigations on it. Migration is likely to happen 08-10. Hibernation sites have never been observed.	insufficient, no scientific investigation
Sweden	Ahlén: A number of migrating bats of this species regularly appeare at a number of points along the south coast of Sweden. As an example, at one single occasion the estimated number of P.nat. swarming over the shore at Ottenby was about 250 specimen. The P.nat. that pass along these sites are assessed to numbers that exceed all summer populations known in Sweden so far.	incomplete

Country	Dates and results	Completeness of information
Poland	Jarzembowski / Ciechanowski: Migration happens from the beginning of May until September with maximum numbers in the middle of August. Paszkiewics / Szkudlarek: Breslau They detected from late August until the middle of September about 100 singing males in a park, in another park 50 males.	sufficient
Slovakia	Kürthy: Research is rare. Only some knowledge in west-region of the country at the March-River. Hibernation roosts assumed.	insufficient
Hungary	Renata/Rafaeal in Geszt at the border with Romania Det.nachw. Sept.´98	
Yugoslavia	Paunovic´ P. nat. it is widely distributed but rare records.	research just started
Bulgaria	Ivanova: Mating roosts: trees in a park near the Danube, crevices in rocky cliffs in kartic gorges. Migration paths not known. Renata/Rafaeal mating places in Varna, Kavarna (East-coast).	insufficient
Czech Republic	Rehak: Flight paths: there are many records from floodplain forests, water bodies. Migration takes place along big rivers (mostly N-S direction). Only females in E and N-E of Czech Rep.	insufficient
Austria	Reiter: Province of Salzburg — migration paths unknown, but hibernation roosts are well-known.	rather incomplete
Slovenia	Bach: Turnisce, few proofs by detector in the floodplain forest of Mur river, Ost-S. 20.5.00.	rather incomplete
Croatia	No contact.	
Norway	Syvertsen: P.n. is rather rare in Norway. Stormark: One recover in Western Norway.	
Denmark	No contact.	
Germany	Barre: Spring migration takes place within two weeks, while the way back to hibernacula takes the time of eight weeks, including mating. In summer, there are small resident populations of males, only few maternity roosts known.	sufficient
France	No data.	
Great Britain / Ireland	Russ, et al.: Secondary evidence showing migration across the North Sea. Signs of migration are not known, however, bimodal activity peaks on North Sea oil platforms suggest that migration occurs (and Channal Islands). Mating roosts occur.	not very complete, but the majority of the data is valid
Italy	Agnelli et al: There are signs of migration in March/April and October. Maternity roosts are known. Two female and one male ringed in Latvia were recovered in Merano, Venice, and Grado lagoons (11.1.88 fem. Merano (ringed in Latvia, Pape, 25.8.87).	extremely rare
Netherlands	No data so far.	but sufficient
Portugal	No data.	
Scotland	No contact.	
Switzerland	No reaction.	
Spain	(Rodriguez-Munoz et al. 1993) summer populations exist in northern Spain	
Turkey	No contact.	

* All of the data are gathered by questionnaire, but some are mentioned in articles by Arnold (1999), Niederfinger *et al.* (1990), Ohlendorf (1999), Petersons & Vintulis (1998), Russ *et al.* (1999).

Main summary

The majority of records indicate that *Pipistrellus nathusii* is highly migratory.

This species migrates along large rivers or coastlines.

It is remarkable, that in some regions only a few bats of *Pipistrellus nathusii* seem to appear in spring but a lot in autumn! This could not be only a matter of reproduction! (Regenerative-fall-out). It may be assumed that there are two different routes — one for the spring — shorter and faster?, and another for the autumn migration.

What will be the next step?

We are going to complete these data in 2000. Then we will offer them to the Advisory Committees of the Bats Agreements, so there can be decisions about the next steps. We recommend, as AHLEN from Sweden, to propose the development of unified/integrated methods — for all countries — to gather data.

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Russ J. M., Hutson A. M., Montgomery W. I., Racey P. A., Speakman J. R. 1999. The status of Nathusius' pipistrelle, *Pipistrellus nathusii* (Keyserling & Blasius 1839) in the British Isles.

Резюме

Барре Д. Міграції Pipistrellus nathusii: трансграничний європейський прект. — Дані щодо міграційних маршрутів *Pipistrellus nathusii* від Уралу до Атлантичного Океану було зібрано за допомогою анкетування. Більшість звітувань свідчить про те, що *P. nathusii* є мігруючим видом, переміщення якого відбувається на великі відстані (1760 км, між Литвою та дельтою р. Рона у Франції). Вид летить через Балтійське море та Північне море, що доведено чудовими спостереженнями, здійсненими на нафтових платформах та островах. Переміщення здійснюється переважно вздовж великих річок або узбережжя, саме тут, біля водних просторів зареєстровано шлюбні сховища та співаючих самців. Інформація й знання щодо міграцій цього виду є достатніми та порівняно повними тільки в Естонії, деяких регіонах Німеччини, у Великобританії, Латвії, Нідерландах і Польщі.

Novitates Theriologicae, Pars 3, 2003: 13–14
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Pipistrellus nathusii (Keyserling et Blasius, 1839) in the western part of Ukraine

Andriy-Taras BASHTA

Institute of ecology of the Carpathians NAS Ukraine (Lviv, Ukraine)

The investigations were carried out in 1996–2000. Nathusius' bat is a common migratory species in the considered territory (wintering only in Transcarpathia: Abelentsev 1950). Through insufficient data, the evaluation of species abundance in the region is rather problematic. However, some decrease in the number of bats may be revealed indirectly based on the resuced seasonal migration intensity. The autumn disappearance lasts from the end of August until the end of September. The spring appearance in Lviv region is noted in the beginning of April.

The places of summering are related to old broadleaf trees and parks; their disposition determined the Nathusius' bat distribution. This species is observed in the Eastern Carpathians up to 550–600 m a.s.l. Maternity colonies (12–140 specimens) are noted in tree hollows (36 %), tree crevices (8 %), bird and bat-boxes (21 %), and in buildings (36 %).

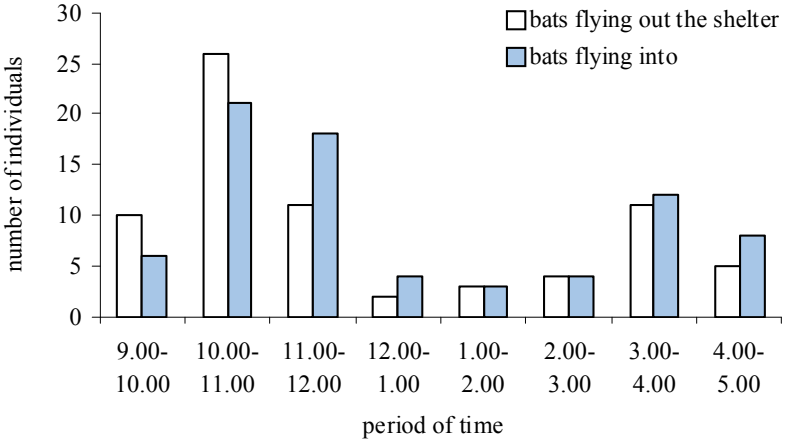

Fig. 1. Nocturnal activity of *P. nathusii* (number of bats flying out and flying into the shelter).

Nathusius' bat flies out for hunting after dusk and usually remains active untile dawn. Mainly two-phasial night activity is noted (Fig. 1): the first phase was noted in the midnight and it is more numbered and marked; the second one is before dawn. Foraging habitats are ecotons: forest edge, forest roads, glades, river and pond shores with trees and bushes, old deciduous forests.

The status of Nathusius' bat may be determined as LR "low risk" (IUCN 1994). The negative factors influencing the specues are the declining number of hollow trees, general decrease of areas of old forests and changes of their age structure, using of pesticides in the past. The main tasks for the investigations and protection of Nathusius' bat in Ukraine are:

a) investigation of migration routes and dynamics, the places of summering and wintering;

b) active direct and indirect species protection: education activity, especially among forestry experts, forest managers, prospects and poster publication, carrying out special studies; handing out bat-boxes, protection of old and hollow trees and important habitats of this species;

c) creation of Nathusius' bat investigation and conservation strategy in the country.

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Резюме

Башта А.-Т. Нетопир лісовий Pipistrellus nathusii (Keyserling et Blasius, 1839) в західних областях України. — Дослідження проводили в 1996–2000 рр. Вид на цій території є звичайним перелітним видом. Через недостатню кількість даних оцінка чисельності виду в регіоні є доволі проблематичною. Осінній відліт триває від кінця серпня переважно до кінця вересня. Весняна поява на Львівщині зафіксована на початку квітня. Місця літнього перебування приурочені до старих листяних лісів і парків. У горах поширений до висоти 600 м. Виводкові колонії чисельністю 12–140 ос. виявлено в дуплах (36 %), щілинах дерев (8 %), дуплянках і скриньках для птахів (21 %), різних частинах будинків (36 %). Самці влітку виявлені в дуплах дерев, під корою, на горищах, в щілинах стін старих будинків, переважно поодиноко. На полювання вилітає після сутінок і, як правило, літає до ранку. Відзначена переважно двофазна активність: перша фаза активності спостерігається в опівнічну пору і є чисельнішою і помітнішою; друга — перед світанком. Мисливські ділянки пов'язані з екотонами: окраїнами лісів, лісовими дорогами, галявинами, просіками, порослими деревами берегами ставків і річок, алеями, а також садами, парками і старими розрідженими лісами. Негативними для цього виду факторами є: зменшення кількості придатних для поселення дуплястих дерев, загальне зменшення площі лісів, омолодження їх вікової структури, застосування отрутохімікатів у лісовому та сільському господарстві у минулому.

Novitates Theriologicae, Pars 3, 2003: 15–18
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Ectoparasites of bats of western Ukraine

Oksana BOBKOVA

Institute of Zoology, National Academy of Sciences of Ukraine (Kyiv, Ukraine)
e-mail: batncave@yahoo.com

Introduction

Epidemic and epizootic significance of ectoparasites is of great importance, because on different development stages ectoparasites are sanguivorous and carriers of agents of a number of transmissive diseases.

Ectoparasites are one of the factors that influence bats. There is an interchange of ectoparasites between bats and other animals (some birds and mammals), so it is possible for infections to pass from bats to other animals.

Among bat ectoparasites, representatives of different groups of arthropods occur, including mites (Parasitiformes, Acariformes) and insects (Aphaniptera, Hemiptera, Diptera). They include both exclusively bat parasites and non-specialised parasites of birds and mammals. In this report, the matter concerns parasites of bats of the western part of Ukraine. This is settled and migrant species.

Materials

Data was collected during 1999/2000 in Podolian caves and in Medobory Reserve. Of a large number of bat hosts, we collected ectoparasites belonging to 10 species, namely *Ixodes vespertilionis, Ichoronyssus* sp., *Spinturnix acuminatus, S. myoti, S. plecotinus,* Liponyssidae gen. sp., *Leptotrombidium russicum,* Ischnopsyllidae gen. sp., *Pulex irritans,* and *Nycteribia* sp.

Results

Analysis of the collected material revealed that the ectoparasites belong to 8 genera of 7 families (Table 1).

Family Ixodidae Murr.

Genus *Ixodes* Latr, 1795

1. *Ixodes vespertilionis* Koch, 1844. Hosts: *Rhinolophus hipposideros* (winter, Kryshtaleva, Vitrova cave). General quantity: 7 specimens.

Table 1. Distribution of ectoparasites by hosts

Host species	Parasite species	
	Parasitiformes	Other groups
R. hipposideros	*Spinturnix myoti*, *Ixodes vespertilionis*	*Leptotrombidium russicum* (Acariformes)
M. daubentoni	*Ichoronissus* sp., *Spinturnix myoti*	(no)
M. myotis	*Ichoronissus* sp., *Spinturnix myoti,*	*Nycteribia sp.* (Diptera), *Ischnopsyllidae gen. sp.* (Aphaniptera)
P. auritus	*Ichoronissus* sp., *Spinturnix myoti, Spinturnix plecotinus*	*Leptotrombidium russicum* (Acariformes)
P. austriacus	*Ichoronissus* sp.	*Pulex irritans* (Aphaniptera)
N. noctula	*Spinturnix accuminatus* Lipponyssidae gen. sp.	(no)
N. leisleri	*Spinturnix accuminatus*	(no)

Family Liponyssidae Ewing, 1923 (= Macronyssidae Oudemans, 1936)

Genus *Ichoronyssus* Kolenati, 1858

2. *Ichoronyssus* sp. Hosts: *Myotis myotis* (winter, Mlynky, Ugryn caves), *Myotis daubentonii* (winter, Ugryn cave), *Plecotus auritus* (winter, Ugryn cave), *Plecotus austriacus* (winter, Kryshtaleva cave). General quantity: 52 specimens.

Gen. et sp.

3. Liponyssidae gen. sp. Hosts: *Nyctalus noctula* (summer, forest). General quantity: 87 specimens.

Family Spinturnicidae Oudemans, 1901

Genus *Spinturnix* v. Heyden, 1826

4. *Spinturnix acuminatus* Kolenati, 1856. Hosts: *Nyctalus leisleri* (summer, forest), *Nyctalus noctula* (summer, forest). General quantity: 27 specimens.

5. *Spinturnix myoti* Kolenati, 1856. Hosts: *Rhinolophus hipposideros* (winter, Kryshtaleva cave), *Myotis daubentoni* (winter, Ugryn cave), *Myotis myotis* (summer, forest; winter, Mlynky, Ugryn caves), *Plecotus auritus* (winter, Slavka cave). General quantity: 30 specimens.

6. *Spinturnix plecotinus* Oudemans, 1910. Hosts: *Plecotus auritus* (winter, Ugryn, Kryshtaleva, Verteba caves). General quantity: 11 specimens.

Family Trombiculidae Ewing, 1929

Genus *Leptotrombidium* Nagayo, Mijagawa, Mitamura, Imamura, 1916.

7. *Leptotrombidium russicum* Oudemans, 1902. Hosts: *Rhinolophus hipposideros* (winter, Verteba cave), *Plecotus auritus* (winter, Mlynky cave). General quantity: 3 specimens.

Family Ischnopsyllidae

Genus *Ischnopsyllus* Westwood

8. Ischnopsyllidae gen. sp. Hosts: *Myotis myotis* (winter, Ugryn cave). General quantity: 1 specimen.

Family Pulicidae

Genus *Pulex* Linne.

9. *P. irritans* Linne. Hosts: *Plecotus austriacus* (winter, Kryshtaleva cave). General quantity: 3 specimens.

Family Nycteribiidae

Genus *Nycteribia*

10. *Nycteribia* gen. sp. Hosts: *Myotis myotis* (winter, Mlynky cave). General quantity: 2 specimens.

Discussion

The issue of bat ectoparasites in the territory of Ukraine was studies by E. M. Yemchuk (1954, 1960), N. G. Bregetova (1956), V. I. Yurkina (1961), G. I. Guscha (1970). Little information is available concerning sanguivorous flies (family Nycteribiidae). Single records of them are reported in proceedings of V. I. Abelentsev (1956) and K. A. Tatarinov (1973).

As a result of research conducted, we registered 10 species of ectoparasites, which represent 8 genera of 7 families belonging to 4 orders of 2 Arthropod classes. Among them are ectoparasites that specialise on the level of Chiroptera order (*Ichoronissus* sp., *Ixodes vespertilionis, Nycteribia* sp., Ischnopsyllidae gen. sp.), on genera level (*Spinturnix accuminatus, S. myoti, S. plecotinus*) as well as parasites of mammals in general (*Leptotrombidium russicum, Pulex irritans*).

The largest species diversity is revealed for the fauna of ectoparasites of *Myotis myotis* and *Plecotus auritus* (4 species are registered).

The largest number of ectoparasites (111 specimens) is registered for *Nyctalus noctula*. Thus, ectoparasites of bats are represented by mites and insects.

The largest species diversity among the ectoparasites is characteristic for the genus *Spinturnix* (3 species).

In addition, we compared the ectoparasite faunas of different bat species. The largest similarity between ectoparasites faunas is registered for bats, which hibernate within the studied territory, including *Rhinolophus hipposideros, Myotis daubentonii, Myotis myotis, Plecotus auritus,* and *Plecotus austriacus*.

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Резюме

Бобкова О. Ектопаразити кажанів західної України. — У ході обліків рукокрилих, що зимують у печерах Поділля та літнього населення кажанів заповіднику Медобори проводилися дослідження ектопаразитофауни кажанів. Вивчався та порівнювався видовий склад ектопаразитів з шести оглянутих печер та лісової частини заповідника, який нараховує сім видів кліщів (*Ixodes vespertilionis, Ichoronyssus* sp., *Spinturnix acuminatus, Spinturnix myoti*, *Spinturnix plecotinus*, *Leptotrombidium russicum,* Liponyssidae gen. sp.), два види бліх (*Pulex irritans,* Ischnopsyllidae gen. sp.) та один вид мух-кровососок (*Nycteribia* sp.). В результаті проведенних досліджень показано, що ектопаразитофауна рукокрилих Поділля складається з 10 видів, 8 родів, 7 родин, 4 рядів та 2 класів.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Реснитчатая (*Myotis nattereri*) и трехцветная (*Myotis emarginathus*) ночницы в Украине

Лена Годлевская

Институт зоологии НАН Украины (Киев, Украина)
e-mail: dc@isppe.freenet.kiev.ua

GODLEWSKA L. Natterer's bat (*Myotis nattereri*) and Geoffroy bat (*Myotis emarginathus*) in Ukraine. — Review of known records and diagnostic measurements of two rare bat species.

Введение

Реснитчатая и трехцветная ночницы относятся к редким видам рукокрылых Украины, имеющие согласно Красной Книге Украины 3 охранную категорию. В задачи данной работы входит обобщение всех имеющихся данных для уточнения границ распространения этих двух видов на территории Украины и уточнения их диагностических признаков.

Материалы и методы

Анализ имеющихся литературных данных. Анализ коллекции Национального Научно-природоведческого музея в Киеве (National Museum of Natural History in Kyiv) и Зоологической коллекции Киевского университета (Zoological collection of Kyiv State University).

Результаты

Myotis nattereri Kuhl, 1917

Распространение. Имеющиеся находки и регистрации вида на Украине имеют место в областях: Крым, Черкасская, Житомирская, Львовская, Закарпатская, Тернопольская, Винницкая, Одесская (см. табл. 1, карту на рис. 1), охватывая территорию юга днепровского правобережья и Крым. Данные относительно находок реснитчатой ночницы в прилегающих к территории Украины регионах позволяет говорить о возможности обнаружения вида и в других областях Украины (см. карту на рис. 1).

Общее. На зимовке одиночные особи найдены в Закарпатской и Львовской областях. Для двух пещер Закарпатья (Дружба и Гребень) за 10 лет регулярных осмотров отмечена только одна особь (Покиньчереда, 1997). Во всех остальных регионах вид найден в течение летнего периода.

Все находки летнего периода представлены одиночными особями (даже в случае однодневного обнаружения 3 самок, животные находились в разных деревьях (Сологор и др., 1970). Исключением является упоминание находки колонии в Корсунь-Шевченковском районе, Черкасской обл. Лихотопом и др. (1990; без деталей). Общее число известных регистраций вида за 100-летний период — около 21. В коллекции ННПМ в Киеве имеется единственный экземпляр реснитчатой ночницы, добытый 31.10.1940 (табл. 2).

Таблица 1. Находки ночницы реснитчатой на территории Украины

Область	Район и местонахождение	Дата, кол-во, пол	Автор
Крым	Симферополь, с. Бурульча Бахчисарай, Тене-Кермен (пещ.) Бахчисарай, Мангуп-Кале (пещ.) Ялта, Крымский заповедник Ялта, Никитский ботсад Хребет Хыр-Алан	__.__.__ (1 M) 25.06.60 (2 M) 28.06.60 (1 F, pregn) __.__.__ (2) 16.06.79 (1 F ad), 07.08.79 (1 M ad) 18.08.54 (1)	Браунер, 1912 Константинов и др., 1976 Дулицкий, 2000; личн. сообщ.
Черкасская	Черкасский лесгоспзаг Корсунь-Шевченковский, с. Выграев	27.09.68 (1 M), 07.05.69 (1 M), 24.06.69 (3 F) __.__.__ колония	Сологор, 1970 Лихотоп и др., 1990
Житомирская	Новоград-Волынский	__.__.__ (погадки сипухи, черепа)	Мигулин, 1938
Львовская	Подкаменский, v. Pinyaki (cave) Львовский, Medovye Caves Дрогибичский, ст. Козлинка (cave)	24.09.40 (1) 03.11.40 (1) 31.10.40 (1 M)	Абеленцев и др., 1956; Татаринов, 1956
Закарпатская	Гжгород, Глыбоке Берегово Мукачево, с. Кольчино Мукачево (attick) Ужгород, с. Вел. Добронь Виноградовский, Вел. Комяты Хустский, пещ. Дружба	__.__.__ (зима) (1) __.__.__ (зима) (1) __.__.__ __.__.__ (черепа) 05.05.48 __.__.__ 12.02.97 (1)	Крочко, 1964 Стрелков, 1969 Татаринов, 1956 Абеленцев и др., 1956 Покиньчереда, 1997
Тернопольская	Бугацкий, Золотой Поток	28.08.98 (2 F+M)	Тищенко, 1999
Винницкая	Ольгополь	__.__.__ (2)	Кузякин, 1950
Одесская	Котовск	__.__.__	Абеленцев и др., 1956

Диагностика. Имеющиеся в распоряжении автора диагностические промеры нескольких особей, добытых на территории Украины, отличаются от представленных в ряде определителей. Рассматривая промеры длины предплечья, как один из главных внешних диагностических признаков, имеем Ra = 39–43 мм (n = 9).

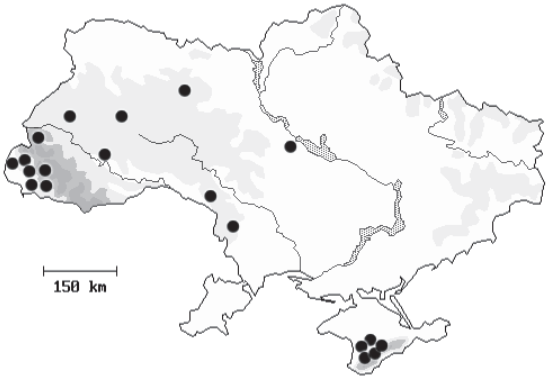

Рис. 1. Места находок *M. nattereri* в Украине.

Таблица 2. Метрические признаки реснитчатой ночницы

Дата	Коллектор	Пол	Ra, мм	L, мм	Ca, мм	P, мм	A, мм	Tr, мм
22.08.98.	Тищенко	♂	43					
22.08.98.	Тищенко	♀	41					
..**.	Браунер	♀	39	42	42		18	12
27.09.68.	Сологор	♂	40	48	45	8	18	11
07.05.69.	Сологор	♂	40	45	43	8	17	11
24.06.69.	Сологор	♀	39,5	51	42	8,5	17,5	10,3
24.06.69.	Сологор	♀	39,5	48	39	9	18	11
24.06.69.	Сологор	♀	42	49	43	8,3	17,8	10,6
31.10.40.	Попов	♂ ad	40,7	49	46		19	10
В целом			39–43 (n = 9)	42–51 (n = 7)	39–46 (n=7)	8–9 (n = 5)	17–19 (n = 7)	10–12 (n = 7)

Большой диапазон в длинах предплечья у ряда авторов «обусловлен» включением в *M. nattereri* Kuhl, 1917 подвида *M. nattereri araxenus* Dahl, 1947, имеющий большие размеры и теперь выделяемый в отдельный вид *M. shaubi* Kormos, 1934 (Horacek, Hanak, 1982–1983). В остальных случаях предлагаемые промеры, возможно, связаны с географической изменчивостью вида.

