

Changes in the bat fauna of Ukrainian Carpathians Mts. in the last 50 years

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Abstract. Considerable changes in the chiroptero-fauna of the Ukrainian Carpathians have been recorded in the last 50 years. In particular, *Myotis bechsteini*, *M. dasycneme*, *Plecotus austriacus*, *Nyctalus leisleri* were added to the list worked out by V. Abelencev in 1950 and 1956 which included 18 species. Recently, 21 species of bats have been recorded in the Ukrainian Carpathians (*Rhinolophus hipposideros*, *R. ferrumequinum*, *Myotis bechsteini*, *M. blythi*, *M. myotis*, *M. daubentoni*, *M. dasycneme*, *M. emarginatus*, *M. nattereri*, *M. mystacinus*, *Plecotus auritus*, *P. austriacus*, *Barbastella barbastellus*, *Miniopterus schreibersi*, *Nyctalus leisleri*, *N. noctula*, *Pipistrellus pipistrellus*, *P. nathusii*, *Vespertilio murinus*, *Eptesicus nilssonii*, *E. serotinus*). The occurrence of *Myotis brandti* is also possible. However, the occurrence of *Myotis ikonnikovi* recorded by V. Abelencev in Transcarpathia is most likely a mistake. The occurrence of *M. schreibersi* is not sure, and this species has possibly disappeared. Significant changes were observed also in the quantitative composition. Several species which were observed in large colonies and had a wide range in the 1970', are observed in small groups or solitary individuals nowadays (*M. blythi*, *M. mystacinus*, *E. serotinus*). Some species have become uncommon (*M. emarginatus*, *M. nattereri*, *B. barbastellus*, *V. nilssonii*, *V. murinus*). The fast reduction in numbers caused that 9 species of bats were included in the Ukrainian Red Book (*R. hipposideros*, *R. ferrumequinum*, *M. bechsteini*, *M. dasycneme*, *M. nattereri*, *M. emarginatus*, *M. schreibersi*, *B. barbastellus*, *N. leisleri*). The main reason for the decrease in bat numbers is the degradation of habitats as well as environmental pollution.

Bats, anthropogenic stress, populations, migration, biotopes, Ukraine

There are many significant changes in the species composition that occurred in the natural world in the last 50 years. They happened in our Eastern Carpathian region as well. It can be shown for many groups of animals, but it is especially true for bats.

We should say that bats are more sensitive group than other mammals to the changes in the environment due to their slow reproduction and small body size. They also have limited ways of the active defence from their predators than some other species. The environmental changes occur very rapidly under the anthropogenic stress. On the one hand, they result in the decrease of the species diversity, numbers of individuals in populations, in the degradation of shelters and limited

food resources, etc. On the other hand, the rare and endangered species are studied more intensively, and systematic revisions of some systematic groups are carried out.

The composition of the bat species in the Ukrainian part of the Eastern Carpathian Mts. has experienced significant changes in the past 50 years. According to the list of species which was published in 1949–50 (Abelencev 1949, 1950) there were 18 species of bats in this region (Tab. 1).

Since that time, significant changes in the taxonomy and nomenclature of bats have appeared, and the following species were added to the list: *Myotis bechsteini*, *M. dasynceme*, *Nyctalus leisleri*, *Plecotus austriacus*. *M. bechsteini* was recorded in the Lviv region in 1949 (Tatarinov 1951), and in Transcarpathia this species was found first in 1969 (Krochko 1975) in the district of Uzhgorod. Since then this species has been recorded almost every year. However, it belongs among the rarest species of our fauna. *Myotis dasynceme* is more common the northern slopes of the Eastern Carpathians Mts. and particularly in the Lviv region. There was only a single finding of the species in Transcarpathia until recently. In 1983, one male was recorded in the vicinity of the village of Sil' in the Velyko-Berezny district. We supposed that this was a case of fall migration. In the Ukrainian Carpathians *Nyctalus leisleri* was found for the first time in 1963 in the Uгла Massive of the Carpathian Biosphere Reserve (Abelencev 1967). Recently, this species can be found in the zone of deciduous forests of the Carpathian Mts. *P. austriacus* was discovered in the area in 1988. Previously, this taxon was listed as a subspecies in spite of our suggestion made in 1970 to consider it as a separate species. In the same year, *Plecotus auritus* was added to the list of species in the Transcarpathian region.

