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New Species of Chiroptera in Czech Fauna

The only mammals capable of active flight belong to the order Chiroptera, which fly thanks to forelimbs which evolved into wings. After rodents, they are the second most numerous type of mammal. Since many of them have adapted to life in human settlements, they are now fairly well known. However, awareness of their inclusion in the zoological system is sometimes hindered by the traditional division into megabats *(Megachiroptera)*, which eat fruit; and microbats *(Microchiroptera)*, which mostly eat insects. This distinction was already formed more than twenty years ago. The study of molecular genetic markers confirmed the phylogenetic relationship between megabats and some groups formerly classified as microbats. Based on this finding, Chiroptera are divided into two sister groups whose alternative names are derived from the symbols of opposites, yin and yang – *Pteropodiformes (Yinpterochiroptera)* and *Vespertilioniformes (Yangochiroptera)*. The first group includes not only megabats *(Pteropidae)*, but also five families previously classified as microbats, such as horseshoe bats *(Rhinolophidae)*. More numerous is the group Vespertilioniformes *(Yangochiroptera)*, which includes the other bat species.

More than 27 species of Chiroptera are currently recorded as part of the fauna of the Czech Republic, including two of the family of horseshoe bats *(Rhinolophidae)*, twenty-four from the family of vesper bats *(Vespertilionidae)*, and one from the family of bent-winged bats *(Miniopteridae)*. Most species of Chiroptera do not remain all year round in our country. Many are only seen during the winter, especially in various underground areas, where they spend the cold months. Summer sightings of greater horseshoe bats, lesser mouse-eared bats, pond bats, and barbastelles are rare. Other species (the greater noctule bat, the lesser noctule, the Alcathoe bat, and Nathusius' pipistrelle)can be observed mostly in summer, and their winter occurrence has not been confirmed or is exceptional. Some species of Chiroptera observed in our territory, such as the greater horseshoe bat, the lesser mouse-eared bat, or the common bent-wing bat cannot be regarded as permanent members of our fauna, but only as rare visitors from other areas.

A lactating female Kuhl's pipistrelle with a baby under her wing. She was highly pregnant when she was caught in 2010 in Brno's Hády Quarry, and she then bred twins. *Photo: Tomáš Bartonička*

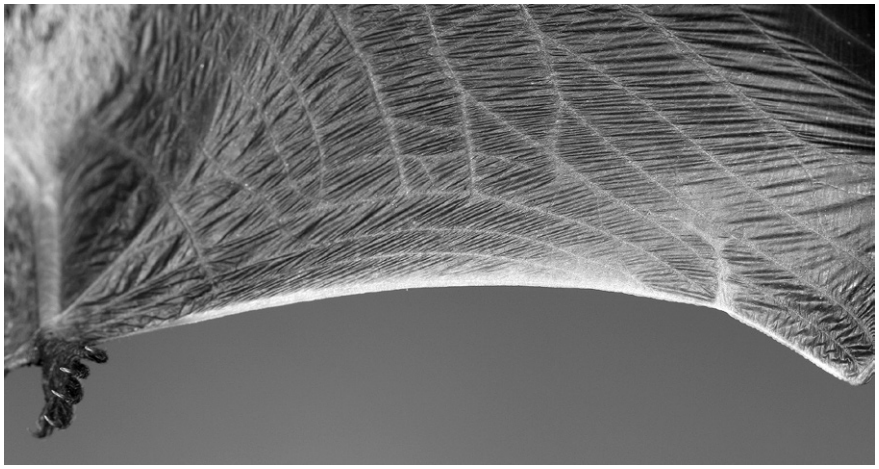
Kuhl's pipistrelle. The northernmost latitude of its original area of occurrence in Southern Europe is roughly 50°. From the 1980s, this has been shifting farther north. In the Czech Republic, Kuhl's pipistrelles were first recorded in 2007. *Photo Petr Šrámek*

Species can only be considered permanent members of the local fauna if they reproduce there. This also applies to most species of Chiroptera registered in our country, whether they are species permanently occurring, or migrant. Reproduction in the Czech Republic was proved in the case of the following twenty-three species: the lesser horseshoe bat, the whiskered bat, Brandt's bat, the Alcathoe bat, Geoffroy's bat, Natterer's bat, Bechstein's bat, the greater mouse-eared bat, Daubenton's bat, the pond bat, the parti-coloured bat, the serotine bat, the northern bat, the common noctule, the lesser noctule, Savi's pipistrelle, Nathusius' pipistrelle, the common pipistrelle, the soprano pipistrelle, Kuhl's pipistrelle, the brown long-eared bat, the grey long-eared bat, and the barbastelle.