Сведения об изменчивости длины предплечья у реснитчатой ночницы, согласно данным разных исследователей, сведены в таблице:

	KUZ 1950*	ABEL 1956	STR 1963	KOW, RUP (1984	WOL 1991	ZAG 1999	KOZH 1999	Автор
Ra	36,5–48	36,4–48	36,4–48	35–42,3	35–43	35–40	36,4–49	39–43

Источники: KUZ 1950 — Кузякин 1950; ABEL 1956 — Абеленцев и др., 1956; STR 1963 — Стрелков 1963; KOW, RUP 1984 — Kowalski & Ruprecht 1984; WOL 1991 — Wolozhyn 1991; ZAG 1999 — Загороднюк та ін. 1999; KOZH 1999 — Кожурина 1999; Автор — сведения автора.

***M. emarginatus* Geoffroy, 1806**

Распространение. Находки вида имеют место в областях: Закарпатской, Тернопольской, Черновицкой, Крыму (см. карту на рис. 2 и таблицу 2).

Общее. На зимовке вид найден в Закарпатской и Черновецкой, Тернопольской (?) областях. Материнские колонии обнаружены в Крыму (чердак, пещера и грот). Отмечена склонность к смешению с подковоносами.

В коллекции ННПМ есть образцы 10 самок (25.06.38, с. Карасубашы, Белогорский р-н, Крым) и 1 самец (19.02.49, Закарпатская обл., г. Берегове).

Рис. 2. Места находок *M. emarginatus* в Украине.

Таблица 3. Находки трехцветной ночницы на территории Украины

Область	Район и местонахождение	Дата, кол-во, пол	Автор
Закарпатская	г. Берегове	19.02.49 (1 M ad)	Абеленцев, 1950
	г. Ужгород	__.08.47 (1)	
	Ужгородский, Н. Солотвино	__.__.__ (зима) (1)	Крочко, 1964
	Мукачевский, с. Кольчино	__.__.__	Стрелков, 1964
	Ужгород, с. Глыбоке	__.__.__	
	Береговский, с. Мужиево	__.__.__	
	Хустский, пещ. Дружба, Гребень	1–8 (каждую зиму в течение 10 лет)	Покиньчереда, 1997
Терно-польская	Залещики	__.__.__ (1)	Татаринов, 1956
Черно-вицкая	Заставневский, с. Баламутовка	11.01.98 (1)	Варгович, 1998
Крым	Симферополь	__.__.__	Браунер, 1912
	Белогорский, с. Карасубашы	25.06.38 (50 F)	Абеленцев, 1956
	Бахчисарайский, с. Почтовое	10–12 F (кажд. зиму 12 лет)	Константинов и др., 1976
	Бахчисарай, Тене-Кермене, пещ. гор.	25.06.60 (1)	
	Бахчисарай, Ели-Сала, пещера		
	Судакский, Кара-Даг	__.__.__ (1) лето	
		__.06.60 (3 F)	
		31.07.47 (1 F juv)	(№ 1951, КГУ, Корнеев)
		01.08.47 (1 M ad)	(№ 1952, КГУ, Корнеев)
		25.06.38 (1 F ad)	(№ 1953, КГУ, Попов)

В коллекции ЗМ КГУ — 3 экз., добытые в разное время в Кара-Даге, Судакского района (1 самка juv., 31.07.47; самец ad, 01.08.47; взрослая самка, 25.06.38). На зимовке в Крыму вид не отмечен (Константинов и др., 1976).

Таблица 4. Метрические признаки трехцветной ночницы

Дата	Музей	Пол	Промеры тела, мм							Промеры черепа, мм		
			Ra	Ra'	L	Ca	P	A	Tr	CBL	Mand	CM3
25.06.38	–	♀	41,9	41,6	47,5	48	9,4	17	–	15,4	12	6,4
25.06.38	–	♀ad	41,8	41,3	48,5	48	9,1	15,5	–	15,2	12	6,4
25.06.38	–	♀ad	41,5	40,9	50	44,5	9,4	16,5	–	15,7	11,8	6,6
25.06.38	–	♀ad	40,5	40,3	48,5	49	9,1	19	–	15,3	11,9	6,3
25.06.38	–	♀ad	41,1	39,8	47,9	44,6	9,4	19	–	15,3	12,1	6,7
25.06.38	–	♀	41,1	40,8	51,5	46,5	9,5	20	–	15,8	12,1	6,7
25.06.38	–	♀ad	40,3	39,9	50	47	9,3	17,5	–	15,2	11,9	6,4
25.06.38	–	♀ad	41	40,4	46,1		9,5	17	–	15,2	12	6,6
25.06.38	–	♀ad	40,1	39,8	44,5	47	9	16,5	–	15,3	11,9	6,3
25.06.38	–	♀ad	41	40,8	50	46	9,2	18	–	15,3	12	6,5
19.02.49	–	♂ad	40	40,5	44,6	44	8,2	17	8	15	11,7	6,2
31.07.47	КНУ	♀juv	–	–	–	–	–	–	–	–	–	–
01.08.47	КНУ	♂ad	–	–	–	–	–	–	–	–	–	–
25.06.48	КНУ	♀ad	–	–	–	–	–	–	–	–	–	–
min-max			40–41,9	39,8–41,6	44,5–51,5	44–49	8,2–9,5	15,5–20	8	15–15,8	11,7–12,1	6,2–6,7

Диагностика. Средних размеров, «оранжевые» мыши. Длинные уши. Прямоугольная вырезка. Среднеазиатские — больше. Данные по длине предплечья согласно разным источникам сведены в следующей таблице.

	KUZ (1950)*	ABEL (1956)	STR (1963)	KOW, RUP (1984)	WOL (1991)	ZAG (1999)	KOZH (1999)	Автор
Ra	39–43,5	39–43,5	38,5–44	36–40,5	36–41	38–44	36–44	40–41,9 [39,8–41,6]

* Примечание: обозначения как в предыдущей подобной таблице.

Исследование показало, что оба рассмотренных автором вида ночниц являются редкими, но регулярно регистрируемыми видами рукокрылых, характерных для фауны Украины.

Коллекции зоологических музеев несут немалый и важный объем материалов благодаря накоплению сведений, собранных в разные годы разными исследователями. Такие материалы важны для формирования представлений о редких видах в составе местной фауны и для планирования дальнейших их поисков и исследования состояния популяций.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Rare bat species of the southwest megaslopes of the Ukrainian Carpathians

Yuly I. KROCHKO

Uzhgorod National University (Uzhhorod Ukraine)
e-mail: krochko@univ.uzhgorod.ua

Introduction

The southwest megaslope of the Ukrainian Carpathians includes the mountainous and piedmont territory. The list of rare bat species of the southwest megaslope of the Ukrainian Carpathians is compiled on the base of a long-lasting investigation of small mammals and generalisation of literature data (Abelentsev 1950, 1956; Tatarinov 1956–1973; Koliushev 1958; Krochko 1964–1998).

There are 13 rare bat species in the studied area (Table 1)[1]. At the same time, the presence of such species as *Myotis dasycneme*, *Miniopterus schreibersii* and *Vespertilio nilssonii* is not confirmed by actual material, which is why it demands further investigations in order to conclude on their occurence in the fauna of the studied region.

Table 1. Rare bat species of the Ukrainian Carpathians

No.	Species	URDB	BC
1	*Rhinolophus hipposideros*	+	–
2	*Rhinolophus ferrumequinum*	+	–
3	*Myotis bechsteinii*	+	–
4	*Myotis daubentonii*	–	+
5	*Myotis dasycneme*	+	+
6	*Myotis nattereri*	+	–
7	*Myotis emarginatus*	+	–
8	*Miniopterus schreibersii*	+	–
9	*Barbastella barbastellus*	+	–
10	*Nyctalus leisleri*	+	–
11	*Pipistrellus nathusii*	–	+
12	*Vespertilio nilssonii*	+	+
13	*Vespertilio murinus*	+	+

URDB — Ukrainian Red Data Book, BC — Bern Convention.

[1] When the record of *Myotis brandtii* will be confimed based on the skull of the only specimen from the Carpathian Biosphere Reserve (Pokynchereda), this list will include 14 species.

Additionally, attention should be paid to some other species, which are included in the Annex 2 of the Bern Convention, such as *Myotis blythii, M. myotis, M. mystacinus, Plecotus auritus, P. austriacus, Nyctalus noctula, Pipistrellus nathusii,* and *Eptesicus serotinus*.

To present the complete taxonomic and biological description of all rare species is unnecessary, because they were presented in a series of publications by V. Abelentsev (1956) and J. Krochko (1964–1999). In this article, we focus only on the sites of their present localities and the settlement characters, evaluation of population's condition, factors that made vulnerable and threaten the species, as well as on main conservation measures.

Species description

***Rhinolophus ferrumequinum* and *R. hipposideros*.** As presented in Table 1, these are well-distributed species in the studied region and can be found (with rare exception) in underground-type shelters. The settlings are solitary. Incompact colonies are characteristic except for *R. ferrumequinum*. This type of settling is observed in Mukacheve district, where the colony consists of up to 350 individuals. The total abundance of *Rhinolophus* in the studied area is relatively small (200–250 individuals of each species). During the last years, a tendency of increasing abundance of *Rhinolophus hipposideros* is noted. There is no essential threat for *Rhinolophus* populations, but the degradation of underground-type shelters leads to the redistribution of settlements. Potentially, privatisation of lands, including vineyards, will provide an opportunity to increase the number of *Rhinolophus* shelters and it will strengthen their total specific weight in the bat fauna of the studied region.

Myotis bechsteinii. The first records of this species in the Ukrainian part of the Carpathian region were reported by K. Tatarinov in 1949–1952. On the southeast megaslopes of the Ukrainian Carpathians, we registered them for the first time in the environs of village Glyboka in 1969. The first findings of this species belong to 1972, 1985, 1991, and 1998. In 1994, *M. bechsteinii* was registered in shelters of the Carpathians Biosphere Reserve. The species's biology is studied insufficiently, but based on the available data we consider that it is a settled solitary species in the studied area. It inhabits tree hollows and dungeons, hibernates in caves and dungeons.

***Myotis dasycneme*.** In the Ukrainian part of the Carpathian region, this species is know from Lviv region. On the southeast megaslope of the Ukrainian Carpathians, only one locality is know in village Sol, Velyko-Berezny district (1983). Since the record was found in autumn, probably it was a migrating animal. As there were no repeated findings, the present distribution of the species in the Transcarpathian region is dubious.

***Myotis daubentonii*.** One of the ecologically plastic species in the studied area. The number of *M. daubentonii* during the last years decreased because of tree cut-

tings on riverbanks and melioration works. According to V. Pokynchereda, it is one of the most abundant bat species in vicinities of Rakhiv.

Myotis nattereri. One of the typically rare species of bats in the studied area, which is mostly related to the Transcarpathian lowland and reaches the altitude of 250–300 m. It is a solitary species inhabiting trees hollows and dungeons. The species number in the studied area is about 100–150 individuals.

Myotis emarginatus. Until the beginning of 1990, it was known mainly from the plain regions. During the last years, it was found to hibernate in small numbers (near 10 individuals) in shelters of the Carpathians Biosphere Reserve. In our opinion, it is because of the current essential degradation of underground shelters in the plains and lowlands. The total number of the species in the studied territory is about 100 individuals.

Miniopterus schreibersii. Until the middle of 1970, it was one of the most numerous bat species in the studied area. In the Transcarpathian region, near 15 colonies of this species were known, the number of each of them was 500 to 4000 individuals. Currently, the species' occurence in the studied region is duboius, but its absence should be not accepted as final. The latest information on this species belongs to the beginning of the 1990, when in the Carpathian Biosphere Reserve (Maramorosh massif, Dovharunya cave) near 200 individuals were found. Under the assistance of EUROBATs, we lead the species searches, but they semm to be futile so far. The works in this direction are continued, especially in the Uzhansky National Park and Zatysiansky regions of Transcarpathia. It is unrealistic that the species whose populations exist in northwest Hungary and Slovakia, has disappeared in Transcarpathia. Potentially, due to the mobility of the species, it will reappear in the region.

Barbastella barbastellus. A typical rare species. Its populations in the studied area are stable, but not abundant. In some years, the species number in shelters during hibernation can reach from a single to 10 and more individuals.

Nyctalus leisleri. It was distributed irregularly on a large part of Transcarpathia. It is one of the most rare bat species in the studied region. Currently, it is know only in the territory of the Carpathian Biosphere Reserve, where it was found by V. Abelentsev in 1963. In vicinities of village Drahovo (18.08.1990), male individuals flew into a house through the window. The number of dendrophyle species complex, and, probably, migrant bat species. Considering that the main part of the area of distribution is situated in the zone of the reserved forest, there are good conditions for the species preservation and reproduction.

Pipistrellus nathusii deserves special attention. It is well-distributed in the forest and forest steppe zones of Ukraine. On the southwest megaslopes of the Ukrainian Carpathians, it is one of the rare species of bats and inhabits the piedmount areas. When hibernating, it is found in hollows of buildings in the lowland part of the Transcarpathian region in colonies together with *Pipistrellus pipistrellus*.

Vespertilio nilssonii. Until 1990, it was one of the rare species of bats in the studied area, the number of which was not more than a few dozens of individuals. The present distribution of this species in the studied area needs to be revised and clarified.

Vespertilio murinus. It is a typical rare species of bats, but during the last years thanks to detector registration it was revealed that the species' number increases in the territory of the Carpathian Biosphere Reserve (according verbal information of V. Pokynchereda).

Discussion

When elaborating measures on the protection of rare species, including of bats, the level of their sedentariness should be considered. There are two aspects. The first aspect is to elaborate measures on the protection of species that are settled. To predict the number and to protect these species for future we should take into consideration the article, which determines the status of the Ukrainian Carpathians. There are a few variants in this direction. The first variant is more optimal. The Ukrainian Carpathians, including the southwest megaslopes will become a cultural-recreational zone in which the industrial development will be limited. The building of cult objects will increase (churches, temples, *etc*.). Using poisonous chemicals against agricultural and forest pests increases. In this perspective, the abundance of bats, including rare species, first will stabilise. Based on current circumstances, dendrophyle species are an exception because there is a total chaos in forest economy. This phenomenon should be taken under control.

It should be noted that the tendency of population dynamics of some species is not even. A part of the well-distributed species, such as *M. blythii, M. myotis, N. noctula, P. pipistrellus,* and *E. serotinus* due to their high ecological plasticity can adapt to the different conditions of the environment and their number will be stable. The number of other species, such as *M. nattereri, M. emarginatus, M. schreibersi,* and *V. nilssonii* will decrease, untill they disappeare.

As an example, this process we can see in *M. schreibersii* and *V. nilssonii*.

The second aspect is elaboration of protection measures on species that carry out regular migrations to more or less large distances. When organising and conducting protection measures, attention should be paid to international aspect. Only the joint work of chiropterologists of the Carpathian region countries can conserve the bats biodiversity. First, cadaster maps should be created in all countries. The data from these maps will be transferred to the Carpathian bats atlas. This atlas should be a database on the bat fauna and contain information on the status of species, their distribution, abundance, seasonal dynamics, conservation measures, and their perspectives in the future.

In our opinion, interesting should be the reintroduction of species to places, where they occurred earlier, but now they are absent. There are some examples of such measures in other groups of animals. They should be used in bats too. In par-

ticular, such experiments should be realised with *M. schreibersi* or *V. nilssonii*, whose populations are large in countries of the Carpathian region. This is a difficult task and it demands a great care not to damage the populations, in which the reintroduction is carried out.

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Резюме

Крочко Ю. Раритетні види кажанів південно-західних мегасхилів Українських Карпат. — Список раритетних видів кажанів південно-західних мегасхилів Українських Карпат складений на основі багаторічного дослідження автором цієї групи дрібних ссавців та узагальнення літературних даних. В районі дослідження до раритетних видів відноситься 13 видів кажанів: *Rhinolophus hipposideros, R. ferrumequinum, Myotis bechsteinii, M. daubentonii, M. dasycneme, M. nattereri, M. emarginatus, Miniopterus schreibersii, Barbastella barbastellus, Nyctalus leisleri, Pipistrellus nathusii, Vespertilio nilssoni, V. murinus*. У разі підтвердження знахідки черепа на території Карпатського біосферного заповідника (колектор В. Покиньчереда) слід додати і *Myotis brandti.* Останніми роками наявність *M. screibersii* та *V. nilssoni* не підтверджується фактичним матеріалом, що вимагає подальших ретельних досліджень. Приймаючи до уваги деградацію сховищ кажанів, при розробці заходів по охороні раритетних видів ми повинні врахувати важливість міжнародної співпраці. Тільки спільна праця науковців сусідніх країн може зберегти біорізноманіття кажанів в Карпатському регіоні. Вихідним у цій справі вважаємо створення карпатського атласу кажанів, який буде базою даних не тільки з видового складу і місць локалізації кажанів загалом, але й вміщувати відомості про їхній статус, ступінь осілості, чисельність тощо.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Cave dwelling bats in the Bihor and in the Padurea Craiului Mountains

Zoltán NAGY[1], László SZÁNTÓ[1], Farkas SZODORAY-PARÁDI[2]

[1] *Transylvanian Museum Association (Cluj-Napoca, Romania)*
e-mail: okostud@mail.dntcj.ro
[2] *Transylvanian Museum Association (Satu Mare, Romania)*
e-mail: farkas@cfk.satmar.ro

NAGY Z., SZÁNTÓ L., SZODORAY-PARÁDI F. ***Cave dwelling bats in the Bihor and in the Padurea Craiului Mountains.*** — In this paper, we present our results of the research in the caves of Padurea Craiului and the Bihor Mountains region from 1996 untill 2000. We found 18 bat species; the most frequent were *Rhinolophus ferrumequinum, Myotis myotis/blythii*, *Miniopterus schreibersii*. We also discuss the changes of species composition, abundance in some important caves. Our data show the decline of the large nursery and hibernating colonies of the above-mentioned species.

Introduction

The bat fauna from the Western Carpathians is poorly known; this is one of the least investigated regions in Romania. Bihor and the Padurea Craiului Mountains — our research area — is a reach karst region, which contains a large number of caves suitable for bats. Two major river valleys compose this territory, the Crisul Negru and the Crisul Repede. The initial research on bats of these parts of the Western Carpathians was carried out in the 1960's (Dumitrescu *at al.* 1962–1963).

They described only five species, but without mentioning the number of bats, just referring to the presence or absence of the animals, and using two categories: isolated individual and colony. In the early 1990's, Hungarian bat workers started a large-scale investigation in the Bihor Mountains (Dobrosi & Gulyas 1997) and they present 13 species but also without mentioning the name of the caves where the bats were observed or the size of the colonies.

Materials and methods

Since 1996, 22 caves were visited, which were selected based on the following criteria: big entrances and the presence of large chambers and corridors. These underground sites are situated between 305 and 700 m a.s.l.

All these caves were visited regularly year to year, in different seasons. For investigation, we use visual census and also mist netting in front of the entrances to roosts, in transitory and summer periods.

During our work, we determined the number of species and individuals, as well as the microclimatic condition of the caves (temperature, humidity).

We tried to establish the seasonal changes in the species composition and abundance in some important caves with high species diversity. At the same time, we investigated roosts of endangered species with unique conservation values.

Results and discussions

In the results of our investigation, we found 18 bat species which were registered in 22 caves during the observation.

1. *Rhinolophus ferrumequinum* (Schreber, 1774)

New data: *Cave Bulz*, 7 ex. 1996.04.20, 276 ex. 1996.10.08, 353 ex. 1996.12.09, 403 ex. 1997.02.28, 114 ex. 1998.10.25, 166 ex. 2000.01.07, 5 ex. 2000.08.13; 60 ex. 2000.09.20, 150 ex. 2000.11.15, *Cave Lesu* 859 ex. 1995.12.08, 709 ex. 1996.01.12, 591 ex. 1996.03.15, 371 ex. 1996.04.05, 225 ex. 1996.04.20, 579 ex. 1996.10.30, 733 ex. 1996.11.20, 804 ex. 1996.12.11, 865 ex. 1997.01.15, 526 ex. 1997.03.19, 54 ex. 1997.04.30, 407 ex. 1997.10.18, 785 ex. 1998.04.03, 354 ex. 1998.10.25, 397 ex. 2000.01.08, 15 ex. 2000.09.20, 541 ex. 2000.11.15, *Cave Gabi* 1 ex. 07.01.2000, *Cave Fata Apei* 9 ex. 2000.01.08, *Cave Ungurului* 89 ex. 1996.10.26, 105 ex. 1997.01.19, *Cave Osoi* 1 ex. 2000.01.20, *Cave Ticlu* 1 ex. 2000.01.20, *Cave Vadu Crisului* 1 ex. 1998.03.28, 150 ex. 1999.02.28, *Cave Dealul Cornii* 7 ex. 1998.10.26, *Cave Astileu* 5 ex. 1996.03.30, 18 ex. 1998.04.12, 4 ex. 2000.01.23, *Cave Igrita* 42 ex. 1996.03.30, 50 ex. 1997.02.10, 15 ex. 1997.10.08, 37 ex. 2000.01.23, 1 ex. 2000.08.13, *Cave Betfia* 110 ex. 1997.11.22, 100 ex, 2000.03.05, *Cave Meziad* 422 ex. 2000.02.15, 4 ex. 2000.06.20, 10 ex. 2000.08.13, 104 ex. 2000.09.21, *Cave Calului* 60 ex. 2000.06.20, *Cave Fagului* 46 ex, 1996.03.31, *Cave Tasad* 20 ex. 2000.06.20, *Cave Stracos* 6 ex. 2000.02.14, *Cave Fanate* 76 ex. 2000.02.16, 20 ex. 2000.06.19, *Cave nr. 27 from Sigistel Valley* 1 ex. 2000.02.17, *Cave Magura* 38 ex. 2000.03.04, 42 ex. 2000.06.19, 70 ex. 2000.09.22, *Cave Coliboaia* 750 ex. 2000.03.04, 3 ex. and 24 death specimens, 2000.06.19, 3 ex. 2000.09.22.

Literature data: Cave Magura and Cave Coliboaia 1949.12.04, Cave Meziad 1953.05.20, Cave Pisnita, Cave Igrita 1955.04.02, Cave Vadul Crisului 1953.05.20, 1955.03.18 (DUMITRESCU *at al.* 1962–1963); Cave Pisnita, Cave Meziad, Cave Magura, Cave Coliboia, Cave Ferice (VALENCIUC 1992–1993); Cave Stracos 7 ex. 1997.02.8, Cave Vadu Crisului 98 ex. 1997.02.15 (BARTI 1997).

Rhinolophus ferrumequinum is present in almost all caves of the territory, with strong colonies in winter, but only with a few small colonies in summer.

Using individual marking with rings in house dwelling summer colonies of the greater horseshoe bats in the lowland in Hungary, our colleagues succeeded to prove that their nursing bats used caves of the Western Carpathians as hibernating sites (Dobrosi & Gulyas 1997). Through our research, we found ten caves with colonies composed of more than 50 specimens, but in the last 5 years their number decreased in some places by 50–90 %, caused by direct human perturbation and non-adequate speleoturism.

