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MATERNITY COLONIES OF *MYOTIS BRANDTII* IN THE POLESIE STATE RADIATION-ECOLOGICAL RESERVE

Valery C. Dombrovski

Polesie State Radioecological Reserve (Khoyniki, Belarus)

Correspondence to: *Polesie State Radioecological Reserve; Tereshkovej St. 7, Khoyniki, 247618 Belarus;*
e-mail: valdombr@rambler.ru

Maternity colonies of *Myotis brandtii* in the Polesie State Radiation-Ecological Reserve. — V. C. Dombrovski. — Two lactating females of Brandt's bat were radio-tracked during 26–28 June 2016 and 14–20 June 2017 in the Polesie State Radiation-Ecological Reserve (Khoyniki district, Gomel region). Four tree roosts of nursery colonies of Brandt's bat were found. The roosts were detected at the dead oak trees in an old oak forest at a distance of 142–870 m from each other. Roosts were located in trunk cracks and behind peeling bark at a height of 4–16 m above the ground. Visual inspection during the evening revealed that the maternity colony consisted of 8–10 individuals of Brandt's bat. In 2016, there was a mixed colony of Brandt's bat and the soprano pipistrelle (*Pipistrellus pygmaeus*). This is the first documented record of maternity colonies of Brandt's bat and the easternmost finding localities of this species in Belarus.

Key words: maternity colony, bats, *Myotis brandtii*, Polesie, Reserve, Belarus.

Материнські колонії *Myotis brandtii* в Поліському державному радіаційно-екологічному заповіднику. — В. Ч. Домбровський. — За допомогою радіостеження за двома репродуктивно активними самками нічниці північної протягом 26–28 червня 2016 р. та 14–20 червня 2017 р. в Хойницькому районі Гомельської обл. на території Поліського державного радіаційно-екологічного заповідника виявлено 4 денних сховища даного виду. Вони розташовувалися в сухостійних дубах на висоті 4–16 м у старовіковій розрідженій діброві на відстані 142–870 м один від одного. Візуальним оглядом встановлено, що у 2016 р. колонія налічувала 10 особин нічниці північної та 20–30 особин нетопира пігмея (*Pipistrellus pygmaeus*), у 2017 р. — 8 особин нічниці північної. Це перші документовані знахідки материнських колоній нічниці північної та найсхідніші з відомих для Білорусі точки реєстрації виду.

Ключові слова: материнська колонія, кажани, *Myotis brandtii*, Полісся, заповідник, Білорусь.

Introduction

Brandt's bat is a rare bat species of Belarus, registered in the last two editions of the National Red Book (2004 and 2015). Information on the number and distribution of Brandt's bat in Belarus is very scarce. It was believed for a long time that the range of the species is limited to the westernmost regions of the country (Demyanchik, Demyanchik, 2001). Until the end of the XX century, all available information on the species was based on A. N. Kurskov's materials collected in Belovezhskaya Pushcha (Kamenets district, Brest region and Svisloch district, Grodno region) during 1950–1970 (Kurskov, 1981; Strelkov, 1983). Due to the increase of research activity, the findings of this species began to appear in other regions of the country as well. In June 2001, one adult male and one female of Brandt's bat were caught in the Brest district of the Brest region (Red Book, 2004). In July 2003, one adult male was caught in the Petrikov district of the Gomel region (Shpak, 2010). In August 2012, five adults (four females and one male) were caught in the Zhitkovichi district of the Gomel region in the territory of the Pripyatsky National Park (Kusnezhev et al., 2012).

In June–July 2015–2016, 12 adult Brandt's bats, including lactating and pregnant females, were caught on the territory of Stary Zhaden Reserve (Zhitkovichi district, Gomel region), which confirmed the reproduction of the species in the Pripyat Polesie region (Dombrovski et al., 2017). How-

ever, by the present time there was not a single documented finding of maternal colonies of Brandt's bat in Belarus.

Material and methods

In May-June 2016 and 2017, acoustic surveys of bats were conducted in the Polesie State Radioecological Reserve (PSRER) (Khoyniki district, Gomel region) by using ultrasonic detectors Bat-corder 3.1 and Batlogger M (Dombrovski, 2017). Detectors were installed at 38 points, covering the main vegetation complexes and landscapes of the Reserve. In one of the points, sonograms of a whiskered bat from the group of cryptic species *Myotis brandtii*. *Myotis mystacinus* were obtained. Identification of these species by echolocation calls is difficult and requires a very large experience (Barataud, 2015). To establish the species, mist nettings were carried out at the place where the calls were detected. It was an old, rarely used road, 3–4 meters wide, passing through a large massif of waterlogged old and middle-aged forests (coordinates 51.7 N 29.9 E). Black alder (*Alnus glutinosa*) dominated in the marshy depressions, while oak (*Quercus robur*) on the dry plots. The catching took place during 24–25 June 2016 and 13–14 June 2017. In each of the seasons, one breeding female of *M. brandtii* was caught (Table 1).

Both females were fitted with LB-2X Transmitters for bats (Holohil Systems Ltd.) and released in the evening. The transmitters were glued onto the back of the bats between the scapulae using medical glue BF-6. All animals were in good conditions and flew far away after the release. Roost search was conducted during 26–28 June 2016 and 15–20 June 2017 using Alinco DJ-X11 receiver equipped with three elements Yagi antenna.