There are now also new species which had not previously been known in our country, most notably Kuhl's pipistrelle (from the Mediterranean), and Savi's pipistrelle (from alpine mountains and rocky Mediterranean areas). Some species „originated" by taxonomic revisions of known species, particularly thanks to molecular genetic analyzes which separated one species into two (or three) cryptic, morphologically very similar species. Previously, we knew of some of these pairs – greater mouse-eared bat/lesser mouse-eared bat, brown long-eared bat/grey long-eared bat, whiskered bat/Brandt's bat. In the last twenty years, other pairs or trinities were added – Alcathoe bat/whiskered bat/Brandt's bat, and common pipistrelle/soprano pipistrelle.

Chiroptera diversity in Central Europe is relatively high, and the number of species is gradually increasing. One possible reason for this increase of fauna in general might be global warming, causing some species to move farther north. The increasing number of species of Chi-

The head of a Kuhl's pipistrelle. *Photo Petr Šrámek*



Kuhl's pipistrelle – left wing with a whitish rim on the back edge – a feature characteristic of this species. Photo Petr Šrámek

roptera, however, is primarily due to the existence of so-called cryptic species, which had previously been classified under one species name. There have been no clearly proven cases of Chiroptera being either intentionally or unintentionally introduced to new places, as is unfortunately the case with many terrestrial (land) mammals.

In the following text, we will describe further new observations of some species of Chiroptera from our region.

Kuhl's Pipistrelle

Kuhl's pipistrelle *(Pipistrellus kuhlii)* exist in Eurasia and Africa, most abundantly around the Mediterranean, from where its area extends east to Pakistan and Afghanistan. It is adaptable, and occurs in both lowlands and mountains, living in open habitats as well as forests. Its shelters are buildings or tree hollows. Parent colonies consist of 20 to 50 females, which give birth to twins. (Single births are the norm for most bat species.) It is the most abundant species of bats found in Adriatic seaside resorts, and its connection to human settlements is the strongest of all bat species. Most often, we can observe it only in the summer because it uses winter shelters which are difficult to find. The hallmark that distinguishes it from other bats is the whitish rim on the rear edge of the wing.

Kuhl's pipistrelles are spreading from the Mediterranean northwards and are now increasingly appearing in Central Europe, including Germany and Poland, and also in Great Britain. Here, however, their occurrence is considered unoriginal. Apparently, they were introduced accidentally by man, perhaps by truck or rail or shipping. Their breeding has been reported in Austria, Slovakia, and the Czech Republic.

This species was first observed in our country on August 25th, 2007 on the banks of the Dyje River in Znojmo, when zoologists caught a female in a net after her recent lactation. The first winter observation was on December 2nd, 2010 in Dobšice, near Znojmo, about 1.7 km from the place of the first observation. A dehydrated adult female was discovered in a crevice of a prefabricated tower block on the outskirts of the settlement. Thus, both summer and winter occurrence in urban environments is now proven.

On the outskirts of Brno on May 18th, 2010, on the shore of a small pond in the Hády Quarry complex, a female was caught in a net in the abandoned Růžena quarry. After three weeks of life in captivity, she gave birth to male twins. She nursed her two pups until, at the age of five weeks, they received their first worms to eat. The pups were released by their mother into the wild at her point of capture. Reproduction of this species in our country was thus proven.

The Alcathoe Bat

Based on findings from Greece, the Alcathoe bat *(Myotis alcathoe)* was discovered in the world of science and described as a species in 2001. In our country it was first detected in the same year, on June 29th, 2001, when zoologists caught one in a net at Havraníky, near Znojmo. This species perhaps came earlier from the south, but its determination was possible only after molecular analysis. In the following years, the number of findings grew, and the species has been recorded in several locations, especially in Central Bohemia, and South and Central Moravia. Some of these Alcathoe bats were caught in nets, but there were also ones that had been hit by cars, for example on the dam road between the upper and middle waterworks basin Nové Mlýny near Pasohlávky (Břeclav region), on the road near Šenov (Ostrava region), and on the road near the Ostravice River near Baška (Frýdek-Místek region). The carcasses of these dead bats were carefully measured, and tissue samples were then subjected to DNA analysis. Species identity was thus confirmed retroactively even before the scientific detection of this species.

The Alcathoe bat is a forest species occupying tree cavities and crevices. *Photo: Radek Lučan*

The male common bent-wing bat awakened from its lethargy. In the Czech Republic, the first and only discovery of this species was in Hranice Abyss on April 21st, 2011. Photo Tomáš Bartonička

The common bent-wing bat (detail of the head). A typical feature is a domed crown above short ears. Photo Petr Šrámek

In summer, the Alcathoe bat has mainly been found in deciduous forests in the lower to middle altitudes, especially in mature oak and hornbeam forests. All the individuals which had been hit by cars were found on roads in places edged with forests and near aquatic habitats.