2. *Rhinolophus hipposideros* (Bechstein, 1800)

New data: *Cave Bulz*, 1 ex. 1996.04.20, 1 ex. 1996.10.30, 2 ex. 1996.12.09, 3 ex. 1997.04.03, 1 ex. 1997.10.18, 1 ex. 2000.09.20, 4 ex. 2000.11.15, *Cave Lesu* 2 ex. 1995.12.08, 1 ex. 1996.01.12, 1 ex. 1996.04.20, 1 ex. 1996.10.30, 1 ex. 1996.11.20, 2 ex. 1996.12.11, 3 ex. 1997.01.15, 2 ex. 1997.03.19, 1 ex. 1997.10.08, 2 ex. 2000.11.15, *Cave Gabi* 2 ex. 07.01.2000, *Fata Apei Cave* 2 ex. 2000.01.08, *Cave Osoi* 1 ex. 2000.01.20, *Cave Astileu* 1 ex, 1996.03.30, *Cave Igrita* 4 ex. 1996.03.30, 3 ex. 1997.02.10, 2 ex. 1997.10.08, 4 ex. 2000.01.23, *Cave Stracos* 4 ex. 2000.02.14, *Cave Meziad* 18 ex. 2000.02.15, 2 ex. 2000.09.21, *Cave Fanate* 24 ex. 2000.02.16, 6 ex. 2000.06.19, *Cave Barta Sat* 1 ex. 2000.02.16, *Cave nr. 27 from Sigistel Valley* 2 ex. 2000.02.17, Cave Coliboaia 10 ex. 2000.03.04, 1 ex. 2000.06.19, *Cave Magura* 19 ex. 2000.03.04, 1 ex. 2000.09.22, *Cave Calului* 4-6 ex. 2000.06.20, *Cave Tasad* 70 ex. 2000.06.20, *Cave Vadu Crisului* 3 ex. 1998.03.28, 40. ex. 1999.02.28.

Literature data: Cave Igrita and Cave Magura 1949.10.26, Cave Ferice 1949.12.07, Cave Meziad 1953.05.20, Cave Pisnita 1955.03.18, Cave Vadu Crisului1955.03.19. (Dumitrescu at all. 1962–1963); Cave Pisnita, Cave Meziad, Cave Magura, Cave Coliboia, Cave Ferice (Valenciuc 1992–1993); Cave Vadu Crisului 4 ex. 1997.02.15 (Barti 1997).

The presence of the little horseshoe bat is sporadic, its number in caves is rarely more than 10 (the maximum was 40), we found this species in the third part of the totally investigated underground sites. They are more frequent in winter, like the greater horseshoe bat.

3. *Rhinolophus euryale* (Blasius, 1853)

New data: *Cave Bulz*, 4 ex. 1996.04.20, 5 ex. 1996.08.02, *Cave Calului* 6–8 ex. 2000.06.20, *Cave Meziad* 1 ex. 2000.06.19.

Rinolophus euryale is almost missing from the territory, its number decreases year by year. In the last years it was found only in summer, but in the beginning of the 90's this species was shown from 6 places with small groups of 10–20 specimens in winter and the biggest colony was formed by 200 bats in summer (Dobrosi & Gulyas 1997). They mostly occur together with *Miniopterus schreibersii.*

4–5. *Myotis myotis* (Borkhausen, 1797) / *Myotis blythii* (Tomes, 1857)

New data: *Cave Bulz*, 250 ex. 1996.04.20, 500 ex. 1996.08.02, 75 ex. 1996.10.30, 5 ex. 1997.01.15, 182 ex. 1997.04.03, 250 ex. 1998.10.25, 4 ex. 2000.07.01, 1.600–1.800 ex. 2000.08.13, 120 ex. 2000.09.20, *Cave Lesu*, 498 ex. 1995.12.08, 1783 ex. 1996.01.12, 3596 ex. 1996.03.15, 3580 ex. 1996.04.05, 1695 ex. 1996.04.20, 34 ex. 1996.10.10, 134 ex. 1996.10.30, 488 ex. 1996.11.20, 1085 ex. 1996.12.11, 2942 ex. 1997.01.15, 3226 ex. 1997.03.19, 918 ex. 1997.04.30, 32 ex. 1997.10.18, 3443 ex. 1998.04.03, 1 ex. 1998.07.25, 96 ex. 1998.10.25, 1.700 ex. 2000.01.08, 82 ex. 2000.09.20, 541 ex. 2000.11.15, *Cave Fata Apei* 4 ex. 2000.01.08, *Cave Ticlu* 6.000 ex. 1996.07.24, 1 ex. 2000.01.20, 610 ex. 2000.08.12, *Cave Vadu Crisului* 30 ex. 1999.02.28, *Cave Astileu* 600 ex. 1998.04.12, 200–250 ex. 2000.08.12, *Cave Igrita* 30 ex. 1996.03.30, 8 ex. 1997.02.10, 3 ex. 2000.01.23, *Cave Betfia* 300 ex. 1997.11.22, 800 ex. 1998.06.19, 130 ex. 2000.03.05, *Cave Stracos* 2 ex. 2000.02.14, *Cave Meziad* 44 ex. 2000.02.15, 1.500 ex. 2000.06.20, 3.500 ex. 2000.08.13,

Cave Fagului 4 ex, 1996.03.31, *Cave Fanate* 9 ex. 2000.02.16, *Cave nr. 27 from Sigistel Valley* 3 ex. 2000.02.17, *Cave Magura* 18 ex. 2000.03.04, *Cave Coliboaia* 5 ex. 2000.03.04, 400–450 ex. 2000.06.19.

Literature data: Cave Pisnita (1953.06.25), Cave Ferice (1957), Cave Onceasa (1956.06.04), Cave Meziad 1953.05.20) (Dumitrescu *at al.* 1962–1963); Cave Tasad 1 ex. 1997.02.08 (Barti 1997).

Beside the greater horseshoe bats, the most common species is *Myotis myotis/blythii* forming large hibernating and nursery colonies of 500–6,000 specimens. In this paper, we consider the two species together because the difficulties of the correct determination. We were able to distinguish the two species only when they were caught by mist netting. During the investigation, we met them in 15 caves, but in most of the caves the presence of bats was accidental, the big colonies inhabited the same shelters in every year. The roosts used by bats in the summer and winter are different, we met more frequently nursery/breeding colonies in the territory. Here is one of the biggest hibernacula with more than 3.500 "big myotis", and one of the largest nursery colony up to 6,000 specimens in Romania.

6. *Myotis bechsteinii* (Kuhl, 1817)

New data: *Cave Lesu* 1 ex. 1997.10.18, 1 ex. 2000.09.20, *Cave Coliboaia* 1 ex. 2000.06.19.

7. *Myotis emarginatus* (Geoffroy, 1806)

New data: *Cave Ungurului* 1 ex. 1996.10.26, *Cave Lesu* 3 ex. 1997.04.30.

8. *Myotis mystacinus* (Kuhl, 1817)

New data: *Cave Lesu* 1 ex. 1995.12.08, 1 ex. 1996.04.20, 2 ex. 1997.03.19, 2 ex. 1997.04.30.

9. *Myotis brandtii* (Eversmann, 1817)

New data: *Cave Lesu*, 1 ex. 1996.11.20, 3 ex. 1997.10.18, 1 ex. 2000.01.08.

In 1996, it was the second record for this species in the country and the first for the Romanian part of the Carpathian Mountains.

10. *Myotis mystacinus* (Kuhl, 1817) / *Myotis brandtii* (Eversmann, 1817)

New data: *Cave Lesu*, 1 ex. 1997.01.15, 4 ex. 2000.01.08, 2 ex. 2000.11.15.

11. *Myotis daubentoni* (Kuhl, 1819)

New data: *Cave Bulz* 1 ex. 1996.10.08, 1 ex. 2000.09.20, *Cave Lesu*, 1 ex. 1996.10.10, 1 ex. 1996.11.20, 2 ex. 1996.12.11, 1 ex. 1997.01.15, 10 ex. 1997.03.19, 4 ex. 1997.04.30, 4 ex. 2000.11.15.

12. *Myotis dasycneme* (Boie, 1825)

New data: *Cave Lesu* 1 ex. 1996.04.05, 2 ex. 1996.04.20, 4 ex. 1996.10.30, 1 ex. 1996.11.20, 2 ex. 1996.12.11, 2 ex. 1997.01.15, 7 ex. 1997.03.19, 1 ex. 1997.04.30, 1 ex. 1997.10.18, 2 ex. 2000.01.08, 2 ex. 2000.09.20, *Cave Bulz* 1 ex. 1996.10.08.

13. *Myotis nattererii* (Kuhl, 1818)

New data: *Cave Lesu* 1 ex. 2000.09.20, *Cave Bulz* 1 ex. 1996.10.08, *Cave Igrita* 1 ex. 1996.03.30.

14. *Eptesicus serotinus* (Schreber, 1774)

New data: *Cave Lesu* 1 ex. 1996.03.15, 2 ex. 1996.12.11, 1 ex. 2000.01.08.

15. *Plecotus auritus* (Linnaeus, 1758)

New data: *Cave Vadu Crisului* 1 ex. 1997.10.07, *Cave Lesu* 1 ex. 1996.10.09, 1 ex. 1996.10.30, 1 ex.1996.12.11, 1 ex. 1997.01.15, 3 ex. 2000.01.08, 2 ex. 2000.09.20.

Literature data: Cave Meziad, 1953.05.20. (Dumitrescu et al. 1962–1963).

16. *Barbastella barbastellus (*Schreber, 1774)

New data: *Cave Lesu* 8 ex. 1995.12.08, 2 ex. 1996.01.12, 1 ex. 1996.04.05, 1 ex. 1996.11.20, 2 ex. 2000.01.08, *Cave Fata Apei* 2 ex. 2000.01.08, *Cave Meziad* 4 ex. 2000.02.15.

Barbastella barbastellus was found during the hibernation and we have poor knowledge about its distribution patterns. Until this time, this bat's presence was shown in just 4 places in the Southern and Eastern Carpathians in a very small number. For distribution area in the country, we described 4 new locations in the western karst regions. Our experience shows that this species is more frequent; sometimes we found winter colonies of 50 specimens.

17. *Pipistrellus pipistrellus* (Schreber, 1774)

New data: *Cave Meziad* 200 ex. 2000.02.15, 1 ex. 2000.06.20.

18. *Nyctalus noctula* (Schreber, 1774)

New data: *Cave Meziad* 2 ex. 2000.02.15.

19. *Miniopterus schreibersii* (Kuhl, 1817)

New data: *Cave Bulz* 250 ex. 1996.04.20, 280 ex. 1996.07.02, 190 ex. 1996.10.12, 378 ex. 1996.10.30, 168 ex. 1997.04.03, 150 ex. 1998.10.25, 200 ex. 2000.08.13, 120 ex. 2000.09.20, *Cave Lesu* 4 ex. 1996.03.15, 1 ex. 1996.04.05, 10 ex. 1996.04.20, 1 ex. 1996.10.09, 1 ex. 1997.04.30, *Cave Astileu* 1 ex. 1996.03.30, 250 ex. 1998.04.12, 1.300 ex. 2000.08.12, *Cave Ticlu* 200 ex. 2000.08.12, *Cave Betfia* 360 ex. 1997.11.22, 190 ex. 2000.03.05, *Cave Meziad* 140 ex. 2000.02.15, 3.000 ex. 2000.06.20, 1.700 ex. 2000.08.13,

Cave Coliboaia 750 ex. 2000.06.19, *Cave Magura* 5 ex. 2000.06.19, 54 ex. 2000.09.22, *Cave Fanate* 350 ex. 2000.06.19.

Literature data: Cave Igrita, Cave Moneasa, 1950.08. Cave Magura 1949.10.26, 1949.12.04, Cave Fanate, Cave Ferice 1949.12.07, 1954.07.30, Cave Meziad 1953.05.20, Cave Pisnita 1955.03.18. (Dumitrescu *at al.* 1962–1963).

In the last decades, the population of *Miniopterus schreibersii* has declined in Romania, hibernating colonies decreased by 90 % as far as we know at this moment. In the Bihor and Padurea Craiului Mountains, long winged bats are present all year, we know three important nursery and two hibernating colonies.

These last hibernaculas are unique in Romania, with more than 100 wintering specimens. In summer and nursery colonies, we found together with the *Myotis myotis/blythii*, and in the southern parts of the Carpathians they have mixed colonies also with *Myotis capaccinii*. In the research area, they disappeared from 4 caves since 1950, but we found 5 new locations in the investigated area.

Conclusion

As a result of our investigation, we found 18 species in the underground shelters of the Bihor and Padurea Craiului Mountains. Besides these species, the literature mentions the presence of *Pipistrellus nathusii* (Dobrosi & Gulyas 1997), so there is a total of 19 species.

The most important of them from the point of view of the protection and frequency are *Miniopterus schreibersii*, *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros,* and *Myotis myotis/blythii*. They form large colonies, and like in most parts of Europe, the populations of these species start to decline dramatically in the last decades in Western Carpathians as well. The nursery and hibernating colonies are present mostly in caves, which are often visited by tourists, and they are continuously under the pressure of human perturbation.

Some other species: *Myotis mystacinus*, *M. emarginatus*, *M. bechsteinii*, *M. nattereri* were observed by mist netting, in spring and autumn.

The other species increase diversity of hibernating bats in caves, including *Eptesicus serotinus*, *Plecotus auritus*, *Myotis dasycneme*, *M. daubentonii*, *M. brandtii*, *Barbastella barbastellus, Nyctalus noctula*, and *Pipistrellus pipistrellus*.

These species appear occasionally and in small number in winter period, with the exception of the pipistrelle bat. We found this species hibernating in one cave in the Bihor Mountains, where it formed a colony of 200 individuals in the crevices of one artificial wall, built relatively close to the entrance of the cave.

Myotis brandtii is recorded first for the bat fauna of the Carpathians, and *Myotis mystacinus, Eptesicus serotinus*, *Pipistrellus pipistrellus* are described also for the first time in the caves of the Bihor and Padurea Craiului Mountains.

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Резюме

Нодь З., Санто Л. , Шодорай-Параді Ф. Кажани — мешканці печер гірських масивів Біхор та Падурея-Краюлуй. — Представлено результати досліджень в печерах регіону Падурея-Краюлуй та Гір Біхор, преведених з 1996 до 2000 рр. Всього виявлено 18 видів кажанів, серед яких найчисельнішими були *Rhinolophus ferrumequinum, Myotis myotis/blythii* та *Miniopterus schreibersii*. Дискутуються зміни видового складу та чисельності кажанів в деяких найголовніших печерах. Отримані дані свідчать про зменшення великих літніх материнських та зимівельних колоній зазначених видів.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Migratory status of *Pipistrellus nathusii* and *Pipistrellus pipistrellus* in Ukraine

Vadym Negoda[1], Igor Zagorodniuk[2]

Ukrainian Centre for Bat Protection: [1] Kyiv National University (Kyiv, Ukraine)
[2] National Museum of Natural History (Kyiv, Ukraine); e-mail: zoozag@ukr.net

NEGODA V., ZAGORODNIUK I. Migratory status of Pipistrellus nathusii and Pipistrellus pipistrellus in Ukraine. — The analysis of all known collection specimens, with reference to the localities and dates of the findings, as well as the reidentifications of the material is presented. Both species have migratory status in Ukraine. Their abidance in Ukraine is limited only to a few months, from May to September (5 months) for *Pipistrellus nathusii*, and from April to October (7 months) for *Pipistrellus pipistrellus*. The breeding areas of the common and Nathusius' pipistrelle in Ukraine overlap only in the Carpathian region. *Pipistrellus nathusii* is common in breeding season only in the northern forest part of Ukraine, and it occurs in the south only during migration time. The males of *P. nathusii* migrate from Zakarpattia later than females. The common pipistrelle is present in Ukraine only in the Carpathian region and Crimea, and its reproduction is known exactly only for its Carpathian population.

Introduction

Among East-European bats, there are three taxonomic groups characterised by clearly expressed seasonal migratory activity: *Nyctalus*, *Vespertilio*, and *Pipistrellus* (Strelkov 1969; Zagorodniuk *et al.* 1998). Genus *Pipistrellus* is represented by 4 species in Ukraine, two of them, namely *P. pipistrellus* and *P. nathusii*, are considered widely distributed species in summer, but with seasonal migrations beyond the borders of Ukraine (Abelentsev & Popov 1956; Krochko 1994; Zagorodniuk 1998). They have high morphological similarity (Strelkov 1963), and it often complicates species identification (Zagorodniuk 2001). The latter is the reason that both traditional and modern views on distribution and migratory status of these two species in Ukraine are very preliminary and need revision.

Therefore, there are numerous inaccuracies in the regional identification keys to species, a large number of erroneously identified specimens by many well-known researchers, lack of clear information on the migration and seasonal dynamics of species ranges in Ukraine. One of the values of zoological collections is the ability to study materials of rare species through the accumulation of such materials. Collections also allow to revise those views that could rely on such material, as well as to evaluate the situation with some species in the distant time, based on the data about localities, dates and details of collected specimens marked on labels.

Material

The collection series of bats stored in two museums were studied: both State and National Natural History Museums NAS of Ukraine. In total, 67 specimens were identified and analysed, including 47 specimens of Nathusius' pipistrelle and 20 of the common pipistrelle.

As it was shown during the research, collections provide unique data on species ratio and their changes over time (Dulitsky 1974; Zagorodniuk & Tkach 1996). It is also possible to analyse such records by seasons, which is important for species with range dynamics, including seasonal migrations. The standard label records (dates and localities) and the label's inscriptions were analysed. In all cases, the identifications were checked and, if necessary, corrections were made on the labels and records.

Nathusius's pipistrelle — *Pipistrellus nathusii*

Based on the re-identification of the collected materials, we can assume that *P. nathusii* breeds only in the northern forest part of Ukraine. There are no specimens collected during the breeding season south of Poltava and Cherkasy Oblasts (Zakarpattia: see below).

At the same time, this species breeds throughout the forest part of Ukraine: there are a number of collections of pregnant and nursing females and young specimens (newborns) from Zakarpattia and other northern regions: Rivne, Ternopil, Kyiv, and Kharkiv Oblasts (Table 1).

It is clear that the geographical limits of the summer range of *Pipistrellus nathusii* in Ukraine completely coincide with the limits of the forest zone. Taking into account all the known records of the species in Ukraine, southern limit of its summer range runs (from the West to the East) through the following Oblasts: southern parts of Vinnytsia, Cherkasy, and Poltava Oblasts, and through the central part of Kharkiv Oblast (Fig. 1).

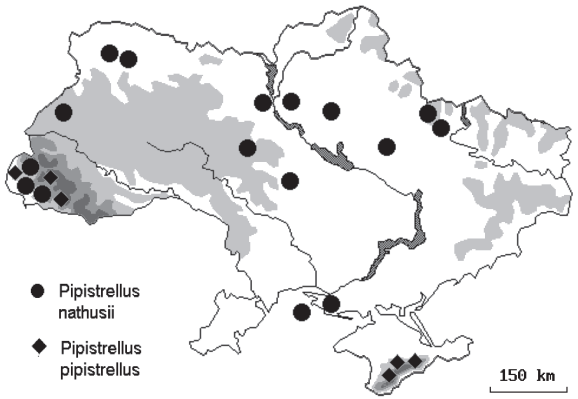

Fig. 1. Geographic distribution of *Pipistrellus pipistrellus* and *Pipistrellus nathusii* after results of revision of the main zoological collections.

Table 1. The number of known collected specimens of *Pipistrellus nathusii* and their distribution by months

Oblast	Specimens	Month	Females (month)	Males (month)	Remarks on reproductive activity
Zakarpattia	8	V, VIII, IX	2 (V)	5 (V, VIII, IX)	1 pregnant female with embryos
Lviv	1	VIII	no	1 (VIII)	no
Volyn	2	V, VII	no	2 (V, VII)	no
Rivne	1	V	1 (V)	no	1 pregnant female with embryos
Ternopil	2	VI	no	1 (VI)	subadult male
Kyiv	14	VI, VIII	6 (VI, VIII)	5 (VI, VIII)	2 pregnant females with embryos (VI)*
Cherkasy	2	VI	no	2 (VI)	no
Poltava	8	V, VII	6 (V, VII)	1 (V)	no
Kharkiv	6	V, VII	2 (V, VII)	4 (VII)	3 subadults: 1 female and 2 male
Kherson	8	VIII, IX	4 (VIII, IX)	4 (VIII, IX)	no
Total	52	V—IX	21 (V—IX)	25 (V—IX)	pregnant females with 2 embryos

* Beside the mentioned specimen from Kyiv Oblast, there are 8 embryos and 1 young specimen from locality “Goryste” (June) in the collection of NNHM.

In cold season this species is absent in northern and central parts of Ukraine after the 15 of September. Exactly there were the last summer records of two "fat and ready to passage" females in the Kyiv Oblast on this date (col. NNHM). Migration ways pass, apparently, through the southern (steppe) part of Ukraine. In this time (between 28 August and 10 of September), there are recurrent cases of trapping of Nathusius's bats (both males and females) in the Lower Dnipro region (Kherson Oblast). Abelentsev & Popov (1956) and Selyunina (1998) described earlier the direct observations of migrating *Pipistrellus nathusii* in this territory. Our results confirmed completely all those previous conclusions. However, we must emphasise, that these authors described the autumn migrations of *P. nathusii* together with *P. pipistrellus*. Actually, known collections from this region (Gola Prystan and neighbouring areas), included these two species. Nevertheless, all those specimens were re-identified only as *Pipistrellus nathusii*.

Situation with this species in Zakarpattia Oblast of Ukraine is different. Museum collections did not support the fact of breeding of *Pipistrellus nathusii* in the region: all of the specimens were collected in the potentially migratory period. There are 4 specimens from early May (2 males and 2 females) from Vynogradiv Raion (plains of the Zakarpattia Oblast), and 4 other specimens (all males) collected in August and September (Beregovo and Mukachevo Raions).

Two versions for the explanation of the presence of only male individuals in autumn in the region has been proposed: 1) this territory is the part of the breeding range of *nathusii*, but females leave this territory in the autumn before males; 2) taking into account the absence of specimens from Zakarpattia in the breeding period, all mentioned records can be explained as the records of migrant specimens from the other regions (for example, more northern regions). Therefore, we can assume that

the spring migration of the specimens of both sexes takes place simultaneously, but they differ in migratory strategies in autumn.

Common pipistrelle — *Pipistrellus pipistrellus* (sensu lato)

This species, after a series of re-identifications, turned out to be southern. Due to a careful examination of all available collections, we came to an unexpected conclusion. According to the collections, in Ukraine this species is known only from Zakarpattia and Crimea. There are also one specimen each from Lviv and Askania-Nova. It is possible that this species may be partially settled and hibernate within Ukraine, in Zakarpattia and Crimea.

In Zakarpattia, this species appears (or becomes active) in early spring — in April. Undoubtedly, here the species not only resides but also breeds (many females with embryos were collected here). Contrary to widespread opinion about migratory status of this species, there is one specimen collected on December 10 in Soimy village, Mizhhirria Raion. Moreover, collection of two specimens in the Grebin cave (mountainous part of the Carpathians*) also confirms our assumption about wintering of this species in Zakarpattia. Earlier, Krochko (1964; also: Krochko & Semistrol 1973) mentioned hibernating specimens of the common pipistrelles for Zakarpattia as objects of his special research.

For Crimea, the first spring findings of this species were registered there from April 29. No females with embryos were found. In addition to the mentioned "spring" specimen, there was one young female collected in the summer, on July 22, which can confirm the breeding of the species in the Crimea. Therefore, the collection materials leave some doubts about the status of the species in the Crimea.

Table 2. The number of known collected specimens of *P. pipistrellus* and their distribution by months

Oblast	Specimens	Month	Females (month)	Males (month)	Remarks on reproductive activity
Zakarpattia	11	IV, V, VII, VIII, XII	9 (IV, V, VII)	2 (VIII, XII)	3 females (IV, V) with 2 embryos; 2 females (V) with 1 embryo*
Lviv	1	VII	no	1 (VII)	no
Kherson	1	VIII	1 (VIII)	no	no
Crimea	8	IV, VII, IX, X	5 (IV, VII, X)	2 (IX, X)	1 subadult female (VII)
Total	21	IV—X	15 (IV, V, VII, VIII, X)	5 (VII, VIII, IX, X, XII)	females with 1–2 embryos

* Beside the mentioned specimen from Zakarpattia Oblast, there are about 20 young specimens (mummies) from Uzhhorod (old castle) in the collection of NNHM.