Species identification

The wing membrane of the caught individuals was attached to the base of the outer toe, which is characteristic of the group of whiskered bats and distinguishes them from the similarly sized *Myotis daubentonii*. The cingulum cusp of the upper third premolar reached or was higher than the height of the second premolar, which is one of the most reliable criteria for distinguishing *M. brandtii* from *M. mystacinus* sensu stricto (Dietz, von Helversen, 2004). The shape of ears, tragus, hair color and others features also corresponded to the species-specific characteristics of *M. brandtii* (Zagorodniuk, Dykyy, 2009).

Results

In 2016, during a three day long radio tracking of the lactating female, two tree roosts were found (Table 2). They were located at the edge of an old (more than 100 years) oak forest, surrounded by marshy depressions. Roost 1 was discovered on 26 June 2016 and it was located in the cracks of a dead oak stump (Table 2). In the lower part of the cracks with a width of about 2 cm, several specimens of *Myotis* sp. were found in the day. The same evening a visual and detector record of bats leaving the roost were conducted. In the roost area, individuals of three species were detected: *Pipistrellus pygmaeus*, *Plecotus auritus*, and *M. brandtii*. It was noticeable that *P. pygmaeus* formed a colony of 20–30 individuals in the uppermost part of the oak stump, and *M. brandtii* kept apart in its lower part. The departure of *M. brandtii* began 8 minutes after sunset and lasted about half an hour, from 21:30 to 22:01. In total, 10 specimens flew out. After the departure of adult individuals, a compact group of young bats remained in the depth of the crack.

Table 1. Measurements of *Myotis brandtii* individuals caught at the PSRER (eastern Belarus) in 2016–2017*

Таблиця 1. Виміри особин *Myotis brandtii*, зловлених в ПДРЕЗ (східна Білорусь) у 2016–2017 рр.*

Date	Age	Sex	W, g	FA, mm	5F, mm	3F, mm	Reproductive status
25.06.2016	Ad	F	7,7	36,6	46,0	56,0	Lactating
14.06.2017	Ad	F	8,85	37,2	46,2	58,4	Pregnant

* W — weight (g), FA — forearm length, 5F, 3F — length of the 5th and 3rd fingers (mm).

Table 2. Roost characteristics of two *Myotis brandtii* individuals, radio tracked at the PSRER (eastern Belarus) in 2016–2017; RN — roost No., DS — distance from the catching site (km), A — age (years), DBH — diameter at breast level (cm), AHE — above ground height of entrance (m), EX — exposure ($^{\circ}$ from N)

Таблиця 1. Характеристики сховищ двох особин *Myotis brandtii*, простежених за радіотреками в ПДРЕЗ (східна Білорусь) у 2016–2017 рр.; RN — номер сховища, DS — відстань від місця лову (км), А — вік (роки), DBH — діаметр на висоті грудей (см), АНЕ — висота входу над землею (м), EX = експозиція ($^{\circ}$ від Пн.)

RN	DS	Tree species	Tree characteristics			Roost characteristics		
			A	DBH	other	AHE	EX	type
1	1.0	Oak	80–100	40	dry, broken at height of about 9 m	4	200	trunk cracks
2	1.2	Oak	100–120	75	dry	16	150	behind peeling bark
3	0.4	Oak	80–100	50	dry	15	0	behind peeling bark
4	0.5	Oak	100–120	60	dry	15	350	behind peeling bark

The next day, on the 27 of June, the colony of *M. brandtii* moved 142 m far from the previous place and settled in an old dry oak tree behind peeling bark (roost 2). In the evening on the 28 of June, the colony was still there and ten *M. brandtii* leaving the roost were recorded at the evening. The presence of *P. pygmaeus* was established again in the colony.

In 2017, during six days of radio tracking, from the 15 of June to the 20 of June, two roosts of the species were found in the same type of forest as in 2016, but 1–1.5 km far (Table 2). The tagged female spent four days in the roost 3 and two days (on the 16 and 18 of June) in the roost 4. The distance between these roosts was 870 meters. In the evening on 19 June 2017, the counting of bats leaving the roost 3 showed the presence of 8 specimens in the colony. The first individual flew out at 21:04, i.e. 17 minutes before sunset, while the last at 21:42. Only *M. brandtii* were detected. On the 18 and 19 of June, the end of the night activity of the tagged female was registered by radio tracking. The female disappeared into the roosts at 4:15 and 4:10, respectively, i.e. 30–35 minutes before sunrise.

Discussion

Our findings of maternity colonies of Brandt's bat in Khoyniki district, Gomel region are the easternmost known record localities within the species' range in Belarus. Based on our data, it can be argued that Brandt's bat inhabits the entire territory of the Belarusian Polesie from the western to its eastern borders. Further east, in the Bryansk region of Russia, Brandt's bat was also repeatedly recorded by researchers (Sitnikova et al., 2009; Vlaschenko et al., 2016). To the south of Belarusian Polesie, on the contrary, this species is extremely rare. In the Ukrainian part of the Chernobyl zone, Brandt's bat was caught only once during a very intensive work on inventory of the bat fauna (Gashchak et al., 2013). Search and inventory of wintering ranges of bats in the vast plain territory of the north of Ukraine allowed identifying only two specimens of *M. mystacinus* (s. l.). *M. brandtii* (Godlevska et al., 2016).

The breeding ecology of Brandt's bat is poorly studied. According to literature data, this is a typical forest-dwelling species preferring wet habitats (Dietz et al., 2009). Presumably, the availability of suitable trees can be a major limiting factor for the maternity colonies (Tillon, Aulagnier, 2014). It is necessary to continue the study on the habitat use and roost selection by Brandt's bat and other rare forest-dwelling species in the Pripjat Polesie. This will allow developing specific recommendations on environmentally oriented forestry management in this very specific region.

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