Since 2009, intensive telemetry research, focused on the study of shelter and foraging ecology of this species, took place in Kostelecký Forest, near Přerov. Approximately 80 shelters in hollows of trees at a height of about 16 meters above the ground, well above the surrounding vegetation, were discovered. Only individuals or small groups of these bats were found in small tree hollows or cracks in the trunks and branches. Occupied cavities of oaks, birches, and lindens were observed. After the birth season in July 2009, however, about 140 Alcathoe bats were observed in a hollow tree trunk. This species was found not only in the forest itself, but also near waterways and reservoirs. However, it has never been found in buildings either in our country or elsewhere in Europe.

Summer colonies of common bent-wing bats are formed in caves by numerous clusters consisting of hundreds to thousands of bats. Photo Petr Šrámek

The first winter finding was on December 29th, 2008, when an adult male was caught in Pleče, a rocky gallery near Jindřichov in North Moravia, and the discovery of these hibernating bats in winter is gradually increasing. Morphological differentiation from similar species is difficult and requires considerable field experience. To confirm species identification, it is necessary to remove a disc with a diameter of two to three millimeters from the wing or tail, and to perform a laboratory genetic analysis.

The Common Bent-Wing Bat

The common bent-wing bat *(Miniopterus schreibersii)* needs warmth, and occurs in a vast area stretching from southwestern Europe across Northwest Africa, Southern Europe and Central Asia as far as China, Japan, and Australia. It has recently been found that this species currently consists of several separate subspecies. The common bent-wing bat had never before been observed in the Czech Republic.

Zoologists here accidentally discovered it on April 21st, 2011 when installing a camera to record the flight of greater mouse-eared bats *(Myotis myotis)* from Rotunda Cave to Puklinová Cave in Hranice Abyss, which is the deepest flooded cave system in the world. A lethargic adult male was seen holding loosely to the vertical rock face above a small hole. This has been the only sighting in our country so far.

The Hranice Abyss and its surroundings have been observed over a long period of time because of the underground system there, which hosts the only Czech colony of greater mouse-eared bats, which breed in a cave. Given that there is no record of the presence of the common bent-wing bat in this area, it had to be a rare visit from an unknown wintering site. The nearest occurrence of the common bent-wing bat is in the neighbourhood of Malacky, in Slovakia, where it can be seen in summer. In the past, they wintered in Plavecká Cave in the Small Carpathians.

Savi's pipistrelle

The main Savi's pipistrelle *(Hypsugo savii)* habitat in Europe is around the Mediterranean, but its area of occurrence extends across the Middle East to Northern India. It mainly prefers rocky places, from the coast to high mountains of over 3,000 meters above sea level. In recent decades, it spread from Southern to Central Europe, adapting to the environment of big cities that simulate the rocky areas of Southern Europe and North Africa. In our country, it seeks shelter in buildings, including tower blocks, where it often hides in the joints between panels.

Savi's pipistrelles in their original area of occurrence in Southern Europe inhabit rocky terrain and hide in rocky crevices. In Central Europe, they prefer more urban environments and find shelter in buildings, including slots in prefabricated houses. *Photo Radek Lučan*

In Central Europe, it was initially observed in Vienna, but has spread further north. In our country, it was first discovered accidentally on May 21st, 2001 in Žabčice, near Brno, where children found an injured male lying on the sidewalk. The bat, which had apparently been attacked by a cat, later died.

In the Czech Republic, Savi's pipistrelles live in cities not only in the summer; for example, in Brno they winter over as well. Reproductive colonies of females with pups can hide between building panels in the summer, as has been confirmed by findings from Eastern Slovakia in 2007. The reproduction of this species in the Czech Republic was proven by the capture of a female who was still nursing in summer. She was trapped on August 17th, 2006 above the fountain in Lužánky Park in Brno. Savi's pipistrelles are therefore well-known year-round residents of cities in our country, but their incidence is only still clearly detected in South Moravia, particularly in Brno and Znojmo, which area lies on the species' northern limits.

The Pond Bat

The reproduction in the Czech Republic of the rare pond bat *(Myotis dasycneme)*, previously known only from underground wintering in northern Bohemia and the Moravian Karst, has been proven relatively recently. Only in the 1990s were modest data supplemented by some of these bats being trapped in nets in front of the entrances to caves during their autumn flights. Reproduction was proven on 10th August 1999 at the confluence of the Morava and Dyje rivers near Lanžhot, when a net caught two newly weaned pups and one adult female a short time after the end of lactation. Also, at the Morava River Canal in the park in Veselí nad Moravou, two adult males and a highly pregnant female were caught on May 18th and May 30th.

Another potentially new species in the Czech Republic might be the greater noctule bat *(Nyctalus lasiopterus)*. One is preserved in a museum in České Budějovice, but there is no mention of where it was found. Currently there are only unverified records of observation or detection by ultrasound. Recurrent observations in the middle of Slovakia, however, provide hope that the greater noctule bat will be clearly identified in the Czech Republic, too.

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The pond bat is a lowland species which, in summer, fishes above slow-flowing water. It spends winter in higher-elevation caves. *Photo Radek Lučan*