* This species was not indicated earlier in the caves of the Carpathian Biosphere Reserve (see: Zagorodniuk *et al.* 1997; Pokynchereda 1997).

Table 3. The features of migratory status of *P. pipistrellus* and *P. nathusii* in Ukraine

Features	*Pipistrellus pipistrellus*	*Pipistrellus nathusii*
Time of presence in Ukraine	9 month: April to December	5 month: May to September
Width of summer range	4 most western and southern oblasts	8 oblasts in the forest zone
Hibernation in Ukraine	yes, not mass and not often	absent
Summary on migratory status	long in time and relatively narrow in space in Ukraine	brief in time and wide in space the colonisation of forest regions

Since in the more northern regions (Dnipro Oblast and Sloboda Ukraine) this species is not known from collections, the Crimean population can be considered as local. Collected males are known from the Crimea only in autumn, whereas females are known from the warm season (Table 2). In winter, this species probably disappears from the Crimea: it was collected from here no later than October 28. Later and until spring (April 29), actually for 6 months, this species is not registered here.

Discussion

Results of analysis of the collections changed our views on the ranges and migratory activity of studied species in Ukraine. Review of the available collected specimens allows revising known literature data on these topics (first of all, monograph by Abelentsev & Popov 1956, and review by Strelkov 1969). Possibly, it is connected with the absence of collected specimens from some regions and with small samples. Nevertheless, it is important to remember that the studied species have much in common, and their morphological differences are nearly imperceptible (Strelkov 1963, *etc*.). Therefore, many errors in the identification can occur, and data on *Pipistrellus* presented in the "Fauna of Ukraine" (Abelentsev & Popov 1956) should be recognised as preliminary in general and erroneous in some parts[*].

It is supported by the fact that about 50 % of *P. pipistrellus* collected from Ukraine we re-identified as *P. nathusii* (Zagorodniuk 2001), and verified collected specimens of the latter are known just from the western and southern regions of Ukraine (Fig. 1). On the other hand, there are several recent (1998–2000) records of *P. pipistrellus* in northern regions: Volyn (I. Dykyy, pers. comm.), Podilia (V. Tyshchenko, pers. comm.), Kyiv (L. Godlewska, pers. comm.), and Sumy (G. Gavrys, pers. comm.). These opposite facts can be explained by two ways:

1) this species is present in most part of Ukraine, but its abundance is very low, and records are not confirmed by the collected materials;

2) this species expanded its modern range during the few last decades, after the period of the collecting of known morphological specimens.

In any case, most of the previous (old) descriptions of the pipistrelle bat from the main part of Ukraine seem to be erroneous and need revision.

[*] Publications on bat ringing in Ukraine (Abelentsev *et al.* 1968–1970) include very little information about *Pipistrellus* and some doubtful data.

Strelkov (1969) and some other authors describe a phenomena of the differentiation of male and female ranges of *Pipistrellus* species in summer, when males occur in more southern regions than females. Our data show such differentiation in *P. pipistrellus* solely: their records overlap only in autumn (see Table 2). In *P. nathusii*, males and females have the same geographical ranges.

According to the literature data (Abelentsev & Popov 1956; Krochko 1964), both species can survive the winter in Zakarpattia. However, we must take into account two facts. First, such reports concern small groups or single specimens, but not large hibernating colonies of *Pipistrellus*. Second, known collected specimens confirm the hibernation in Ukraine (Zakarpattia) of *P. pipistrellus* only. Verified records of *P. nathusii* in Ukraine are only in warm period (from the beginning of May to the beginning of September). Thus, we have no facts confirming the hibernation of Nathusius's bat in the territory of Ukraine.

Conclusion

Revision of the collected samples allows concluding:

1. Nathusius's bat is widely distributed in Ukraine, but its geographical range during breeding season is limited to the central and northern oblasts within the forest zone. This species was registered in the South only in the time of seasonal migrations, in early spring and late autumn.
2. Pipistrelle bat occurs in Ukraine only in Zakarpattia and Lviv Oblasts in the West and in the Crimea and Kherson Oblast in the South. According to these data (after verifying the collected specimens), the known breeding (summer) range of this species overlaps with that of *P. nathusii* in the West.
3. Presence of *Pipistrellus nathusii* in Ukraine is limited to 5 months, from May to September. This species is a highly migratory bat, which hibernats beyond the territory of Ukraine. There are two verified places of its migration ways in the south of Ukraine: via the Carpathians and via the Dnipro Delta.
4. Presence of *Pipistrellus pipistrellus* in Ukraine is limited to 9 months, from April to December. This species seems to be not a highly migratory bat, and it survives the winter in Ukraine in the Crimea and in the Carpathians.
5. In both species, females fly away earlier than males. Most records of females are from May to July, while most of males were registered in June to August. In the Crimea, Kherson, and Zakarpattia, *P. nathusii* stays to September, and *P. pipistrellus* to October (once to December).

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We are thankful to Svitlana Zolotukhina (NNHM, Kyiv) and Andriy Bokotey (SNHM, Lviv) for help during the work with collections, Ihor Dykyy (Lviv National University), Volodymyr Tyshchenko (National Agriculture Academy, Kyiv), Lena Godlewska and Gleb Gavrys (Institute of Zoology, Kyiv) for information about new records of the studied species.

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Резюме

Негода В., Загороднюк І. Міграційний статус Pipistrellus nathusii та Pipistrellus pipistrellus в Україні. — Аналіз всіх відомих колекційних зразків, з увагою до місць і дат знахідок, а також з перевизначенням матеріалу. Обидва види мають в Україні статус перелітних. Їхнє перебування в Україні обмежене лише кількома місяцями — з травня до вересня (5 місяців) для нетопира лісового, з квітня до жовтня (7 місяців) для нетопира малого. Ареали розмноження малого та лісового нетопирів в Україні перекриваються лише в Карпатському регіоні. Нетопир лісовий поширений на розмноженні лише у північній лісовій частині України і зустрічається на півдні тільки на прольоті. Із Закарпаття самці нетопира лісового відлітають пізніше самиць. Нетопир малий представлений в Україні у Карпатському регіоні та в Криму, а про його розмноження можна говорити лише щодо його карпатської популяції.

Novitates Theriologicae, Pars 3, 2003: 44–47
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Fauna of hibernating bats in caves of Central Podolia

Yaroslav Petrushenko

Institute of Zoology, National Academy of Sciences of Ukraine (Kyiv, Ukraine)
e-mail: batncave@yahoo.com

Petrushenko Ya. Fauna of hibernating bats in the caves of Central Podolia. — The results of the accounting of bats in 1998–2000 during the time of their hibernation in underground winter dwellings, as well as the results of the analysis of museum collections and literature sources on the registration of hibernating bats in caves of Transdnistrian Podolia are presented. Based on the accounts, the presence of 5 bat species of 3 genera was confirmed in the caves of the studied region. In general, the bat fauna of Podolia is similar in species richness and dominant species to the winter fauna of bats in the Carpathian region. However, there is a change of place between the two dominant species, *Rhinolophus hipposideros* and *Myotis myotis*.

Introduction

Bats (Chiroptera) are an interesting and rare group of animals and bat investigations are impossible outside their shelters. Therefore, Central Podolia, which is adjacent to the Carpathian region, was chosen as territory of our investigations.

A transition from plain, slightly undulate watersheds to deep steep river valleys is the most characteristic feature of this territory. Karst forms of the relief, typical for the Podolian-Bukovinian karst region, are widespread in Central Podolia. It creates favourable conditions for hibernation of many bat species.

Materials

Data was collected during February in 1998, 1999, and 2000 in the six largest karst caves of Central Podolia: Mlynky, Uhryn, Verteba, Vitrova, Kryshtaleva, and Slavka. In addition, for a more representative picture of the bat fauna two aaditional data sources were studied: literature data (Abelentsev & Popov 1956; Tatarinov 1956, 1974 et al.) and results of study of two zoological collections, the National Natural-History Museum of Ukraine and Zoological Museum of Kyiv National University.

Results

Results of the winter registrations of bats in the Podolian caves are presented in Table 1. Generally, the bat fauna of the region is represented by 12 species, however we found only 5 of them (marked by asterisks "*" in the descriptions).

Table 1. Results of bat registrations in the Podolian caves in 1995–2000*

Cave	Species	1995	1996	1998	1999	2000
Mlynky	*M. myotis*	—	5	13	18	17
	P. auritus	—	0	1	2	0
	Myotis sp.	—	1	0	0	1
Ugryn	*M. myotis*	—	—	13	21	27
	M. daubentonii	—	—	0	1	1
	P. auritus	—	—	0	1	1
	Myotis sp.	—	—	1	0	0
Verteba	*R. hipposideros*	—	—	—	—	52
	M. myotis	—	—	—	—	30
	P. auritus	—	—	—	—	2
Optymistychna, Vitrova	*R. hipposideros*	40	20	—	—	205
	P. auritus	0	0	—	—	1
Kryshtaleva	*R. hipposideros*	—	—	40	73	80
	M. myotis	—	—	8	16	6
	P. auritus	—	—	0	2	0
	P. austriacus	—	—	0	2	0
	Plecotus sp.	—	—	0	1	0
Slavka	*R. hipposideros*	—	—	5	10	13
	P. auritus	—	—	2	5	0
Total specimens		40	26	84	152	436

* Including data of R. Vargovych.

Genus *Rhinolophus* Lacepede, 1799. Two species of this genus are known in Podolian caves. For the species *Rhinolophus ferrumequinum* (Schreber, 1774), only one doubtful record is known from the Middle Dnister region (Vargovych 1998).

Rhinolophus hipposideros (Bechstein, 1800)*. This species is included into the Red Data Book of Ukraine and European Red Lists. However, in Central Podolia, *R. hipposideros* is a usual inhabitant of 4 inspected caves and dominates there. Its number ranges from 5 to 205 individuals in different caves.

Genus *Myotis* Kaup, 1829. This genus is presented in Central Podolia caves by 4 species.

Myotis blythii (Tomes, 1857). There is only one doubtful record for the considered region (Ugryn cave) (Polushina 1998).

Myotis myotis (Borkhausen, 1797)*. This species is common for Podolian underground cavities (Abelentsev & Popov 1956; Tatarinov 1956, 1962, 1973, 1974). It dominates in caves in which *R. hipposideros* is absent and it was found in a number of 5 to 30 individuals.

Myotis bechsteinii (Kuhl, 1817). An extremely rare species: only one record is known for Central Podolia (Tyshchenko 1999).

Myotis daubentonii (Kuhl, 1817)*. One hibernating individual of this species was registered in Ugryn cave in 1999 and 2000.

Genus *Plecotus* Geoffroy, 1813. This genus is represented in Central Podolian caves by 2 species.

Plecotus auritus (Linnaeus, 1758)*. It is a typical settled species, which we found in all inspected caves in small quantity — from 1 to 5 individuals.

Plecotus austriacus (Fischer, 1829)*. This species was registered in Central Podolia for the first time. Two individuals of *P. austriacus* were found in Kryshtaleva cave in 1999.

Genus *Barbastella* Gray, 1812. There is one species in the region.

Barbastella barbastellus (Schreber, 1774). Only one record is known from the Central Podolia caves, namely from Kryshtaleva cave (Tatarinov 1962).

Genus *Nyctalus* Bowdich, 1825. There are 3 species in the region; but only one was registered in caves.

Nyctalus noctula (Schreber, 1774). Two records are known from the considered region (Abelentsev & Popov 1956; Tatarinov 1973).

Genus *Eptesicus* Rafinesque, 1820. There is one species in the region.

Eptesicus serotinus (Schreber, 1774). Three records of this species are known in the studied region (Abelentsev & Popov 1956).

Genus *Vespertilio* Linnaeus, 1758. There is one species in the region.

Vespertilio murinus Linnaeus, 1758. Only one record of this species is known for the region, from Kamianets-Podilsky City (Abelentsev & Popov 1956).

Discussion

In Podolian caves, we registered 5 bat species, which represent 3 genera of 2 families. They reprerent about 30 % of total species richness of Central Podolia and at least the half of all bat species that hibernate in Podolian caves.

Three genera — *Rhinolophus, Myotis* and *Plecotus* — have the highest indices of species richness (2 and more species) and they are the most numerous. Dominant group consists of two species — *R. hipposideros* and *M. myotis*, one of them is dominant in most of the studied locations.

The bat fauna of Central Podolia is generally similar to that of the Carpathians by the species composition and dominantion structure. However, a pair of dominant species (*Myotis myotis* vs *Rhinolophus hipposideros*) has another number correlation, and dominant species exchange their place with subdominants.

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Резюме

Петрушенко Я. Фауна зимуючих кажанів із печер Центрального Поділля. — Наведено підсумки обліків кажанів протягом 1998—2000 років на зимівлі у підземних їх зимових сховищах, а також результати обробки музейних колекцій та літературних джерел щодо реєстрацій кажанів на зимівлі у печерах Придністровського Поділля. В результаті обліків підтверджена присутність у печерах розглянутого регіону 5 видів кажанів із 3 родів. Загалом фауна кажанів Поділля виявилася подібною за видовим багатством та домінуючими видами до зимової фауни кажанів Карпатського регіону. Однак спостерігається зміна місць між двома видами-домінантами — *Rhinolophus hipposideros* та *Myotis myotis*.

Novitates Theriologicae, Pars 3, 2003: 48–50
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Spatial structure of winter bat colonies of the Ukrainian Carpathians

Vasyl Pokynchereda

Carpathian Biosphere Reserve (Rakhiv, Ukraine)
e-mail: pokynchereda@ukr.net

Pokynchereda V. Spatial structure of winter bat colonies of the Ukrainian Carpathians. — Bats start wintering in warmer parts of the cave, but then move to cooler parts, where they spend most of the winter. In spring, the bats leave the shelters directly from the cold zone without forming intermediate colonies in warmer parts of the caves. The author found that the temperature optimum for bats during wintering is very diverse and specific. *Myotis myotis / M. blythii* hibernate in winter in the coldest parts of the caves, where the temperature ranges from 0 to 5°C. *Rhinolophus hipposideros* chooses to winter in the area of the cave with temperature 5–8°C. *Rhinolophus ferrumequinum* is the most thermophilic among the species noted: temperatures of 8°C and above are optimal for its wintering. Other species found are cold-loving and they winter in cold areas. Changes in the spatial structure of winter bat colonies are illustrated by the dynamics of the grouping index during winter. The grouping index gradually increases over the winter, peaking in February, after which its value begins to decrease.

Introduction

Spatial structure of winter bat colonies and its dynamics practically has remained beyond attention of researchers in the Ukrainian Carpathians. Partially this topic is discussed only by Krochko (1992).

The spatial structure of winter bat colonies was studied every month during September–May 1998/1999 in 3 caves in the territory of the Carpathian Biosphere Reserve, which are located in the Maramoroski Alps and in Svydovets. These caves are characterised by different inner architecture, dimensions and microclimate.

Results and discussion

The specifics of spatial structure are investigated for the winter colonies of 4 bat species: *Rhinolophus hipposideros*, *R. ferrumequinum, Myotis myotis* and *M. blythii.* It was determined that spatial structure is very dynamic and depends on many factors. The biggest influence on the change of spatial structure have the microclimate of the refuge and specifics of biology of the Chiroptera.

The general regularity consists in the fact that Chiroptera begin hibernation in the warmer parts of a cave and later move to the cooler zones (except for *R. ferrumequinum*, which remains to hibernate in the warm zone), where they spend the main part of hibernation.

In spring, bats leave the refuge directly from the cold zone, and do not form intermediate colonies in the warmer parts of caves, which is noted by some authors (Krochko 1992).

Among the model shelters, the most evident influence of microclimate is observed in the adit "Dovharunia", where, in the stable zone, a considerable gradient of temperature is marked — from $+1^0$C to $+10^0$C. The biggest changes of spatial structure are common for *Myotis myotis / M. blythii*, which is related to the specifics of biology of this species (Fig. 1).

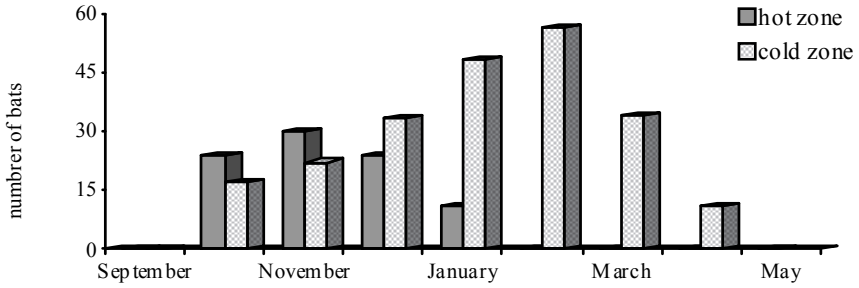

Fig. 1. Dynamics of *Myotis myotis* and *blythii* during hibernation in "Dovharunia".

The changes of spatial structure of winter colonies of those bat species, which form the dense groups, illustrates the dynamics of grouping index during hibernation (Fig. 2). The grouping index constantly increases reaching the maximum in February, afterwards its meaning decreases.

The grouping index depends on the type of refuge, its dimensions and microclimate. In the model objects, it did not exceed 2.0, while the biggest meanings of grouping indices of the winter Chiroptera colonies in separate karst caves of the Uholskyi massif of the Carpathian Biosphere Reserve was 4.4 (cave "Hrebin") and even 6.5 (entrance hall of the cave "Druzhba").

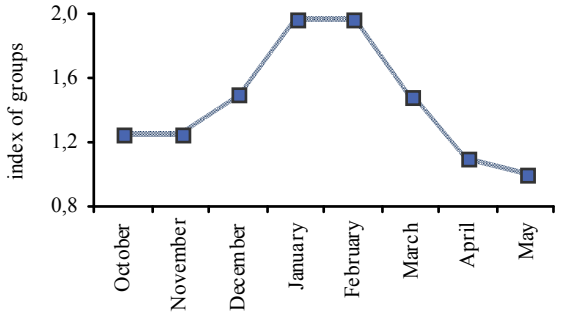

Fig. 2. Dynamics of the grouping index of *Myotis myotis / M. blythi* during hibernation in the adit "Dovharunia" .

Conclusion

Bats begin the hibernation in warmer parts of a cave and later move to the cooler zones, where they spend the main part of hibernation. In spring, bats leave the shelters directly from the cold zone, and do not form intermediate colonies in the warmer parts of caves.

The changes of spatial structure of winter colonies of those bat species, which form the dense groups, illustrate the dynamics of grouping index during the hibernation. The grouping index constantly increases, reaching the maximum in February, afterwards its meaning decreases.

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Резюме

Покиньчереда В. Просторова структура зимових колоній кажанів в Українських Карпатах. — Рукокрилі починають зимівлю в тепліших частинах печери і згодом переміщуються у більш прохолодні зони, де і проводять основну частину зимівлі. Навесні кажани покидають сховища безпосередньо з холодної зони, не утворюючи проміжних колоній у більш теплих частинах печер. Встановлено, що для рукокрилих температурний оптимум під час зимівлі є дуже різноманітним і видоспецифічним. *Myotis myotis / M. blythii* зимують у найбільш холодних частинах печер, де температура складає від 0 до 5°С. *Rhinolophus hipposideros* обирає для зимівлі ділянки печери з температурою 5–8°С. *Rhinolophus ferrumequinum* є найбільш теплолюбним серед відмічених видів — оптимальною для зимівлі виду температурами є 8^0С та більше. Інші відмічені види є холодолюбними і зимують у холодних зонах. Зміни просторової структури зимових колоній кажанів ілюструє динаміка індексу групування протягом зимівлі. Індекс групування поступово зростає протягом зимівлі, досягаючи максимуму в лютому, після чого його значення починає зменшуватися.

Novitates Theriologicae, Pars 3, 2003: 51–52
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Seasonal dynamics of winter bat colonies in caves of the Ukrainian Carpathians

Vasyl Pokynchereda & Vira Pokynchereda

Carpathian Biosphere Reserve (Rakhiv, Ukraine)
e-mail: pokynchereda@ukr.net

Покиньчереда В. Ф., Покиньчереда В. В. Сезонна динаміка зимових колоній кажанів в печерах Українських Карпат. — В Українських Карпатах зимівля кажанів триває більше 7 місяців. Зимові колонії починають формуватися в останній декаді вересня і цей процес завершується на початку грудня, хоча представники окремих видів поповнюють сховища до березня. Розпад колоній починається в березні і інтенсивно у квітні. Повністю завершується виліт кажанів із зимових сховищ на початку травня. *Myotis myotis* та *M. blythii* з'являються в зимових сховищах у другій половині жовтня, досягають піку чисельності в лютому–березні та остаточно покидають зимові сховища у I декаді травня. *Rhinolophus hipposideros* та *R. ferrumequinum* формують зимові колонії протягом вересня–листопада і не покидають обраних восени сховищ протягом зими, весною їхній виліт зі сховищ триває з березня до кінця квітня. Інші види з'являються на зимівлі дуже пізно і реєструються спорадично.

Introduction

Research into seasonal dynamics have a huge significance for revealing many aspects of biology and phenology of hibernation of bats and for the protection of wintering shelters. In the native literature, practically there is no data on seasonal dynamics of hibernating bats in the Ukrainian Carpathians. The sole exception is the article by Krochko (1992), which sums up the results of long-term studies.

Materials and methods

The seasonal dynamics of bat species composition and number was studied during the whole period of their wintering (September–May) in 1998/1999 by means of monthly (in months breaking) investigations in 3 model objects with different inner architecture (horizontal and vertical), dimensions and microclimate, which are located in the Maramoroski Alps and in Svydovets.

Results and discussion

In total, 7 bat species were found in the process of investigations: *Rhinolophus hipposideros*, *Rh. ferrumequinum, Myotis myotis, M. blythii*, *M. mystacinus, Plecotus austriacus*, and *Barbastella barbastellus*. It was revealed that wintering features of different Chiroptera varies considerably.

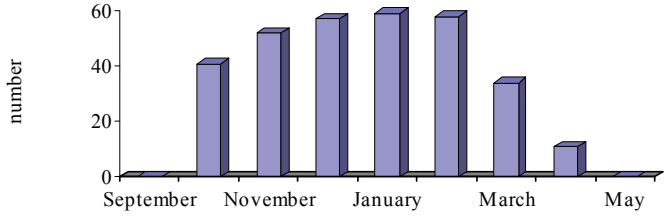

Fig. 1. Dynamics of *Myotis myotis* / *blythi* during hibernation in cave Dovharunia.

A part of species is constantly registered in shelters during the entire wintering period and they practically do not leave them. These are *Myotis myotis, M. blythii*, *Rhinolophus hipposideros*, and *Rhinolophus ferrumequinum*.

The other species repeatedly change the shelters during winter and do not stay in any of them for a long time.

We have marked the first finding of bats in the condition of hibernation (*Rhinolophus hipposideros*) in the last decade of September. The other species of Chiroptera appeared in the hibernation period during October. The formation of winter colonies had been completely finished in early December (above 90 %), though representatives of separate species supplemented the shelters during the entire winter. The biggest number of the large mouse-eared bat was marked in the studied shelters exactly in January-February (Fig. 1).

In March, winter colonies start to disintegrate. This process is the most intense in April, though flight of bats from wintering shelters is completely finished only in the beginning of May. Literature data confirmes (Krochko, 1992) that wintering bat colonies under mountain conditions cease to exist in April. Therefore, the period of bats hibernation in underground shelters of the region lasts more than 7 months.