The findings of *Myotis brandti* in the Ukrainian Carpathians can be regarded reliable. At the same time, *Myotis ikonnikovi* was excluded from the species list. It was included in the list by Abelencev probably by a mistake. It is a typical south-Siberian species.

Reliable data on *Miniopterus schreibersi* are currently lacking. This species was quite numerous in the region until the middle 1970's. A number of colonies existed in the region. Their size varied from few hundreds to 2000 and more individuals. Unfortunately, now it is only a historical reference. Since 1994 there are no findings in the former sites of their colonies. Presently, we attempt to find new localities of the colonies of the species. Unfortunately, it has not yet resulted in a positive finding. We only hope that this species did not disappear definitively from the regional fauna.

Some big changes happened also in the size of the bat populations. The species which were numerous (e. g. *Miniopterus schreibersi*) in the beginning of the 1980's and occurred in large colonies, live in small groups or individually today. Some other species, *Myotis emarginatus*, *Myotis nattereri*, *Barbastella barbastellus*, *Eptesicus nilssoni*, *Vespertilio murinus*, became endangered. The decline in numbers of bats resulted in the fact that nine species from the regional fauna are now listed in the Red Book of Ukraine (Tab. 2).

Tab. 1. List of bat species in Ukrainian Carpathians Mts. after Abelencev (1949, 1950)

Family	Genus	Species
Rhinolophidae	<i>Rhinolophus</i>	<i>Rh. hipposideros</i> <i>Rh. ferrumequinum</i>
Vespertilionidae	<i>Myotis</i>	<i>M. blythi</i> <i>M. myotis</i> <i>M. nattereri</i> <i>M. mystacinus</i> <i>M. ikonnikovi</i> <i>M. emarginatus</i> <i>M. daubentoni</i>
	<i>Plecotus</i>	<i>P. auritus</i>
	<i>Barbastella</i>	<i>B. barbastellus</i>
	<i>Pipistrellus</i>	<i>P. pipistrellus</i> <i>P. nathusii</i>
	<i>Nyctalus</i>	<i>N. noctula</i>
	<i>Eptesicus</i>	<i>E. serotinus</i>
	<i>Amblyotus</i>	<i>A. nilssoni</i>
	<i>Vespertilio</i>	<i>V. murinus</i>
	<i>Miniopterus</i>	<i>M. schreibersi</i>

It is possible, that there are more endangered species than listed in the Red Book. In the nearest future the list can be extended with other species of bats. Out of 21 species of bats in the Ukrainian part of the East Carpathians, 13 are rare. The future of some colonial species of bats appears uncertain. At the same time, we consider as a positive the fact that the abundance of such species as *Rhinolophus hipposideros* and *Myotis blythi* increased in the recent years.

In evaluation of the abundance of bats in the region we should account for the distribution of different species in various habitats and landscape zones, e. g., in lowland oak woods (31.7%), mixed deciduous forests of the piedmonts (77.3%), coniferous forests (27.3%), mountain and alpine forests (18.1%), orchards and vineyards (50.0%), towns and villages (45.4%), meadows, fields and river valleys (31.7%).

As we can see, most of the species (77.3%) occur in the mixed woods of the piedmont. The lowest number of species (18.1%) was recorded in the mountain alpine forests. Even if in the orchards and vineyards the number of species is large and composition is variable, this landscape type gradually loses its importance as the wildlife refuge. The reasons are changes in the methods of the horticulture, the decrease in the number of basements, small underground food storages, and buildings at the vineyards that are considered as traditional sites for bats.