Conclusion

Myotis myotis / *M. blythi* appear in winter dwellings in the second part of October, and reach the largest abundance in February to March, which is the evidence of a constant replenishment of colonies in cave during wintering, and finally they leave the wintering shelters in the first decade of May. *Rhinolophus hipposideros* and *R. ferrumequinum* form winter colonies in September to November, and do not leave their roosts during winter, but in spring their flight from caves proceeds from March until the end of April. The other species appear in hibernation sites later, at the end of autumn or the beginning of winter and they are registered only sporadically.

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Novitates Theriologicae, Pars 3, 2003: 53–54
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Хіроптерофауна Шацького національного природного парку

Євгенія Сребродольська, Ігор Дикий

Ivan Franko Lviv National University (Lviv, Ukraine)

Srebrodolska Ye., Dykyy I. Bat fauna of Shatsk National Natural Park. — Data on species composition of bats at the biostation of Lviv National University in the vicinity of Lake Pisochnoe are presented. Three species of bats were identified: two species of mouse-eared bats (*Myotis daubentoni*, *M. myotis*) and one species of pipistrelle (*Pipistrellus pipistrellus*). Two maternal colonies of the latter species were revealed and 5 individuals were ringed.

Вступ

Шацький національний природній парк розташований на північному-заході Волинської області України в регіоні Волинського Полісся. Територія Парку охоплює комплекс Шацьких озер (22 озера) і займає площу 32,5 тис. га. На даний час в межах парку відомо 5 видів кажанів: вухань звичайний (*Plecotus auritus*), пізній кажан (*Eptesicus serotinus*), вечірниця дозірна (*Nyctalus noctula*), малий нетопир (*Pipistrellus pipistrellus*) і ще один вид вказано із помилкою в латинській назві — водяна нічниця [що має назву «*Myotis daubentonii*»] вказана як «*M. dasycneme*» [назва іншого виду — нічниці ставкової] (Матейчик та ін. 1994). Крім цього, за даними Н. Полушиної (1998), у квітні 1974 р. тут зареєстровано лилика північного (*Eptesicus nilssonii*).

Місце та методи дослідження

Дослідження кажанів проведено у червні 2000 р. в межах біостаціонару Львівського університету, на березі оз. Пісочне (Шацький р-н Волинської обл.). Дослідження проводили з використанням УЗ-детектора D–200, наданого нідерландськими колегами для Прикарпатсько-Волинського осередку хіроптерологів. Крім цього, автори проводили візуальні спостереження і пошук денних схованок кажанів у дуплах дерев та в господарських будівлях.

Результати

З допомогою детекторних обліків на території ШНПП підтверджено наявність нічниці водяної (*Myotis daubentoni*). Над озером Пісочне спостерігали групи цього виду чисельністю по 2–4 особини. За характерним низьким польотом над землею і великими розмірами тіла ідентифіковано новий для українського Полісся вид — нічницю велику (*Myotis myotis*).

Таблиця 1. Проміри відловлених особин малого нетопиря, *P. pipistrellus* (мм)
Table 1. Body measurements of captured and ringed specimens of *P. pipistrellus* (mm)

N	Стать [sex]	Тіло [body length]	Передпліччя [forearm]	Вухо [ear]	Козелка [tragus]	Хвіст [tail]	N кільця [ring N]
1	female	43.3	30.1	9.8	4.7	24.3	A 00108
2	female	44.4	31.2	8.7	4.8	28.9	A 00107
3	female	41.5	30.9	7.3	3.5	30.8	A 00106
4	female	44.6	31.1	8.4	3.5	28.7	A 00104
5	female	46.3	31.2	8.2	4.1	27.7	A 00111
6	female	40.4	31.0	8.4	4.9	30.0	колекція

За допомогою детектора знайдено дві колонії нетопира малого (*Pipistrellus pipistrellus*) в будівлях біостаціонару (визначив І. Загороднюк). Одна з колоній знаходилася за дерев'яною обшивкою житлового будинку на висоті 2,5 м. Відмічено виліт кажанів протягом 22:00–22:30 год. від однієї до п'яти особин з інтервалом 3–5 хв. у такому порядку: 5–2–5–4–1–1–1–2 особин. Чисельність кажанів в колонії сягає 21–25 особин. З цієї колонії нами зловлено 6 самиць нетопира, з них 5 закільцьовано (польськими кільцями) і одну зафіксовано для подальшого точного визначення (вологий препарат) (табл. 1).

Отже, обліки видового складу кажанів в околицях оз. Пісочне дозволили зафіксувати три види кажанів — нічницю водяну (*Myotis daubentoni*) і велику (*Myotis myotis*) та нетопира малого (*Pipistrellus pipistrellus*). Виявлено місце знаходження двох материнських колоній останнього виду.

Загальний список кажанів Шацького НПП включає 7 видів:

1) вухань звичайний (*Plecotus auritus*), 2) нічниця велика (*Myotis myotis*), 3) нічниця водяна (*M. daubentonii*), 4) вечірниця дозірна (*Nyctalus noctula*), 5) нетопир малий (*Pipistrellus pipistrellus*), 6) кажан пізній (*Eptesicus serotinus*), 7) лилик північний (*Eptesicus nilssonii*).

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Резюме

Сребродольська Є., Дикий І. Хіроптерофауна Шацького національного природного парку. — Наведено дані про обліки видового складу кажанів на біостанції Львівського національного університету в околицях оз. Пісочне. Відмічено три види кажанів — нічниць водяну (*Myotis daubentoni*) та велику (*M. myotis*), нетопира малого (*Pipistrellus pipistrellus*). Виявлено дві материнські колонії останнього виду, і закільцьовано 5 особин.

Novitates Theriologicae, Pars 3, 2003: 55–58
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Study of bat communities of the Lesu Water Cave (Piatra Craiului Mountains, Romania)

László SZÁNTÓ

Transylvanian Museum Association (Cluj-Napoca, Romania)
e-mail: szantolaci@yahoo.com

SZÁNTÓ L. Study of bat communities of the Lesu Water Cave (Piatra Craiului Mountains, Romania). — The study of bats was not continuous in Romania. Our society started the research on bats in the middle of the '90s, and one of the first sites studied was the Lesu Water Cave (Padurea Craiului Mountains). In this paper, I discuss the results of 5-year study. I studied the way in which bats use the cave and the factors that endanger the existence of the colonies. Lesu Water Cave is an important underground refuge in this region, housing 15 bat species in hibernation or as a transitory roost, and needs adequate protection measures to improve the present situation and to maintain this site in the future. The most important endangering factor observed is speleological research during hibernation.

Introduction

In the whole Europe, the size of the bat communities show a decreasing tendency. To maintain these endangered species we must know the specifics of their habitat and the endangering factors. Unfortunately, in Romania, no continuous research was carried out on the distribution of bats and the last data about the whole country was edited in 1963 by Dumitrescu *et al*.

Our society started the research on bats in the middle of the '90s, and one of the first sites studied was the Lesu Water Cave (Padurea Craiului Mountains). The objective of the study was to find out in which way bats use this site and to identify the endangering factors that disturb the existence of the colonies.

Materials and methods

The Lesu Water Cave is situated in the Padurea Craiului Mountains (Western Carpathians) in the valley of Lesu creek, at 700 m a.s.l., has a total length of 1256 m, with 9.8 C average temperature and has a constant water-course with 0–10 l/sec outcome (Rusu 1988). The first 800 m of the cave is a low, tunnel like corridor and is used preferentially by bats.

My research started in December '95. I investigated the cave with a monthly regularity untill April '97, and then only occasional censuses were made. I used the visual census method to identify the bats with minimal disturbance; the bats were taken off only exceptionally for determination. I also used mist nets, but never dur-

ing hibernation, to identify the occasional users of the cave and the crevice dwellers. During my research, I noticed the number of species, individuals and the localization of these in the cave. I also measured the temperature and relative humidity in and outside of the cave. The species were identified using the keys of Topal (1969), Dobrosi (1993) and Ujhelyi (1993).

Results and discussion

No previous data exist concerning the bat populations of the cave. We published some preliminary data in '96 on the 10th European Bat Research Symposium in Eindhoven (Coroiu 1996).

Totally, 15 bat species that use the cave mainly as hibernacula or as a transitory roost were identified. This species were:

1. *Rhinolopus ferrumequinum*
2. *R. hipposideros*
3. *Myotis bechsteinii*
4. *M. dasycneme*
5. *M. daubentoni*
6. *M. emarginatus*
7. *M. myotis*
8. *M. blythii*
9. *M. mystacinus*
10. *M. brandtii*
11. *Barbastella barbastellus*
12. *Miniopterus schreibersii*
13. *Plecotus auritus*
14. *P. austriacus*
15. *Eptesicus serotinus*

Rhinolophus

The greater horseshoe bat forms here the biggest hibernating colony from this part of Romania, and a connection with a nursery colony from Hungary was proved (Dobrosi 1997). The lesser horseshoe bat is constantly present but in small number and only during hibernation.

Myotis

The mouse-eared bats form here a big hibernating colony and use the cave also for transitory roost in spring. The pond bat was found here for the first time in this part of Romania, and was present only occasionally. Brandt's bat was found here for the first time in Romania here in 1996, was present also occasionally. Bechstein's bat was found here only during mating period and caught with mistnet, was not observed during visual census.

Barbastella

The barbastelle has here a finding site for Romania, present only during hibernation.

Other groups

The other species are present in small number and only occasionally. I observed a decrease in the size of the greater horseshoe bat colony related to the degree of disturbance, speleological research during hibernation. The colony decreased to half of his original size after continuous disturbance by illegal speleological research.

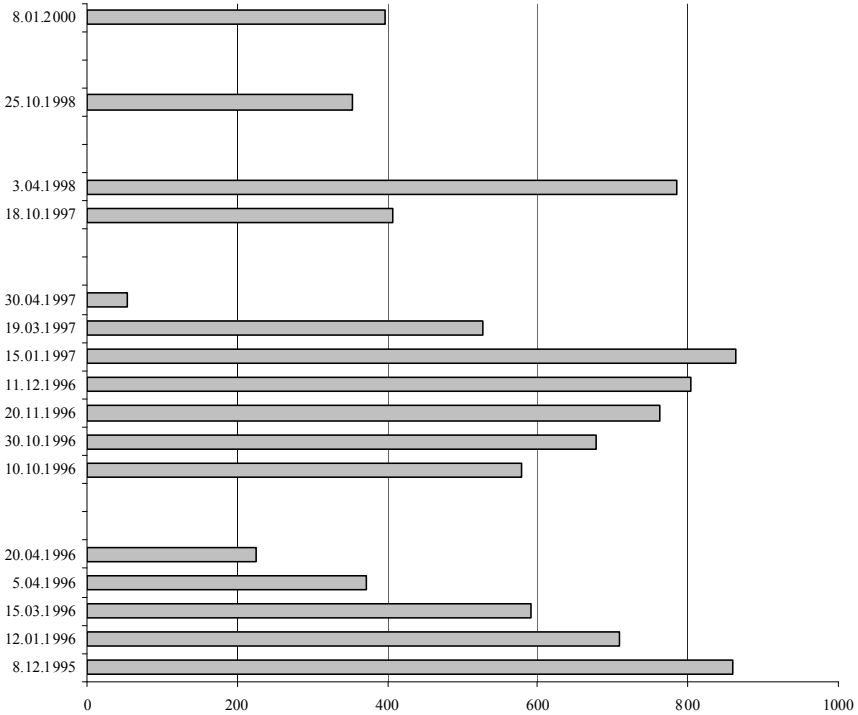

Fig. 1. Occurrence of *Rhinolophus ferrumequinum* in Lesu Water Cave.

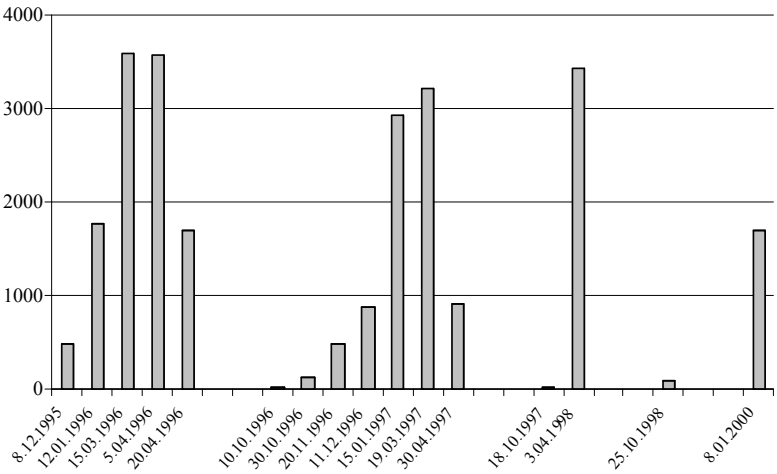

Fig. 2. Occurrence of *Myotis myotis/blythii* in Lesu Water Cave.

Conclusions

Lesu Water Cave is an important underground refuge in this region, housing 15 bat species in hibernation or as a transitory roost, and needs adequate protection measures to improve the present situation and to maintain this site in the future.

For further study, we intend to identify the summer colonies of the mouse-eared bats that hibernate here for a better protection strategy, and to take measures for protecting this important site together with the local authorities.

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Резюме

САНТО Л. Вивчення угруповань кажанів водної печери Лешу (гори Пятра-Краюлуй, Румунія). — Вивчення рукокрилих у Румунії не є тривалим. Наше товариство розпочало дослідження рукокрилих у середині 90-х років. Одним із перших об'єктів вивчення стала водна печера Лешу. У цій статті обговорюються результати 5-літнього дослідження. Досліджували спосіб використання печери кажанами та чинники, що загрожують існуванню колоній у ній. Печера Лешу є важливим підземним сховищем для регіону, як під час гібернації кажанів, так і у якості транзитного сховища. Загалом тут знайдено 15 видів кажанів. Печера потребує адекватних засобів охорони для поліпшення ситуації, що спостерігається, а також й для підтримки цього місця в майбутньому. Найбільш загрозливим фактором є спелеологічне вивчення печери під час зимівлі кажанів.

Novitates Theriologicae, Pars 3, 2003: 59–63
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Monitoring of building dwelling bats in Satu Mare County (Romania)

Farkas SZODORAY-PARÁDI [1] and Abigél SZODORAY-PARÁDI [2]

Transylvanian Museum Association (Satu Mare, Romania)
e-mail: farkas@ckf.satmar.ro

SZODORAY-PARÁDI A., SZODORAY-PARÁDI A. Monitoring of building dwelling bats in Satu Mare County (Romania). — The submitted material considers the results of the monitoring of bats carried out by the authors in buildings of Satu Mare during 1999–2000. A total of 116 buildings were surveyed and 9 species were found: *Rhinolophus ferrumequinum, R. hipposideros, Eptesicus serotinus, Plecotus austriacus, Vespertilio murinus, Myotis myotis, M. blythii, M. emarginatus*, and *Pipistrellus pipistrellus*. Two species — *Eptesicus serotinus* and *Plecotus austriacus* — are the most common in the buildings over the region. These species were found even in places that had no openings (attic windows). Tiled roofs have a negative impact on the settlement of bat colonies. The conservation and protection of colonies is only possible if the close cooperation between the researchers and the owners of buildings is taking place. In addition, it is our responsibility to clean the houses from the guano, if necessary. Another important point is the educational communication with people in order to prevent the negative attitude towards bats.

Introduction

The monitoring of house-dwelling bats was carried out by our work group for the first time in the country. Up to the present never have made studies on this field in Romania. Besides this monitoring, other members of our group made a similar survey in the county of Ciuc and in the county of Cluj. So we have to get references on this field from Hungary or other countries, which have richer activities and results.

In Romania, there is a law about bat protection but this does not include efficient protection strategies. Our task is to work out them. In our country, many people are still afraid of bats because of superstitions and misbelieve, that is why we can do educational work as well.

Material and methods

The survey was carried out between 1998 and 2000 on the area of Satu Mare County. The target area is situated in the north of Romania. The variety of superficial forms is rich resulting in diversified meso- and microclimate. This area is situated at 100–350 m above sea level.

During this monitoring, we have surveyed garrets, church towers, castles and other buildings, which seem to be possible roosts for bats. We checked the attics or

cellars of buildings. The bats were visited in daytime and they were estimated by counting. We have detected the bats using bat detector.

The quantity of guano can help us to estimate the size of bats colonies.

During data registering, it was very important to take into account the following parameters:

— the size and the condition of buildings that were checked,

— the place and the size of attic-windows,

— the type and condition of roof,

— the environment of churches,

— number of individuals of bats, the died bats,

— the quantity of guano,

— the presence of other animals- they may have an influence on the presence and size of bats colonies,

— all these data are registered in data sheet,

— we used to note the name and the address of building owners or of the priest (pastor).

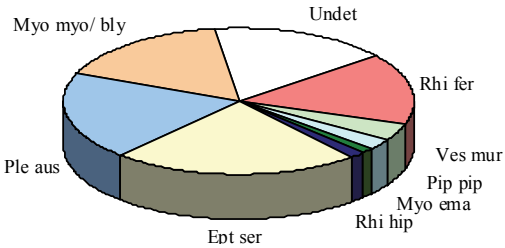

Fig. 1. Distribution of bat colonies in Satu Mare County (number of rosts).

Results and discussion

Satu Mare County has 186 villages. The research was conducted in 153 buildings of 78 settlements in the survey period between 1998–2000. We found in garrets and church towers the following species: *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Eptesicus serotinus, Vestpertilio murinus*, *Myotis blythi, M. myotis, Myotis emarginatus, Pipistrellus pipistrellus,* and *Plecotus austriacus.* Many times, we observed the presence of sparrows, pigeons, martens, barn owls, jackdaws.

Eptesicus serotinus. The biggest number of roost was represented by *E. serotinus*. This species is relatively insensitive to human disturbance. In some times, they may be found in buildings which were under renovation. The presence of other animals such as martens, pigeon, barn owls, sparrows do not seem to disturb them too. This species has a successful distribution because of its high adaptation ability.

Myotis blythi, M. myotis. We have found this species from 13 roosts. It has the highest abundance and the greatest breeding colonies. (1307 specimens were found). Usually they like the undisturbed buildings. Often we found specimens in old buildings renovated long time ago.

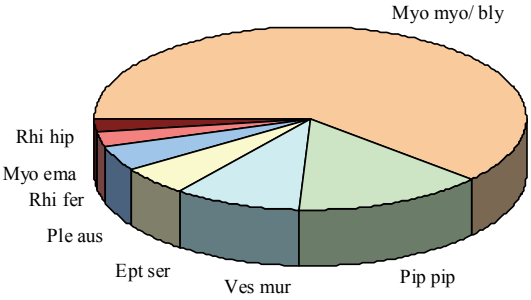

Fig. 2. Distribution of bat colonies by the number of individuals.

Plecotus austriacus. They were found in 15 roosting place, in a small number of colonies. Only 97 individuals were registered.

Vestpertilio murinus. This species is interesting because its breeding colony was found for the first time in Romania by our work group. The greatest part of Satu Mare County is lowland, the females were found here forming nursery colonies but the males were seen in mountain regions far away from this county (in south of Romania at 1000 m above sea level). It is important to mention that we have never seen both *Vespertilio murinus* and *Eptesicus serotinus* in the same roost. Moreover (*and what is more*) we have found this species without serotine bats in large territories. This distribution area should be containing more neighbouring settlements.

Pipistrellus pipistrellus. Only in two roosts were found in total 300 specimens.

Myotis emerginatus. 50 specimens were found from one roost. We saw them just once.

Rhinolophus hipposideros. We have seen this species just once from one roost. There was one specimen detected.

Rhinolophus ferrumequinum. They are frequent on the hill area. 53 specimens were found from 12 roosts.

Undeterminited species. Often we could not determinate the species. From 13 roosts were found just tracks of bats.

Conclusion

The most frequently found species in the studied are was *Eptesicus serotinus* but this species was presented by a small (5 %) individual number (Fig. 1–3).

The greatest individual number had *Myotis myotis/Myotis blythi*, they were found in 62 %. Its frequency was represented only in 17 %.

In the researched area has been found 19 % of *Plecotus austriacus*, but its individual number was only 3 %. *Rhinolophus ferrumequinum* from 12 roosts 53 (only 2 %) individuals were found. *Vestpertilio murinus* was found in 3 roosts. Building dwelling bat species (monitored by our work group) from Satu Mare County consists of 9 % *Vespertilio murinus*. *Rhinolophus hipposideros* and *Myotis emarginatus* were found only once or twice.

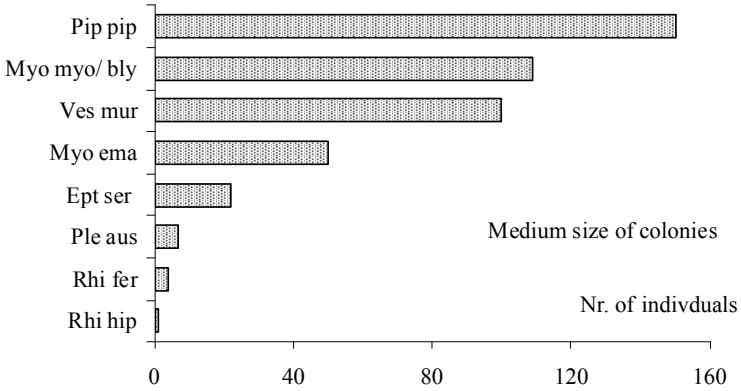

Fig. 3. Distribution of bat colonies by the number of individuals.

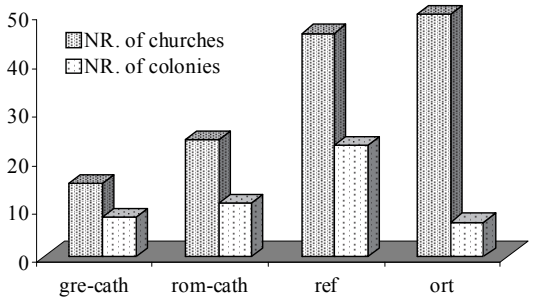

Fig. 4. Distribution of house dwelling bats in Satu Mare County in different churches.

The biggest medium size of colony has *Pipistrellus pipistrellus* followed by *Myotis myotis/ M. blythi, Vespertilio murinus, Myotis emarginatus,* and *P. pipistrellus* usually having big colonies (Závoczky 1997; Papp 1997; Dobrosi 1997; Bihari 1993).

Taking into account the bad condition of most of the buildings, in same habitats we have bigger bat population than Hungary has (Papp 1997). Reformed churches are in the worst condition so most of the bats have found shelter in these kinds of buildings. Orthodox churches usually have been restaurated and thus only few bats were found there (Fig. 4).

Bats, especially those that find shelter in buildings, need efficient protection. These animals are defenceless in the world of ordinary people who usually have many superstitions. That is why we can include in our monitoring program educational work as well.

Our study is just a beginning. We are going to continue this monitoring in the future in order to survey the building dwelling bats in a greatest part of Romania.

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Резюме

Содорай-Параді Ф., Содорай-Параді А. Моніторинг кажанів, що оселяються в будинках в місцевості Суту-Маре, Румунія). — Поданий матеріал розглядає результати моніторингу кажанів, здійсненого авторами в будівлях місцевості Сату Маре протягом 1999–2000 років. Всього обстежено 116 будівель і знайдено 9 видів: *Rhinolophus ferrumequinum, R. hipposideros, Eptesicus serotinus, Plecotus austriacus, Vespertilio murinus, Myotis myotis, M. blythii, M. emarginatus*, та *Pipistrellus pipistrellus*. Два види — *Eptesicus serotinus* та *Plecotus austriacus* — найчастіше зустрічаються в будівлях регіону. Ці види знайдено навіть у місцях, що не мали відповідних отворів (вікон на горище). Черепичні дахи мають негативний вплив на поселення колоній кажанів. Збереження та охорона колоній можливі тільки за умови співпраці дослідників з власниками будівель. Крім цього, в наші обов'язки входить чищення будинків від гуано, якщо це необхідно. Ще одним важливим моментом є навчальне спілкування з людьми з метою упередження негативного ставлення до кажанів.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Leisler's bat (*Nyctalus leisleri*) in the west of Ukraine

Volodymyr Tyshchenko

National Agricultural University (Kyiv, Ukraine)
e-mail: kazhan@online.ua

Tyshchenko V. Leisler's bat (Nyctalus leisleri) in the west of Ukraine. — The distribution of a rare in Ukraine species — *Nyctalus leisleri* in the west of Ukraine is considered. Until 1999, according to the literature, only four locations of this species were known. The first findings of this species in Podillia from Medobory Nature Reserve (Ternopil Region) are described. Colonies of *Nyctalus leislerii* were found in two locations in Gorodnytsia forestry of the reserve in August 1999. One colony (numbering approx. 40 ind.) were found in a crack hollow of ash (2 females, 2 males were caught). A second colony (probably mixed with *Nyctalus noctula*) was observed in the hollow of a sharp-leaved maple (7 females and 4 males were caught). Swarming of *Nyctalus leisleri* near this shelter was observed and *Myotis bechsteinii* was also caught here. The features of the hollows location and the characteristics of biotopes are described. The specifics of biotopes with *Nyctalus leisleri* roosts in the region is assessed. The importance of preserving hollow trees in areas with variable landscape for this species protection is noted.

Leisler's bat (*Nyctalus leisleri* Kuhl, 1817) (NYL) is a rare species of the local fauna included into the Red Data Book of Ukraine (1994, VU). This species has a sporadic distribution in the territory of Ukraine and is known in the majority of its regions only by several separated summer findings. There is a lack of information on wintering sites of NYL in the territiory of Ukraine, but some of early spring and late autumn findings in the south of Ukraine (Berestennikov, 1977; Dulitsky, 1979) may indicate probable wintering there. NYL presence at many regions was not confirmed by findings during the last decades, and the total number of NYL populations has a tendency to decrease (Kryzhanovsky 1988; Krochko 1992; Bulakhov & Chegorka 1998; Polushina 1998; Kovalyova 1999). Totally, 17 NYL individuals (8 males, 6 females, 3 unknown) from about 9 sites of Kharkiv, Kherson, Kyiv, Poltava, Luhansk, and Kirovograd regions are presented in the collections of three main zoological museums: National Museum of Natural History (Kyiv), Zoological Museum of Kyiv Taras Shevchenko University, and State Natural History Museum (Lviv). Another 6 individuals (1 male, 5 females) from Kherson and Dnipropetrovsk regions are thoroughly described by Mygulin (1938). About 35 places with NYL findings in Ukraine (mainly in central and eastern regions) are registered by scientists at different time (Mygulin 1938; Kuziakin 1950; Abelentsev & Popov 1956; Abelentsev 1967; Abelentsev *et al*. 1970; Dulitsky 1979; Likhotop & Sologor 1991). Some of these references are outdated and not confirmed by recent facts.

This species was not found in the Carpathian region untill 1960th (Abelentsev & Popov 1956; Tatarinov 1956; Abelentsev 1967). The territories of western Ukraine, *i. e.* the Transcarpathian region, Ukrainian Carpathians, and Volyno-Podillia constitute the "hotspot" of the highest rank, where the share of endangered mammal species is superior (Zagorodniuk 1997). Moreover, this "hotspot" is one of the areas of endemism in Ukraine. There is a tendency of increase in number of species from the east to the west due to wider diversity of habitats, extension of the number of shelters, as well as climatic factors (Krochko 1994).

Only four places of *Nyctalus leisleri* findings in western regions of Ukraine were known untill 1999 (see Fig. 1):

1. Nearby Penyaky village, Pidkamin district, Lviv region. Three NYL individuals, which were collected in the XIX century and were kept in the collections of Lviv State Natural History Museum (Natural History Museum of Institute of Agrobiology) (Tatarinov 1956)*.

2. Strusiv (Strusy) village, Terebovlyansky district, Ternopil region (Abelentsev & Popov 1956). The date and authors of this finding are not denoted.

3. Zolochiv town (vill.), Lviv region (Abelentsev & Popov 1956). The date and authors of this finding are not denoted.

4. Nearby Mala Uholka village, Tyachiv district, Zakarpatska oblast. One NYL individual (female; forearm length 44 mm) was captured 20.05.1965 by Abelentsev (1967). Capture was carried out by mist net at the forest glade on the right bank of Mala Ugolka River in beech forests zone of southern Carpathian slopes. There were also registered *Myotis myotis, Barbastella barbastellus* and *Eptesicus serotinus* at the same forest glade. According to other data (Zagorodniuk *et al.* 1997), 3 NYL individuals have been captured since 1963 at this territory (Carpathian Biosphere Reserve Uholsky massif).

For a long time, NYL distribution in Podillia was not confirmed by findings (Belke 1858; Brauner 1910; Kunts & Noskevich 1938; Tatarinov 1956, 1974; Polushina 1998), so this species' existence in the region was dubious. Our 1998–2000 summer expeditions to Central and Western Podillia confirm the NYL presence here. Leisler's bat was found for the first time in two districts in the territory of Gorodnytske forestry of Medobory Nature Reserve (Ternopil region) in August 1999 (see Fig. 1: point 5 and 6).

NYL ecological features are poorly studied, that is why our findings of Leisler's bat in bisex colonies in the territory of Medobory Nature Reserve are of valuable importance for research of this rare species.

* It is possible that one of them (without original label data) is displayed in the exposition of the Lviv State Natural History Museum.

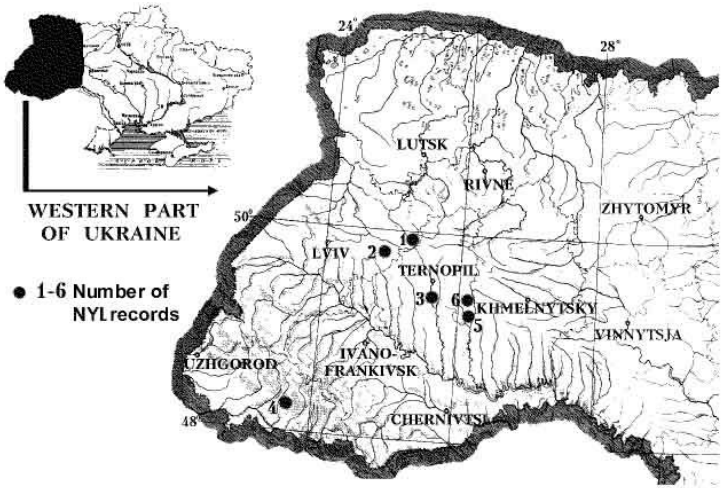

Fig. 1. Sites of *Nyctalus leisleri* findings in western Ukraine.

Рис. 1. Місця знахідок *Nyctalus leisleri* на заході України.

Medobory Nature Reserve (10454 ha) is situated to the east of Ternopil region. The territory of the reserve occupies the forested parts of Tovtry range, raising up to 100 m over the Zbruch river valley — the eastern border of reserve. Forest associations occupy over 90 % of the total area of the reserve. They are represented mainly by oak-hornbeam, hornbeam and hornbeam-ash forests on grey and dark-grey wood soils. The conditions of the reserve facilitate the formation of reach and specific entomofauna. A large number of rare insect species was registered (Kapelyukh 1999). The features of relief in the reserve, diversity of karst formations, and availability of old forest tracts altogether create favourable microclimate, good conditions for shelter and feeding of many bat species.

A search for bat roosts in forest tracts was conducted by route examination of districts with immature and mature forests in the evenings. The location and habitance of hollows were determined by registration of social vocalisation of bats. The number of bats in the roosts was evaluated visually as they flied out in the evening. Registration of species and sex determination were carried out by capture of bats with mist nets in the investigated area, and by external examination and measuring. Moreover, photographing of bats and collection of endoparasites were conducted.

Nyctalus leisleri colony (see point 5 on Fig. 1) was settled in *Fraxinus excelsior* crack hollow (age of the tree is about 70 years). This hollow was created as a result of longitudinal mechanical peeling of bark at the south-west inclination of the tree. Two little slit-like openings were placed on the height 1.9 m from the ground (see Table 1).

Leisler's bat individuals settled in the upper part of the hollow as far as 15–30 cm from the openings. NYL colony was formed by approximately 40 individuals. Four of them (2 m and 2 f) were captured during daytime on 13.08.1999 and measured (see Table 2). This locality is situated on the northeast exposition of a slope (5^0-15^0) 100 m beyond the quarter cutting and 1.25 km beyond the Zbruch river. There is a glade of 15 x 20 m formed by windfall. Forest stand is rarefied and is composed mainly by middle-aged *Fraxinus excelsior*, *Acer platanoides*, *Fagus sylvatica*, and *Quercus robur*.

The second *Nyctalus leisleri* locality (see point 6 on figure) was on the afforested limestone swelling 50x70 m, which is stretched out from southeast to northwest. Eleven NYL individuals (4 m; 7f) were caught in this area on 16.08.1999 (see Table 2). The definite roost placing was not determined.

Table 1. Specifics of *Nyctalus leisleri* roosts location in Medobory Nature Reserve

Таблиця 1. Особливості розташування сховищ вечірниці малої у «Медоборах»

№ of roost	Location of roost	Tree species	D, cm*	h, m**	Dimension (cm) and orientation of hollow opening	Orientation of hillside	Dimension of glade, m***
1.	Gorodnytske forest range, 27 quartal	*Fraxinus excelsior*	43	1,9	Slit-like hollows: 14 x 1,2 SE 5 x 0,8 NW	NE $5–15^0$	15 x 20
2.	Gorodnytske forest range, 24 quartal	*Acer platanoides*	59	7,0 7,5 9,0	5 x 6 S SW S	Height	10 x 15

* Diameter of tree at a height of 130 cm; ** height of hollow opening; *** dimension of glade before hollow tree.

Table 2. Some parameters of *Nyctalus leisleri* captured in Medobory Nature Reserve

Таблиця 2. Деякі показники відлову вечірниць малих у заповіднику "Медобори"

No. of roost	Date of capture	Local time of capture	Sex	Forearm length, mm
1	13.08.1999	–	m	42,3
		–	f	44,1
		–	f	46,0
		–	m	42,0
2	16.08.1999	00.55	f	45,3
		01.04	f	43,0
		03.45	f	44,4
		04.15	f	43,9
		04.25	f	44,7
		05.21	f	43,7
		05.32	M	43,1
		05.39	M	43,9
		05.39	M	43,7
		05.41	M	–
		05.47	F	43,9

However, we can suppose that the colony of NYL was situated in the upper hollow of *Acer platanoides* (at the height of 9 m) (see Table 1). Emergence of *Nyctalus noctula* was recorded from the lower opening of this tree (at the height of 7 m). The presence of the upper roost in this tree was confirmed by long-term swarming of Leisler's bats near this shelter from 00:40 am untill 01:10 a.m., and from 04:10 untill 05:50 a.m. (local time) at the height of 2–3 m. It is necessary to note that this swarming was not disturbed by light, smoke of campfire, and passing drizzle. Presence of the same mite *Spinturnix accuminatus* (the mites gathered from the bats were identified by Bobkova) on both bat species (*Nyctalus leisleri* and *Nyctalus noctula*) is one more argument that the mentioned roosts were next to one another or it was a mixed double-species colony. Similar allocation of the roosts of these species was described by Kuziakin (1950). A little glade (10 x 15 m) was near this tree. Steep slope and deep ravine bordered this area on the south, and thickened stand of the underwood — on the north. Here and there, this area was covered by lump limestone outcrops. Rarefied forest stand was composed mainly by mature *Acer platanoides, Fraxinus excelsior, Tilia cordata* trees and immature *Carpinus betulus*, *Acer campestre*, *Ulmus caprinifolia* trees. High density of insects from Diptera and Hymenoptera orders was marked here. *Nyctalus noctula* (4 m, 2 f) and *Myotis bechsteinii* (1 m) were also captured for examination in this area.

Conditions of Medobory Reserve are favourable for Leisler's bat existence. Absolute absence of human interference and realisation of monitoring investigations are important factors for conservation of this rare species.

The analysis of NYL findings in western regions and generally in Ukraine demonstrates that NYL habitats are adapted to the broad-leaved forest and forest park massives of the Forest-steppe zone, and to the river-valley forests of the Steppe zone. These are mainly sparse mature and immature oak, hornbeam-oak, oak-pine, beech forests, and floodplain forests. Evidently, allocation of such forest massives on slopes or swellings is favourable for NYL. This creates good conditions for heating of treecrowns, reproduction of entomofauna, and simplifying bat maneuvering during taking-off and returning to the treehollow. Little information is known on features of NYL roosts in the territory of Ukraine. More often summer NYL roosts are allocated in treehollows (on *Quercus robur*, *Tilia cordata*, *Acer platanoides*, *Pyrus communis*, *Populus nigra*, *Fraxinus excelsior* species), or in bird boxes (Abelentsev & Popov 1956; Likhotop & Sologor 1991; Krochko 1997). Crack hollows in bark peeling and typical hollows with upper cavity also may be used as NYL roosts. Most probably, the height of hollows allocation is not of great importance. Hollows with two entrances, which have oval or chinky shape, are the most favourable for NYL habitats, as it follows from personal investigations, and confirmed by Kuziakin (1950) and Abelentsev & Popov (1956). Social sounds of NYL colony can be heard in the evening from the roosts on a distance of 30–40 m. This species is sensitive to disturbance in the roost. During visual examination, NYL individuals are not as aggressive as *Nyctalus noctula*.

This species is not registered in Volyn, Rivne, Chernigiv, and Sumy regions of Ukraine. The absence of NYL findings in Ivano-Frankivsk, Chernivtsi, Khmelnytsky and Zaporizhzhya regions can be explained by the lack of bat investigations in these regions. We suppose that the effective measures for conservation of this interesting species include execution of directives by forestry managers, according to which they have to preserve hollow trees in forest massifs with ecological purposes, and to keep the "quiet season" (May, June, and July). Organization of local reserved areas with NYL roosts, and upgrading of NYL conservation status in the next edition of the Red Data Book of Ukraine would contribute to conservation of this important species.

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Резюме

Тищенко В. Вечірниця мала (Nyctalus leisleri) на заході України. — Розглянуто поширення рідкісного в Україні виду — вечірниці малої (*Nyctalus leisleri*) на заході України. До 1999 року за літературними даними відомо лише чотири місцезнаходження виду. Описано перші на Поділлі знахідки виду в природному заповіднику «Медобори» (Тернопільська обл.). Колонії вічірниць *Nyctalus leislerii* знайдено у двох місцезнаходженнях на території Городницького лісництва заповідника у серпні 1999 року. Одну колонію чисельністю близько 40 особин знайдено у щілинному дуплі ясена (відловлено 2 самиці і 2 самці). Другу колонію (ймовірно спільну з *Nyctalus noctula*) відмічено у дуплі клена гостролистого (відловлено 7 самиць і 4 самці). На ділянці спостерігалось роїння вечірниць, тут відловлено також нічницю довговуху (*Myotis bechsteinii*). Описано особливості розташування дупел та характеристики біотопів. Оцінено біотопічну приуроченість сховищ виду у регіоні. Відмічено важливість збереження дуплистих дерев на ділянках зі змінним ландшафтом для охорони виду.

Novitates Theriologicae, Pars 3, 2003: 71–72
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Sexual dimorphism in forearm length of two bat species: *Nyctalus noctula* and *Eptesicus serotinus*

Anton Vlashchenko

Kharkiv National University (Karkiv, Ukraine)
e-mail: vadim.i.chebotarev@univer.kharkov.ua

VLASHCHENKO A. Sexual dimorphism in forearm length of two bat species: Nyctalus noctula and Eptesicus serotinus. — The variability of forearm length in 539 individuals of the common noctule and the serotine bat was investigated. Sexual dimorphism was revealed: the length of the forearm in females was statistically longer than in males. It is suggested that the difference in forearm length is due to the fact that females need to carry more weight in flight during pregnancy and lactation than males.

Introduction

It is known that the presence of primary sexual features in Chiroptera allows to identify whether the specimen belongs to one or another sex. Nevertheless, detailed study of sexual dimorphism is of key importance to a better understanding of species' biology or the group's biology in general.

Materials and methods

In order to reveal any possible sexual dimorphism in such an important character as forearm length, we analysed 539 specimens of *Nyctalus noctula* (Schreber 1774) and *Eptesicus serotinus* (Schreber 1774) collected in 1961 to 1999 in the building of Kharkiv National University (KhNU). The same data in *Nyctalus noctula* were additionally collected by the author in 1998 to 1999 in animals found in the building of KhNU.

Results

***Nyctalus noctula*.** Data on *N. noctula* were collected by the author from1998 until 1999 in animals found in the building of KhNU. Measurements of 248 specimens are analysed (72 females, 176 males). The average forearm length for both sexes is 53.6 mm. In males, the average value of this parameter is 53.4 mm, while it is 54.3 mm in females (Table 1). The difference between these two parameters (0.9 mm) proved be statistically significant ($p = 0.01$).

***Eptesicus serotinus*.** Data on forearm length of *E. serotinus* were taken from the catalogue of bat findings in the building of KhNU in 1961–1991 (collected by

A. Lysetsky). Measurements of 291 specimens are analysed (143 females, 148 males). The average forearm length for both sexes is 52.6 mm. In males, the average value of this parameter is 52.1 mm, while it is 53.3 mm in females (Table 1). The difference between these two parameters (1.2 mm) proved to be statistically significant (p = 0.01).

Table 1. Forearm length in males and females of *N. noctula* and *E. serotinus*

Species	Sex (sample)	Limits of variation (min–max)	Mean (X)	Standard error of the mean (Sx)
Nyctalus noctula	females (n = 72)	51,6–58,5	54,3	0,17
	males (n = 176)	48,9–56,9	53,4	0,11
Eptesicus serotinus	females (n = 143)	49,0–57,9	53,3	0,14
	males (n = 148)	48,0–56,3	52,1	0,13

Discussion

Sexual dimorphism in forearm length in *N. noctula* and *E. serotinus* exists but there are no indications on it in the literature. I. Rakhmatulina (1980) earlier found statistically reliable difference in forearm length in favour of females in *Myotis blythii* and *Rhinolophus mehelyi*.

The difference in forearm length in males and females of *N. noctula* and *E. serotinus* is not by chance: in ou opinion, it is related to the fact that females are to carry more weight than males. During pregnancy and the first days of lactation, their whole flying weight increases because of the offspring's weight. The increas in forearm length led to the increase of the area and ascension power of wings.

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Резюме

ВЛАЩЕНКО А. Статевий диморфізм за довжиною передпліччя у двох видів кажанів: Nyctalus noctula та Eptesicus serotinus. — Досліджено мінливість довжини передпліччя у 539 особин вечірниці рудої та пергача пізнього. Виявлено статевий диморфізм: довжина передпліччя у самиць статистично більша, ніж у самців. Припускається, що різниця у довжині передпліччя пов'язана з тим, що самицям під час вагітності й лактації необхідно нести у польоті більшу вагу, ніж самцям.

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Proceedings of the III International Conference
"Bats of Carpathian Region" (Rakhiv, Ukraine)

Variation and diagnostics of two close bat species from Ukraine: *Pipistrellus nathusii* and *P. pipistrellus (sensu lato)*

Igor ZAGORODNIUK

Ukrainian Centre for Bat Protection & National Museum of Natural History of Ukraine
e-mail: zoozag@ukr.net

ZAGORODNIUK I. Variation and diagnostics of two close bat species from Ukraine: Pipistrellus nathusii and P. pipistrellus (sensu lato). — The variability of morphometric and craniometric parameters of the common pipistrelle group, *Pipistrellus nathusii* and *P. pipistrellus*, is discussed. The variability of such metric characters as body weight (W), 4 standard (L, Ca, Pl, Au) and two additional external measurements (Tr, FA), as well as three skull measurements (CBL, CM3, Mand) important for the study of bats were studied. In the course of the study of collections, the re-identification of specimens was carried out based on "traditional" keys and on the studied metric features (in the light of sex and age), which allowed to re-identify 45 % of the collection specimens. All specimens with incorrect identification belong to *P. nathusii* (mostly young individuals), which were identified by the collectors as "*P. pipistrellus*".

Introduction

Pipistrellus is represented in the fauna of Ukraine and neighbouring countries by 4 species — *pipistrellus*, *nathusii*, *kuhlii*, and *savii* (Abelentsev & Popov 1956; Krochko 1994; Zagorodniuk & Tkach 1996). Two of them, *pipistrellus* (PIP) and *nathusii* (PIN), are widely distributed and ecologically similar species[2]. Their morphological similarity is significant (Strelkov 1963 etc.) and comparable with the level of similarity of many other pairs of closely related species, such as *Myotis myotis* + *blythii* or *Plecotus auritus* + *austriacus* (Zagorodniuk 1998). There are no special publications on these species from Ukraine, but some interesting data are presented in a review of Ukrainian bats by Abelentsev & Popov (1956).

This investigation was initiated after our survey of collected specimens of *Pipistrellus nathusii* in order to describe the seasonal dynamics of its geographical range in Ukraine. Our preliminary research showed that more than 50 % of known collected specimens of *Pipistrellus* must be re-identified and diagnostic keys should be revised. Therefore, the main goals of this study are: (1) to study the morphologi-

[2] Recently it was shown that ultrasonic signals of the common pipistrelle from Ukraine refer to the form "55 kHz", which is recognized as a separate species *P. pygmaeus*, as indicated in the previous issue of this bulletin (Limpens, 2000), so the material regarding *P. pipistrellus* should be designated as "*P. pipistrellus* (s. lato)» and most likely refer only to *P. pygmaeus*; all such materials are considered here as "*P. pipistrellus*» in broad sense.

cal variation of collected specimens, (2) to describe their diagnostic features, (3) to reveal general trends in morphological differentiation of related species.

Materials and methods

Bat collections of both of the central natural history museums of Ukraine were studied: National Museum of Natural History (NMNH, Kyiv) and State Museum of Natural History (SMNH, Lviv). Because of numerous mistakes in species identification in collections, all available specimens of "*nathusii*" and "*pipistrellus*" were studied and re-identified. The total number of studied specimens is 76 (specimens from the exhitions were not studied).

Two groups of characters were analysed: 5 non-metric (2 external and 3 dental features) and 10 metric characters (7 external and 3 skull measurements). The list of characters was compiled after analysis of keys to species distributed in Ukraine (Abelentsev & Popov 1956; Zagorodniuk *et al.* 1999) and neighbouring countries (Strelkov 1963; Kuziakin 1965; Pucek 1984; Woloszyn 1991).

The non-metric characters are as follows: (1) relative size of the second incisor compared to the first one, (2) level of reduction and place of the smallest upper premolar; (3) hiatus between the second and third lower incisors; (4) development of the fur on the upper side of tail membrane; (5) relative size of the thumb. Dental characters were studied using binocular microscope.

Metric characters of adult specimens are as follows: *W* — body weight, *L* — body length, *Ca* — tail length, *Pl* — hindfoot length, *Au* — ear length, *Tr* — tragus length, *Ra* — forearm length, *CBL* — condylobasal length of the skull, *CM3* — basal length of the upper tooth row, *Mand* — condylar length of the mandible.

Characters *Ra'*, *CBL*, *CM3*, and *Mand* are our original measurements by calliper; values of other characters are taken from the original labels of collection specimens. For each metric character, the mean value and standard deviation were calculated, and samples were compared using Mayr's coefficient of divergence estimated as $CD = (X_1–X_1) / ((SD_1+SD_2)/2)$ and DIF index (level of difference between separate characters).

Species names are abbreviated in the text as PIP (*P. pipistrellus* s. l.) and PIN (*P. nathusii*).