The character of the seasonal dynamics of bats shows that most of bats (except small species of *Myotis*, *Plecotus auritus* and *P. austriacus*, *Barbastella barbastellus*), migrate from the region in winter. A part of the populations of *Myotis myotis*, *M. daubentoni*, *M. blythi*, *Pipistrellus pipistrellus*, *Nyctalus noctula*, *Eptesicus sero-*

Tab. 2. Bat species of the Ukrainian Carpathians Mts. included in the Red Book of Ukraine

Species	Status	Distribution
<i>Rh. hipposideros</i>	I	Transcarpathia, Regions of Ivano-Frankivsk, L'viv, Ternopil and Hmelnicki, Krim
<i>Rh. ferrumequinum</i>	I	Ukrainian Carpathians, Krim
<i>M. bechsteini</i>	III	Transcarpathia, Regions of L'viv, Vinnica and Odessa
<i>M. dasycneme</i>	III	Transcarpathia, Regions of L'viv, Kyiv, Poltava and Harkov
<i>M. nattereri</i>	III	Transcarpathia, Regions of L'viv, Cernovici, Zitomir, Vinnica, Odessa, Cherkassi, Krim
<i>M. emarginatus</i>	III	Transcarpathia, Ternopol region, Krim
<i>M. schreibersi</i>	I	Transcarpathia, Krim
<i>B. barbastellus</i>	III	Transcarpathion Lvov, Regions of I. Frankovsk, Kijev, Cherkassi, Kirovohrad, Krim
<i>N. leisleri</i>	III	Ukraine

tinus, and some others live in our region permanently and hibernate in caves, tree holes or buildings. In the wintering places that are situated in the protected territories like the Carpathian Biosphere Reserve, the number of bats increases every year.

What are our prognoses about the future of bat species in the Ukrainian Carpathians? We hope that the ecological situation in our region will facilitate an increase in the number of bats in the future. An important role in this process has to be played by the protected territories and nature reserves. It is also important to improve old and develop new measures in the protection of the bat species.

Since bats species are known as very mobile, this work has to be done on the basis of international cooperation. Therefore, we think that the leading role in the protection of bats can be played by well coordinated work in the newly created and existing parks, reserves and protected territories. Only from this kind of cooperation we can expect positive results and provide a future for the bat species in our region.

Súhrn

Zmeny vo faune netopeirov Ukrajinských Karpát v priebehu posledných 50 rokov. V priebehu posledných 50 rokov sa potvrdili významné zmeny vo faune netopierov Ukrajinských Karpát. Do zoznamu 18 druhov, ktorý bol spracovaný Abelencevom v rokoch 1950 a 1956 boli doplnené druhy *Myotis bechsteini*, *M. dasycneme*, *Plecotus austriacus* a *Nyctalus leisleri*. Z Ukrajinských Karpát je v súčasnosti známy výskyt 21 druhov netopierov, tj. *Rhinolophus hipposideros*, *R. ferrumequinum*, *Myotis bechsteini*, *M. blythi*, *M. myotis*, *M. daubentonii*, *M. dasycneme*, *M. emarginatus*, *M. nattereri*, *M. mystacinus*, *Plecotus auritus*, *P. austriacus*, *Barbastella barbastellus*, *Miniopterus schreibersi*, *Nyctalus leisleri*, *N. noctula*, *Pipistrellus pipistrellus*, *P. nathusii*, *Vespertilio murinus*, *Eptesicus nilssonii*, *E. serotinus*. Výskyt *Myotis brandti* v skúmanom území je pravdepodobný. Abelencevom uvádzaný

výskyt *Myotis ikonnikovi* je veľmi pravdepodobne mylným údajom. V prípade *M. schreibersi* je výskyt tohto druhu stále diskutabilný a v priebehu výskumu sa zistilo, že tento druh v skúmanom území vymizol. Významné zmeny boli zistené v kvantitatívnej štruktúre netopierov oblasti. Niektoré druhy, ktoré boli v minulosti pozorované vo veľkých kolóniách a boli široko rozšírené v 70. rokoch sú v súčasnosti zisťované len v malých skupinách alebo jednotlivcovi (*M. blythi*, *M. mystacinus*, *E. serotinus*). Niektoré druhy v poslednom období neboli zistené (*M. emarginatus*, *M. nattereri*, *B. barbastellus*, *V. nilssoni*, *V. murinus*). Výrazná redukcia početnosti vyústila do zaradenia 9 druhov do Červenej knihy Ukrajiny (*R. hipposideros*, *R. ferrumequinum*, *M. bechsteini*, *M. dasycneme*, *M. nattereri*, *M. emarginatus*, *M. schreibersi*, *B. barbastellus*, *N. leisleri*). Hlavnou príčinou poklesu početnosti netopierov je degradácia úkrytov a znečisťovanie životného prostredia.

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