General characteristics of the specimens

In both studied collections, there are 76 specimens of *Pipistrellus* ex grex "*nathusii* + *pipistrellus*", 5 of which are stored SMNH and 71 in NMNH. Most specimens are represented by study-skins with prepared skulls, while 9 specimens in the collection of NMNH are fluid-preserved. According to initial identification (current designations in the catalogues*), 55 specimens are stored as "*Pipistrellus pipistrellus*" and 21 specimens are stored as "*P. nathusii*" (Table 1).

* In most cases, the specimens have the same primary identification on the original labels.

Contrary to primary identifications, 43 % of specimens were re-identified. Specimens of Nathusius' bat appears to be taxonomically homogenous and all *Pipistrellus* specimens stored as "*nathusii*" were identified as the same species. There is an opposite situation for specimens of "*pipistrellus*": 33 specimens of "*pipistrellus*" were re-identified as "*nathusii*" and 59 % of the total available specimens of "*pipistrellus*" were identified earlier incorrectly.

Thus, the real ratio between the two studied species in zoological collections contradicts to all traditional views (Abelentsev & Popov 1956; Zagorodniuk & Tkach 1996). According to initial data, there are 55 PIP and 21 PIN, while based on our revision there are 23 PIP and 53 PIN. Analysis of new data showed that all previous records of both species in the plain part of Ukraine should be attributed to Nathusius' bat, while Crimean records are *P. pipistrellus* only and records from the Carpathian region include both species (but mostly *P. pipistrellus*).

Table 1. The number of known collected specimens of *Pipistrellus pipistrellus* and *P. nathusii* in the two central natural history museums of Ukraine and results of their re-identification

Re-identification	Deposited as "*P. nathusii*"		Deposited as "*P. pipistrellus*"		Total
	NMNH	SMNH	NMNH	SMNH	both museums
P. nathusii	21 sp.	0 sp.	28 sp.	4 sp.	53 sp.
P. pipistrellus	0 sp.	0 sp.	22 sp.	1 sp.	23 sp.
total number	21 sp.	0 sp.	50 sp.	5 sp.	76 sp.
% of mistakes	0 %	0 %	56 %	80 %	43 %

Variation of the diagnostic characters

Variations of non-metric characters are relatively large. Diagnostically important characters are those metric features that show low variability within the specimens and noticeable differences between the average values. The traditional use of Student's t-test is not correct in assessing the diagnostic significance of characters, because this criterion evaluates differences between mean values rather than the level of divergence or overlap of character values. Mayr's divergence coefficient is more convenient (and similar in calculation technique), which normalises the difference between means due to the dispersion of characters.

Data are summarised in Table 2.

For comparison, Table 2 includes two criteria, CD and DIF. According to the data in Table 2, DIF shows the external features, while CD demonstrates the largest differences in craniometric characters + forearm length.

Three of the studied craniometric characters were highly significant: 1) mandible length (*Mand*) CD = 6.49, 2) condylobasal length (*CBL*) CD = 5.36, 3) basal length of the upper tooth row (*CM3*) CD = 3.48. According to these indices, the specimens do not overlap (see Table 2). Thus, for mandible measurements (*Mand*) the ranges are 7.7–8.6 and 9.2–9.7 mm (*P. pipistrellus* vs. *P. nathusii*). The length of the forearm (*Ra'*) showed a smaller value: CD = 3.15.

Table 2. Values of metric characters in two close species of *Pipistrellus* from Ukraine and their comparison using criteria CD and DIF

Metric	*P. pipistrellus*				*P. nathusii*				Comparison	
character	mean ± SD		min–max	n	mean ± SD		min–max	n	CD	DIF
Weight										
W	4.6 ± 0.75		3.3–5.7	15	7.7 ± 1.59		5.0–11.5	19	2.65	**67.4**
Body										
L	39.9 ± 3.05		34.5–44.0	18	48.9 ± 2.27		43.7–54.0	41	**3.38**	**22.6**
Ca	33.1 ± 1.58		29.0–35.5	19	36.8 ± 2.93		30.0–42.0	41	1.64	11.2
Pl	5.8 ± 0.89		4.5–7.0	18	7.0 ± 0.79		5.5–8.9	33	1.43	**20.7**
Au	10.3 ± 0.90		8.5–12.1	15	12.6 ± 1.11		9.9–14.0	31	2.29	**22.3**
Tr	4.8 ± 0.31		4.2–5.3	11	6.4 ± 0.91		5.0–8.0	15	2.62	**33.3**
Forearm										
Ra	30.8 ± 1.11		29.0–32.8	18	33.9 ± 1.12		31.5–36.0	38	2.78	10.1
Ra'	30.4 ± 0.98		29.0–32.3	21	33.2 ± 0.80		31.8–34.9	45	**3.15**	9.2
Skull										
CBL	11.2 ± 0.35		10.5–11.8	15	12.7 ± 0.21		12.4–13.2	27	**5.36**	13.4
CM3	4.0 ± 0.15		3.8–4.2	15	4.4 ± 0.08		4.3–4.5	27	**3.48**	10.0
Mand	8.2 ± 0.23		7.7–8.6	14	9.4 ± 0.14		9.2–9.7	24	**6.49**	14.6

In combination with non-metric characters (e.g., the gap between the lower incisors is significant) and taking into account sex (females are larger) and age, species identification is not so problematic.

Differences in the two main metric characters that are important for species diagnostics (forearm length and mandible length) are shown in figs 1–2.

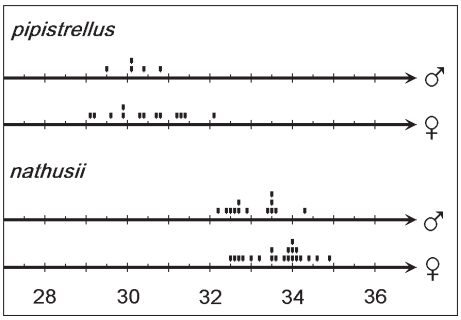

Fig. 1. Distribution of the forearm length in *Pipistrellus pipistrellus* and *P. nathusii* from Ukraine (measured on study skins, separately for females and males).

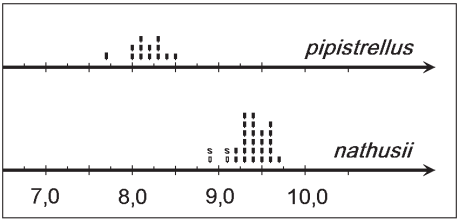

Fig. 2. Distribution of mandible length in two related species of *Pipistrellus*: *P. pipistrellus* (above) and *P. nathusii* (below).

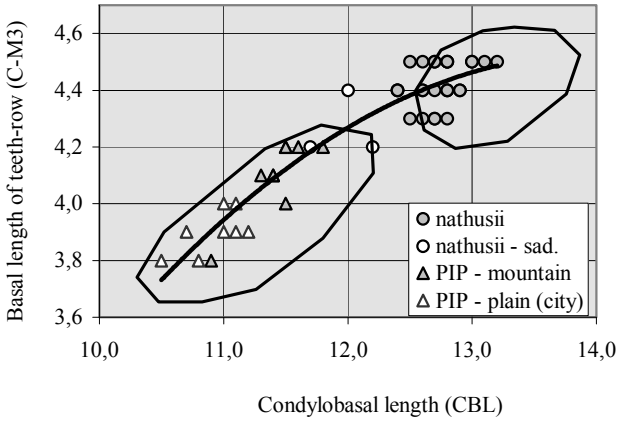

Fig. 3. Distribution of two diagnostically significant skull measurements in two related bat species, *Pipistrellus nathusii* and *P. pipistrellus* (s. lato).

The nature of morphological differences

The ontogenetic component in the variability of traits is expressive in the whole group of studied bats. In general, *Pipistrellus pipistrellus* is similar to subadult specimens of *P. nathusii*. Moreover, it is important to consider the sex of specimens, because males are always more juvenile: in both species, females are larger in all measurements than males, and these sex-related differences are similar to species differences. The comparison of species by metric characters shows that they form a continuous univariate series "♂ PIP → ♀ PIP → ♂ PIN → ♀ PIN". Due to the overlap of data in the middle pair of this series (♀ PIP vs ♂ PIN), effective identification could be provided by only taking into account sex and age. This feature was noticed a long time ago. Kessler (1851: p. 3) wrote:

> Кстати я долженъ здѣсь замѣтить, что мнѣ случалось имѣть кожановъ, которые по многимъ признакамъ занимали какъ-бы средину между двумя видами V. pipistrellus и V. Nathusii. Мнѣ даже казалось, что названіе V. Nathusii дано старымъ недѣлимымъ, а названіе V. pipistrellus молодымъ, однолѣтнимъ недѣлимымъ одного и того-же нераздѣльнаго вида, но до сихъ поръ не удалось мнѣ собрать достаточныхъ данныхъ, чтобы произнесть по этому дѣлу окончательное рѣшеніе.

Possible heterogeneity of Pipistrellus pipistrellus

The author found no significant differences between the two pipistrelle samples and believes that all available materials should be assigned to the two mentioned species, *Pipistrellus nathusii* and *Pipistrellus pipistrellus* s. l. The latter is likely to be identified as *P. pygmaeus*, given that the first detector tests in Ukraine showed the presence of *P. pygmaeus* (ultrasonic signals at 55 kHz: Limpens, 2000).

It should be noted that most of the re-identifications of pipistrelles, which concerned the misidentifications of young *P. nathusii* as "*P. pipistrellus*", refers to specimens that originate from the northern part of Ukraine. This gives rise to a mys-

tery: re-identification of all northern (within Ukraine) "*P. pipistrellus*" as *P. nathusii* suggests that "*P. pipistrellus*" was absent 50–70 years ago throughout the northern part of Ukraine in general. However, *P. pygmaeus* was discovered namely in the north (Chernihiv Oblast), which raises the question: why it did not appear in the collections earlier, especially since it was found in a synanthropic location (colony in a country club). Therefore, the answer to this question should be sought in the changes of fauna and biological invasions.

Diagnostic characters and their stability

In all cases, metric characters are hightly significant for species diagnostics and demonstrate good hiatus. Taking into account that the most important character in primary study of both field materials and collected specimens is forearm length, the author tested this metric character in old specimens and showed that metric features decrease in time. Moreover, this "drying" is proportional to the value of characters, and individuals with larger characters become clearly smaller (Fig. 4).

Thus, long-term storage of specimens affects the value of diagnostic characters reaching 1 mm of 30–35 mm in forearm length, i. e. about 3 %. This is a significant value because the hiatus between the species is the same.

Species abundance and geographical ranges

Results of re-identification completely changed our previous view on species abundance. *Pipistrellus pipistrellus* appears to be a relatively rare and narrowly distributed bat species in contrast to earlier considerations. Collection materials show that the geographical range of this species is restricted to the Carpathian region (from Zakarpattia to Lviv Oblasts) and to the Crimea (up to Askania-Nova).

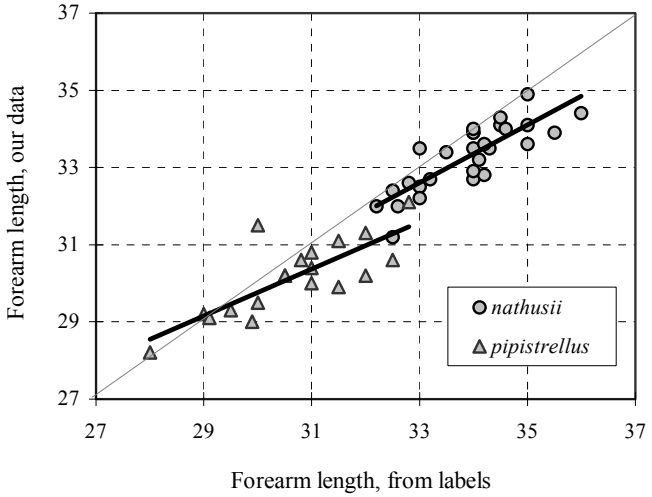

Fig. 4. Correlation between initial (fresh materials) and secondary (study skins) measurements of the forearm length in two *Pipistrellus* species from Ukraine.

A more detailed picture of geographical ranges of the two studied species is presented in Negoda & Zagorodniuk 2001.

Thus, most of the previous records of the pipistrelle bat, at least based on the known collected specimens, should be recognised as erroneous. Modern records of *P. pipistrellus* in Podolia (V. Tyshchenko, pers. comm.), Kyiv (L. Godlewska, pers. comm.), and Sumy Oblasts (Gavrys *et al.* 1997) can be classified as follows: 1) the species is present in most part of Ukraine, but its abundance is low, and these records are not confirmed by collected materials, 2) the species expanded its range during the last 2–3 decades after the period when the known museum specimens were collected. In any case, previous descriptions of the pipistrelle bat in the main part of Ukraine by Abelentsev and Popov (1956) are incorrect.

Conclusions

To sum up the results of collection analysis we can conclude:

1. Many researchers have regular problems with species identification. About 50–70 % of available collected specimens were re-identified during this research. The latter is one of the reasons that both traditional and modern views on distribution and migratory status of these two species are too preliminary and need to be revised. The main reason for erroneous definitions is the fact that young *P. nathusii* were accepted for "*P. pipistrellus*".
2. All collection materials of *P. pipistrellus* (after re-identifications of some specimens as young *P. nathusii*) are a homogeneous sample that cannot be divided into two "small" species; but taking into account the field identifications of "lesser" pipistrelle as "*P. pygmaeus*", the author suggests that collection specimens of "*P. pipistrellus*" can be preliminarily referred as "*P. pygmaeus*".
3. In both species, females are larger in all measurements than males, and these differences are similar to species differences. Comparison of species by metrics shows that they form a continuous series: ♂ PIP — ♀ PIP — ♂ PIN — ♀ PIN. Due to the overlap of data between sexes of different species (♀ PIP vs ♂ PIN), effective identification can be provided considering sex-related variation.
4. Analysis of changes of charactres in collection specimens during their long-term storage showed that metric features decrease over time. This decrease is proportional to the value of characters and in individuals (as well as species) with larger characters the effect of "drying" is greater, while the studied characters are almost unchanged in smaller individuals.

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Резюме

Загороднюк І. Мінливість та діагностика двох близьких видів кажанів з України: Pipistrellus nathusii та P. pipistrellus (sensu lato). — Розглянуто мінливість морфометричних та краніометричних ознак нетопирів групи *Pipistrellus nathusii* та *P. pipistrellus*. Досліджено мінливість таких показників, як маса тіла (W), 4 стандартних екстер'єрних виміри (L, Ca, Pl, Au) та два додаткові екстер'єрні виміри важливі для вивчення кажанів (Tr, FA), три виміри черепа (CBL, CM3, Mand). У процессі вивчення колекцій проведено реідентифікацію зразків з урахуванням «традиційних» ключів та досліджених метричних ознак (з урахуванням статі й віку), що дозволило реідентифікувати 45 % колекційних зразків. Всі зразки з помилками визначення — це зразки *P. nathusii* (переважно молоді особини), що були ідентифіковані колекторами як «*P. pipistrellus*».

Тези доповідей учасників конференції
Кажани Карпатського регіону III (Рахів)

Logo of the conference

Novitates Theriologicae, Pars 3, 2003: 82
Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Current state and research prospects of bats on the northeast slopes of the Ukrainian Carpathians

Alexander KYSELYUK

Carpathian National Natural Park (Yaremche, Ukraine)

Киселюк О. Сучасний стан і перспективи дослідження кажанів північно-східних схилів Українських Карпат. — Аналіз показав наявність 10 видів 7 родів двох родин.

In general, the number of works related to the bat fauna and its abundance on the northeast slopes of the Ukrainian Carpathians for last years is not sufficient. Due to the presence of an insignificant number of natural and artificial shelters (caves, undergrounds) used by bats as dwelling sites in the researched area, data concerning winter population are not complete. Based on sightings in twilight, it is necessary to note the significant diversity of species and number of animals during spring and autumn migrations, in comparison with registration on collected animals. Moreover, it is necessary to note that the fauna of bats in the studied territory is mainly represented by dendrophilic species.

Materials were collected in protected areas of northeastern macroslops, in particular by inspecting old buildings and old hollow trees as typical summer shelters of bats.

Taking into account literature data (Tatarynov 1973, 1988; Krochko 1992, Kyselyuk 1999, *etc*.) and results of collecting specimens in protected areas of the northeast slopes (Carpathian National Nature Park and Gorgany Natural Reserve), which were carried out in 1986–1999, it is possible to conclude that the list of bats includes ten species of two families such as Rhinolophidae (*Rhinolophus hipposideros*) and Vespertilionidae (*Myotis myotis, M. daubentoni, M. mystacinus, Plecotus auritus, Nyctalus noctula, Pipistrellus pipistrellus, Vespertilio murinus, Eptesicus nilssoni,* and *E. serotinus*). All registered species have conservation status according to the appendix of the Bern Convention and one species — *R. hipposideros* — is included into the Red Data Book of Ukraine (1994).

The list of species is incomplete. Today, the use of detector methods in field research is part of bat studies, which gives essential additions to the species composition and biological features of bats. However, such research are carried out only in some parts of Ukraine. It would be expedient to organise regional centres of bat studies, to obtain detectors and carry out studies in protected areas and in other territories in general.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Hibernating *Pipistrellus pipistrellus* in Romanian caves. Review

Zoltán NAGY, László SZÁNTÓ

Transylvanian Museum Association (Cluj-Napoca, Rumania)

НОДЬ З., САНТО Л. Зимівля Pipistrellus pipistrellus в румунських печерах. Огляд.

In 1963, the existence of an extraordinarily big hibernating colony of pipistrelle bats (with 60,000 specimens) in the Sura Mare cave, Sureanu Mountains, was published by the first time in "Annales de Speleologie". Unfortunately, during the last decades, this information has been cited mostly with wrong data concerning the extent of the colony and the location of the cave. The aim of this review is to clarify the status of this colony. In many articles and books, the existence of a colony of 100,000 individuals is mentioned as "somewhere in Dobrogea", but in the south-eastern parts of Romania nobody found pipistrelle bats hibernating in caves.

In the winter of 1999–2000, we investigated 45 underground sites in different regions in the country: Dobrogea, Southern and Western Carpathians. We found 5 caves with hibernating pipistrelle bats, including Sura Mare cave. In this cave, during the last 30 years, the number of bats decreased significantly, in early February of 2000 we found ~25,000 specimens of pipistrelle (4,5 compact square meters), as well as one barbastelle colony with 32 individuals.

As the results of the winter census, we found hibernating colonies in four other caves in Bihor-, Trascau Mountains and in the Cazan Pass near the Danube. All these caves share some particularities, such as large entrance, high corridors and halls (15–25 m), constant water flow (0,5–2 m deep) and relatively low temperatures (4–5 ^{0}C) under and near the colonies. In three of the caves, we found just a few hundreds of bats, but the cave, which is in the Trascau Mountains, seems to be a very particular hibernating site. This site houses the biggest colony of pipistrelle bats in the present, which consists of more than 40,000 individuals associated with about 230 *Nyctalus noctula* in one small part of the colony. This colony of noctules is first mentioned from a cave in winter in such number. In the cave, 3,500 specimens of *Myotis myotis*, 70 of *Rhinolophus ferrumeqinum* and 11 of *R. hipposideros* were also hibernating, and one of the biggest hibernating *Barbastella barbastellus* colony (48 ind.) from Romania was also identified here. This year, in July, using "Pettersson D200" bat detectors, we identified *P. pygmaeus* for the first time in Romania near the Bihor Mountains in the neighbourhood of Cefa village. The next step is to demonstrate the ratio of the pipistrelle and pigmy bats in these huge winter colonies and make a proposal to protect these caves.

Winter bat censuses in the Polish Tatra Mountains

Krzysztof PIKSA[1] & Jakub NOWAK [2]

[1] *Krakow Pedagogical University,* [2] *University of Agriculture (Krakow, Poland)*

ПІКСА К., НОВАК Я. Зимові обліки кажанів в польський частині Татринських гір

In 1997–2000, a bat research was carried out in the Tatra Mountains caves. Altogether, 3059 bats were counted during the calendar winter. The authors observed 12 bat species: MYM — *Myotis myotis*, MBE — *M. bechsteinii*, MYN — *M. nattereri*, MYS/B — *M. mystacinus*/*brandtii*, MDS — *M. dasycneme*, MDA — *M. daubentonii*, ENI — *Eptesicus nilssonii*, ESE — *E. serotinus*, PAR — *Plecotus auritus*, PAS — *P. austriacus* (PAR/S — *P. auritus/austriacus*), BAR — *Barbastella barbastellus*, IND — Chiroptera indeterminate. The most numerous were *Myotis mystacinus* (64.9 %), *M. myotis* (13.7 %), and *Eptesicus nilssonii* (10.3 %) (Fig. 1).

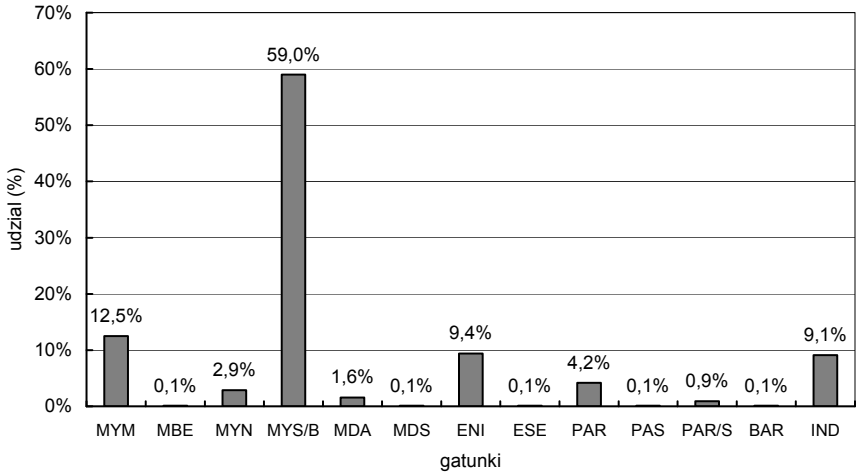

Fig. 1. Dominance of bat species hibernating in the Polish Tatra Mts in 1997 to 2000.

The most numerous Polish localities of *Myotis mystacinus* and *Eptesicus nilssonii* are in the Tatras. These species are characteristic for the mountains in Poland. Tatra caves are one of the most important regions for wintering bats in Poland.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

To the methods of bat roosts detection in forests of western Ukraine

Volodymyr Tyshchenko

National Agricultural University (Kyiv, Ukraine); e-mail: admin@zoo.freenet.kyiv.ua

Тищенко В. До методів пошуку сідал кажанів у лісових масивах західної України.

Ecological and faunistic bat investigations need complex field studies in the explored territories. Finding of summer bat roosts is a really important stage of such investigations. Its realisation in large forest stands is a laborious process, which requires learning allocation regularity of bat roosts. Interchange of experience between chiropterologists may leed to elaboration of perfect and effective summer bat roosts searching technique. The proposed method may become a part of this technique. It is based on social bat sound registration during field investigations of some forested areas. This method was worked through three summer seasons in 1998–2000 during field investigations of forest stands in west Podillia.

Primary determination of the most perspective forest stands for bat roosts searching was defined by intensive data analysis of large-scale maps, forest stand plans and polling of forestry employees. First of all such territories are immature, mature and overmature forest stands with *Fraxinus excelsior, Fagus sylvatica, Acer platanoides, Populus tremula, Tilia cordata* domination and mainly D_2 forest site type. The most interesting are windbreak and windfall areas, small felled areas, glades on a gibbous relief, slopes and meadows, saplings areas, karst formations and ponds near forest stands. Preliminary route not more than 5 km was designed based on these data. This route is desirable to be formed by forest quarterly cuttings or pathes. Intensification of social bat activity becomes increasing in the evening (17.00–20.00), so these hours are the best for going through the planned route and looking for bat roosts by their social sounds. So, *Nyctalus noctula* roosts can be explored at a distance of 60–80 m, *N. leisleri* — 30–40 m. If necessary, capture of bats near the explored roosts may be realised in the same evening. The most favourable season for such bat investigations is the latter half of the summer, when absence of bird evening acoustical activity advantages to conduct them.

Thereby inventory and monitoring of bat populations in forest roosts will allow to get detailed information about their current state, quantity changes and also will promote their preservation.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Leisler's bat (*Nyctalus leisleri*) under conditions of Medobory Nature Reserve

Vododymyr TYSHCHENKO[1], Stepan STOROZHUK[2]

[1] *National Agricultural University (Kyiv, Ukraine); e-mail: kazhan@online.ua*
[2] *Medobory Nature Reserve (Hrymailiv, Ternopil region, Ukraine)*

Medobory Nature Reserve (10454 ha) is situated in the east of Ternopil region. Studies in Gorodnytske forestry were carried out in August 1999. Leisler's bat (NL) was found in two areas for the first time.

The NL colony is located in the *Fraxinus excelsior* crack hollow (the tree is 43 cm in diameter). This hollow was created as a result of longitudinal peeling of bark at the south-west inclination of the tree. Two little openings (bat-entrances) are located at 1.9 m above the ground. They have the following dimensions and exposition: 14 x 1.2 cm south-east and 5 x 0.8 cm north-west. Bats were located at the upper end of the hollow at a 15–30 cm distance from the openings. NL colony is formed by approximately by 40 individuals. On 13.08.1999, four specimens (2m and 2f) were caught and measured. This area is situated on the north-east exposition of a slope (5°) in 100 m beyond the quarter cutting and 1.25 km beyond the Zbruch river. There is a glade 15 x 20 m formed by windfall. Forest stand is rarefied and composed by middle-age *Fraxinus excelsior*, *Acer platanoides*, *Fagus sylvatica*, *Quercus robur*.

The second NL locality is situated on afforested limestone 50–70 m swelling which is stretched-out from south-east to north-west. On this area, on 16.08.1999, 11 NL individuals were caught (4 m; 7f) from 00:45 to 05:47 by the local time. Unfortunately, NL roost was not found for certain, but quite possible that NL formed an aggregative colony with *Nyctalus noctula* in *Acer platanoides* hollow at 7 m height above the ground (the tree is 59 cm in diameter). A small glade (10 x 15 m) is near the hollow tree. Steep slope and deep ravine restrict this area from the south, and thickened stand of the young growth — from the north. Somewhere the area is covered by lump limestone outcrop. Rarefied forest stand is composed mainly by mature *Acer platanoides*, *Fraxinus excelsior*, *Tilia cordata* and immature *Carpinus betulus*, *Acer campestre*, *Ulmus caprinifolia*. High density of insects (mainly Diptera and Hymenoptera orders) are common there.

Medobory Reserve conditions are favourable for the existence of Leisler's bat. Absolute absence of human interference and realisation of monitoring studies are important conditions for preservation of this rare bat species.

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Bats of the Carpathian Region (Rakhiv)
Кажани Карпатського регіону (Рахів)

Biogeography of Plecotine bats in Europe and analysis of the East-Carpathian node

Igor ZAGORODNIUK

Institute of Zoology, NAS of Ukraine, Kyiv, Ukraine; e-mail: zoozag@ukr.net

ЗАГОРОДНЮК І. Біогеографія роду Plecotus в Європі та аналіз Східно-Карпатського вузла.

Generally accepted that the genus *Plecotus* is represented in the Palaearctic by two species, *P. auritus* and *P. austriacus*. The analysis of all the early-published data allows asserting the following. Both known species of *Plecotus* are characterised by allopatric ranges in general. The extensive zone of their sympatry in Europe is obviously a secondary phenomenon. All know data testify that it was formed as a result of range expansion of *P. austriacus* into the historical range of *P. auritus*.

The time when this process took place apparently was in the early Holocene or, as a maximum, when human expansion occurred in Europe. It is confirmed not only by direct paleontological data, but by data on species ecology also. *Plecotus auritus* clearly prefers woodlands and mountains (boreal ecosystems) and it is relatively abundant in both northern and mountain regions. *Plecotus austriacus* is the most common in the southern Palaearctic and prefers open xerotermic habitats. Its abundance in the zone of sympatry is connected with disturbed or secondary biotopes.

The situation in East Europe seems to be different. Until recently, both species were considered here as allopatric subspecies divided by the Carpathian arch. For the last 15 years, records of both species were reported from Podolia, i. e. northeast of the Carpathians. Moreover, a study of collections showed that both species are present in samples from Transcarpathia due to studies by Abelentsev and Popov (1956), who considered the Carpathians as a natural border between these species. Besides, we revealed *Plecotus austriacus* in samples from Podolia, the Black Sea region and Crimea, where only *P. auritus* was identified earlier.

The zone of sympatry of the two species refers to those parts of East Europe, where the greatest species richness of bats exists. There is the following correlation between the distribution of *P. auritus* and its sympatry zone in East Europe: 1) range of "caves", 2) range of *Fagus*, 3) ranges of *Rhinolophus* and *Paramyotis*. East-European samples of studied species are more similar than Central European ones, which is explained mainly by the increasing of the size of *P. auritus*. Similar morphology of related species in the zone of their sympatry corresponds to the model of opposite izomorphism as a way of formation of sibling species.

Хроніки Теріологічної школи
та теріологічного життя в Україні

Logo of the conference

Novitates Theriologicae, Pars 3, 2003: 89–90
Chronicle and information

Participants of the Third International Conference "Bats of the Carpathian Region"

Учасники III Міжнародної конференції «Кажани Карпатського регіону»

Name	Organisation	Address	E-mail
Barre, Dorothea	Team of Bat Protection Schleswig-Holstein — Germany	D–24109, Germany Schneiderkoppel 21, Melsdorf	Barre@juedes-ultraschall.de
Bashta, Taras-Andrij	Institute of Ecology of the Carpathians, Nat. Acad. Sci. Ukr.	UA–79026, Ukraine Kozelnytska st. 4, Lviv	at-bashta@polynet.lviv.ua
Bobkova, Oxana	International Solomon University & Ukrainian Centre for Bat Protection	UA–02105, Ukraine P. O. Box 11, Kyiv-105, Kyiv	batncave@yahoo.com
Dovhanych, Yaroslav	Carpathian Biosphere Reserve	UA–90600, Ukraine P. O. Box 8, Rakhiv, Zakarpatska Oblast	eco-club@rakhiv.ukrtel.net
Fedorchenko, Alexandr	Ecocentre "Delta" (Kyiv division)	UA–01004 , Ukraine Gorkij st. 20, cab. 35, Kyiv	salix@kiev-page.com.ua
Godlewska, Lena	International Solomon University & Ukrainian Centre for Bat Protection	UA–03142, Ukraine Vernadsky st. 87, cab. 85, Kyiv	dc@isppe.freenet.kiev.ua
Hamor, Fedir	Carpathian Biosphere Reserve	UA–90600, Ukraine P. O. Box 8, Rakhiv, Zakarpatska Oblast	cbr@rakhiv.ukrtel.net
Kyselyuk, Olexander	Carpathian National Natural Park	UA–78500, Ukraine Vasyl Stus st. 6, Yaremche, Ivano-Frankivsk Oblast	ecoplay@ phantom.pu.if.ua
Kondratenko, Olexander	Lugansk Natural Reserve, Nat. Acad. Sci. Ukr.	UA–13600, Ukraine Sjoma Linaja st. 7a, Stanychno-Luganske, Lugansk Oblast	(no)
Krochko, Julij	Uzhgorod State University	UA–88000, Ukraine Lermontov st. 5a, cab. 64, Uzhgorod	Krochko@ univ.uzhgorod.ua
Lina, Peter H. C.	Reference Centre for Bat Studies and Conservation	NL–2331, The Netherlands P. O. Box 835, HH Leiden	P.H.C.Lina@n.agro.nl
Murariu, Dumitru	Grigore Antipa National Museum of Natural History	RO–79744, Romania Soseana Kiseleff 1, Sectorul 1, Bucharest 2	dmurariu@antipa.ro
Nagy, Zoltan	Transylvanian Museum Association	3400, Romania Napoca 2,Op. 1, Cp. 191, Cluj-Napoca,	okostud@mail.dntcj.ro

Name	Organisation	Address	E-mail
Nowak, Jakub	University of Agriculture in Krakow	31–425, Poland al. 29 listopada 46 p. 903, Krakow	(no)
Petrushenko, Yaroslav	International Solomon University & Ukrainian Centre for Bat Protection	UA–02105, Ukraine P. O. Box 11, Kyiv-105, Kyiv	batncave@yahoo.com
Piksa, Krzysztof	Krakow Pedagogical University, Institute of Biology	31–054, Poland ul. Podbrzezie 3, Krakow	(no)
Pokynchereda, Vasyl & Vira	Carpathian Biosphere Reserve & Ukrainian Centre for Bat Protection	UA–90600, Ukraine P. O. Box 8, Rakhiv, Zakarpatska Oblast	pokynchereda@ukr.net
Postawa, Tomasz	Chiropterological Information Centre	PL–31-016, Poland Slawkowska St. 17, Krakow	postawa@isez.pan.krakow.pl
Srebrodolska, Evgenia	Lviv National University	UA–270005, Ukraine Grushevsky st. 4, Lviv	zoomus@franko.lviv.ua
Storozhuk, Stepan	Medobory Nature Reserve	UA–270005, Ukraine Mitskevych st. 21, Hrymailiv, Husyatyn distr., Ternopil region	(no)
Sukharyuk, Dmytro	Carpathian Biosphere Reserve	UA–90600, Ukraine P. O. Box 8, Rakhiv, Zakarpatska Oblast	cbr@rakhiv.ukrtel.net
Szanto, Laszlo	Transylvanian Museum Association	3400 Romania Napoca 2, Op. 1, Cp. 191, Cluj-Napoca	szantolaci@yahoo.com
Szodoray-Paradi, Abigel & Farkas	Association for Protection of Bats in Romania	3900 Romania Str. Liviu Rebreanu 103, Satu Mare	farkas@ckf.satmar.ro
Tyshchenko, Volodymyr	National Agricultural University of Ukraine	UA–03142, Ukraine Palladin prosp., 24, cab. 12, Kyiv	admin@zoo.freenet.kyiv.ua
Vlashchenko, Anton	Kharkiv National University	UA–130013, Ukraine P. O. Box 10971, Kharkiv	Vadim.I.Chebotarev@univer.kharkov.ua
Zagorodniuk, Igor	Institute of Zoology, Nat. Acad. Sci. Ukr. & Ukrainian Centre for Bat Protection	UA–02105, Ukraine P. O. Box 11, Kyiv-105, Kyiv	igor@zag.alpline.kiev.ua
Zhdanovych, Vira	Uzhgorod State University	UA–88000, Ukraine Voloshyna st. 54, Uzhgorod	

Novitates Theriologicae, Pars 3, 2003: 91–93
Хроніка та інформація [Chronicle and information]

Report on the work with bat detectors in Ukraine in 2000

Робота із ультразвуковими детекторами в Україні: звіт за 2000 рік

1. General

Bats in Ukraine represent one of the least studied groups of animals. Before the workshop period, there were two or three "private" detectors in Ukraine (D–100). Later, D–230 detectors were presented for temporary use by the Polish Centre of Chiropterological Information (Krakow) and were in use between bat researchers from Rakhiv and Kyiv.

2. Workshop event

2.1. Date and location

On 30.04.2000 to 03.05.2000 in the Biostation of Nizhyn Pedagogical University; vicinity of Yaduty Village, Nizhyn District, Chernigivska Region of Ukraine.

2.2. Bat Detector Network in Ukraine

On the end of the workshop, a detector network was arranged. Three main tasks were taken into account: (1) to carry out bat monitoring, (2) to develop own surveys by bat workers, and (3) to share detector–bat knowledge. The first task required to cover as large territory as possible and join the most active researchers. The second task required to develop private interests of researchers in realisation of new knowledge by development of individual survey. The third task required to enlighten as many people as possible, using also the opportunity of involving specialists into carrying out field studies for biological departments.

Considering all tasks, a "resolution" on the creation of detector network was accepted. Working units of the Network are seven regional nodes, or centres, and a bat detector was handed to each of them (Table 1 and Fig. 1)[3]. The coordinator of the nodes' work is the Ukrainian CEntre for BAt Protection (UCEBA). Each batworker had a possibility to use a detector during a certain period (1 or 2 months) in the summer of 2000 and then pass the detector to a node-partner. To the autumn, each bat detector worker had to present a report on the use of new knowledge.

[3] The possibility of detectors' migration was taken into account at creation of the network.

3. Reports

3.1. Post-workshop informational work

Distribution of information covers:

3.1.1 Bulletin "*Novitates Theriologicae*", issue 2, 2000. The bulletin contains the general information on the workshop, report on the results of the workshop, information of the work with bat-detectors. — [In Ukrainian]

3.1.2 Zagorodniuk I., Godlewska L. Theriological School 2000: Workshop on identification of bats and localization of roosts using bat detectors. *Vestnik zoologii*, 2000, Vol. 34 (6): 119–120. — [In Ukrainian]

3.1.3 Kedrov B., Sheshurak P. Regional reports on the first bat detector season. *Proc. Nizhyn State Univ.*, 2000, in press. — [In Ukrainian].

Original texts of regional reports are presented in Annex 1.

4. General analyses

Analysis of the regional reports allows to conclude:

4.1. Network

— It is early to talk about a real monitoring network. However, the learning is lasting and researchers have their own results. Undoubtedly, even when it is difficult to present a whole picture on bat populations of some landscapes, the detector helps in looking for roosts, compiling a general notion on the surrounding situation, etc.

4.2. Public work

— The Workshop, as an event, has attracted attention. The detector, in addition to its function as a tool of scientific research, also has an important role for fact-finding stories for a broad audience, work with students and scholars (in some cases work of detector, literally, allows to prove the presence of bats and to muse people about their existence). In general, it is possible to say that the attention to study and protection of one of the little-known groups of animals in Ukraine grows among not only zoologists, but also among the broader public. The realisation of the workshop played an important role, as well as the availability of such tool as the detector in hands of the researchers.

4.3. Difficulties and needs

a. Additional materials/data on the work with bat-detectors, on ultrasound bat biology.

b. Additional workshops. It concerns some seminars in the country for general communication and experience exchange between bat detector workers as well as seminars led by professional bat detector workers to solve current questions. No one from Ukraine can give answer to such kind of questions.

c. More detectors. 7 detectors migrated between different regions and almost no one could use the detector all the time. Only 13 of 18 participants of the workshop had the possibility to use detector during a season.

5. Planning

Analyses of available regional reports, bat detector worker's interest in future work, etc. allows to distribute detectors among workers in 2001.

Table 1. Regional nodes of the bat detector network

№	Name of the node	Worker's name and city
1.	Polissia Region Node	*B. Kedrov* (Nizhyn) ⇔*S. Gaschak* (Chornobyl)
2.	Podolia–Dnipro Region Node	*V. Tyshchenko* (Kyiv-Ternopil) ⇔ *N. Ruzhilenko* (Kaniv) ⇔ *V. Serebriakov* (Kyiv-Kaniv) ⇔ *V. Negoda* (Kyiv-Kaniv)
3.	Eastern Node	*O. Kondratenko* (Luhansk) ⇔ *A. Vlaschenko* (Kharkiv)
4.	Precarpathians–Volyn Node	*T. Bashta* ⇔ *E. Srebrodolska* (Lviv)
5.	Southern Node	*I. Polyschuk* (Askania) ⇔ *A. Dulitsky* (Symferopil)
6.	Transcarpathian Node	*V. Pokynchereda* (Rakhiv) ⇔ *V. Zhdanovych* (Uzhhorod)
7.	Central Node	*I. Zagorodniuk* ⇔ *L. Godlewska* ⇔ *I. Kovaliova* (Kyiv)

Fig. 1. Points of the bat detector network.

Novitates Theriologicae, Pars 3, 2003: 94–96
Хроніка та інформація [Chronicle and information]

Теріологічні конференції та випуски бюлетеню *Novitates Theriologicae* у 2000–2001 роках

Zagorodniuk I. Theriological conferences and issues of the bulletin "Novitates Theriologicae" in 2000–2001. — A brief review of conferences and editions organised and prepared by the Ukrainian Theriological Society (Theriological School network) in 2000–2001.

Загальна інформація про семінари й конференції

Цей стислий огляд містить повідомлення про теріологічні зібрання, що відбулися протягом 2000–2001 рр. Це був один з найпліднішних років у житті Українського теріологічного товариства. Окрім конференції «*Кажани Карпатського регіону*» (цей випуск NT), мали місце ще 4 зібрання: семінар «*Використання ультразвукових детекторів у дослідженнях кажанів*», симпозіум «*Сакральна архітектура та охорона тварин*», теріошколи «*Великі хижі ссавці України та прилеглих країн*» та «*Ссавці відкритих просторів*».

Перше зібрання проведено групою УЦОЦ у співпраці з Мінекології та Ніжинський педінститутом на біостанції НДПІ «Ядути» на початку травня 2000 р., за участі тренерів з Нідерландів. Другим зібранням стала Міжнародна конференція «Кажани Карпатського регіону», проведена на базі Карпатського біосферного заповідника у вересні 2000 р. (це видання). Третє зібрання — симпозіум з охорони тварин у сакральних спорудах (зокрема кажанів), проведений у співпраці з Центром хіроптерологічної інформації (Польща). Четверте зібрання — школу-семінар «Великі хижі ссавці України та прилеглих країн» — проведено на базі Поліського природного заповідника у грудні 2000 р., а наступну теріошколу «Ссавці відкритих просторів» — у заповіднику «Провальський степ» (Луганщина) у травні 2001 р.

Семінар «Використання УЗ-детекторів у дослідженнях кажанів»

Семінар з використання ультразвукових детекторів у дослідженнях кажанів та пошуку їхніх сховищ організовано за ініціативою групи УЦОК і активної участі ніжинських колег-зоологів Олександра Вобленка, Бориса Кедрова та Павла Шешурака та управління біоресурсів Мінекології України. Місцем проведення обрано біостанцію «Ядути» у Борзнянському районі Чернігівській обл. Тренерами виступили нідерландські колеги Герман Лімпенс та Пітер Ліна. Ця школа-семінар тривала 3 дні, включно з нічними обліками кажанів і пошуком їхніх сховищ, протягом 4 днів, з 30 квітня до 3 травня 2000 р. Опубліковано матеріали семінару у вигляді окремого випуску *Novitates Theriologicae* (Pars 3) та звіти про семінар (Загороднюк та ін., 2000).

Симпозіум «Сакральна архітектура та охорона тварин»

Розвиваючи попередні ініціативи, зокрема Круглий стіл «Сакральна архітектура і охорона кажанів» в рамках VII Європейського симпозіуму з вивчення кажанів (Краків, 1999), Центр хіроптерологічної інформації ПАН за участю Українського центру охорони кажанів організували зустріч за цією темою — симпозіум у Перемишлі, протягом 20–21 жовтня 2000 р. Організатори семінару — польські колеги проф. Броніслав Волошин та Томаш Постава (Prof. Bronislaw Wołoszyn та Dr. Tomash Postawa), координатор від України — Лєна Годлевська. Загалом у симпозіумі взяли участь 8 колег з України.

Семінар «Великі хижі ссавці України і прилеглих країн»

Школу-семінар «Великі хижі України та прилеглих країн» організували Дирекція Поліського природного заповідника та Українське теріологічне товариство НАН України. Місце проведення семінару — Поліський природний заповідник, який у жовтні 1997 р. був місцем проведення Теріологічної школи «Ссавці у Червоній книзі України» (Загороднюк та ін., 1998). Семінар організовано за ініціативою групи HELP (про групу: Дикий, Загороднюк, 2000). Оргкомітет: С. Жила (Поліський заповідник), І. Загороднюк (Інститут зоології НАНУ), Д. Вишневський (Міжнародний Соломонів університет).

Головними завданнями школи-семінару стали розвиток моніторингових польових досліджень великих хижих у Східній Європі, поширення інформації про загальноєвропейські ініціативи у царині вивчення та охорони великих хижих, обмін досвідом у методиках проведення обліку хижих, проведення польового навчання з відслідковування переміщень вовчої зграї в районі розташування Поліського природного заповідника.

Семінар проведено на садибі ППЗ протягом трьох повних робочих днів, 15–17 грудня 2000 р. Програма школи-семінару включала три головні теми: 1) конференція «Великі хижі Східної Європи, моніторинг і охорона», 2) круглий стіл «Методи обліку великих хижих», 3) теренове заняття «Практика польових досліджень». Докладний звіт про семінар буде вміщено у наступному випуску 4 бюлетеню *Novitates Theriologicae*.

Теріологічна школа «Ссавці відкритих просторів»

VIII Теріологічну школа-семінар під назвою «Ссавці відкритих просторів» проведено 13–18 травня 2001 р. в заповіднику «Провальський степ», що входить до складу Луганського природного заповідника НАН України. Організатор від приймаючої сторони — Олександр Кондратенко, за активної участі директора заповідника Віктора Борозенця та співробітників відділення «Провальський степ» Олега Ушакова та Андрія Бондаренка. Школа зібрала близько 70 учасників, її основними частинами були сесії та теренові заняття. Матеріали доповідей та звіт будуть представлені у випуску 5 *NT*.

Інформація про випуски бюлетеню *Novitates Theriologicae*

Перший випуск NT присвячено поточним подіям теріологічного життя в Україні. Його основою стали звіт про роботу Подільської Теріологічної школи, інформаційні сторінки *УЦОК* та групи *HELP*, хроніка конференцій 1999 р. та інформація про конференції 2000 р., бібліографічна сторінка, інформація про законодавчі ініціативи з охорони ссавців, про роботу наукових груп. Обсяг випуску — 12 с. Його поширено за 120 адресами у квітні 2000 р.

Другий випуск NT присвячено школі-семінару з використання ультразвукових детекторів для вивчення кажанів, що відбулася на біостанції «Ядути» у травні 2000 р. Видання містить матеріали про семінар та дві статті Г. Лімпенса про техніку пошуку кажанів та їхніх сховищ з використанням УЗ-детекторів, звіт про семінар, інформацію про організацію детекторної мережі в Україні. Препринт *NT2* (18.04.2000, 24 с.) поширено за 40 адресами запрошених колег. Кінцева версія (29.06.2000, 56 с.) поширена серед учасників семінару в Ядутах та на конференції «Кажани Карпатського регіону».

Третій випуск NT присвячено матеріалам Міжнародної конференції «Кажани Карпатського регіону», що пройшла на базі Карпатського біосферного заповідника (Рахів) 8–12 вересня 2000 р. До випуску NT3 включено матеріали і тези доповідей учасників конференції. Бюлетень видано у двох версіях — препринт з програмою і тезами доповідей, виданий до конференції (як роздатковий матеріал для її учасників), а повна його версія — цей збірник, до якого включено також наукові праці, впорядкований протягом 2001–2003 років.

Четвертий випуск NT містить повідомлення про Школу-семінар «Великі хижі України та прилеглих країн», що відбулася у Поліському природному заповіднику 14–17 грудня 2000 р. До Бюлетеню включено інформацію про спільний польсько-український семінар «Сакральна архітектура та охорона тварин», який відбувся 20–21 жовтня 2000 р. в Перемишлі. В остаточну версію випуску планується включити звіти про роботу обох згаданих конференцій та інформацію про запланований з'їзд УТО. Очікуваний обсяг — 70–75 с.

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Ігор Загороднюк

Кажани Карпатського регіону

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Випуск № 3 Бюлетеню *Теріологічні новини*
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