

Migracje nietoperzy pomiędzy terenami leśnymi Kotliny Milickiej a Jaskinią Szachownica

Bat migration between forests of Milicka Basin and Szachownica Cave

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Abstract

Between forest areas of Milicka Basin (south of Wielkopolska) and Szachownica Cave (Wielun Uplands) were identified 23 flights of bats. Among the documented migrations, 18 of them were migrations of Greater mouse-eared bat *Myotis Myotis* and the 5 of Natterer's bat *Myotis nattereri*. The traveled distance was between 80 and 95 kilometers in the south-east direction.

Introduction

Bats in the temperate zones due to adverse weather conditions migrate between summer residence and hibernation place. Different species migrate at different distances. From long-distance migrations to 1,000 km (e.g. Nathusius's pipistrelle *Pipistrellus nathusii*), by medium-sized migrants (e.g. Greater mouse-eared bat *Myotis myotis* or Daubenton's bat *Myotis daubentonii*) to sedentary species such as the Brown long-eared bat *Plecotus auritus* or Serotine *Eptesicus Serotinus* (Steffens et al. 2004).

The knowledge about the migration habits of bats is still poorly understood. There are not many published data on bat migration from Poland (Harmata 1996).

The purpose of the research was to learn the habits of migrating bats and obtain data on bats attachment to their roosts. The paper presents data on bat migrations from the forest of the eastern part of Milicka Basin (south of Wielkopolska) to Szachownica Cave (Wielun Uplands, Silesian Voivodship).

Research methods

Bats were ringed in the forests of Milicka Basin between 2004 and 2015. Animals were caught in bat boxes. The rings were read in Szachownica Cave during winter monitoring and during catching during the swarming. Bats were ringed with the register number of the center in Dresden: FMZ DRESDEN, and A. Mickiewicz University: UAM PO and UAM PL.

For the catching and ringing of the bats were obtained approvals of GDOŚ and RDOŚ: DOP-oz.6401.09.3.2013.km, DOPog-4201--04A-1/2002, DOPweg-4201-04A-4/03/al., DOPPog-4201-04A--3/04/al., OS-III-1-6631-49/Z/2001, OS-III-1-6631-33/02, SR-III--2-6630-9/2002, SR-III-3-6631-40/2002, SR-III-4-6630-28/03, SR.III-5.6631-8/2003/04, SR.III-5.6631-8/2003/04, SR.III-5. 6630-87/04, SR.III-5.6631-553/04, WPN.6205.24.2004.MM, WPN.6401.234.2005.DC, WPN.6401.36.2007.DC, WPN.6205. 9.2012.MM, WPN.6401.486.2014.DC, WPN.6401.412.2015.DC

Results

We have received information on the migration of 23 bats, between the forests of Milicka Basin and Szachownica Cave (18 of Greater mouse-eared bat *Myotis Myotis* and the 5 of Natterer's bat *Myotis nattereri*), wherein 6 Greater mouse-eared bats and 2 Natterer's bats were observed more than once in the cave (Tab. 1).

The distance between the ringing places and the places of reading is 80-95 km, in the south-east direction.

In case of 7 Greater mouse-eared bats and 3 Natterer's bats there was observed "return" from the winter place to the place of ringing.

Most documented flights refer to individual bats, ringed in mating groups in bat boxes in the woods (summer or autumn), whose rings were read during hibernation or swarming in the cave. There was also a reversed situation where a bat (FMZ DRES-DEN A80128) caught in a cave during swarming (27.07.2013) was found in a forest box more than a month later (07.09.2013).

The shortest period between readings in the Milicz Basin and the cave is 37 days (FMZ DRESDEN A80128) and the longest time is over 6 years (FMZ DRESDEN A56056).

Some bats have been registered repeatedly at the place of ringing (maximum 42 times - male of Greater mouse-eared bat FMZ DRESDEN A56056). There are also bats that were re-registered in hibernation period (maximum four times in the cave during 3 consecutive seasons: male of Greater mouse-eared bat: FMZ DRESDEN A80050).

Conclusions

Obtained data on bat migrations shows that Szachownica Cave are visited by relatively numerous bats from areas in the distance about 100 km. The results confirm that on the territory of Poland, Greater mouse-eared bat is medium-distance migrant, which regularly migrate for distances up to 100 km.

In case of the Natterer's bats the longest documented migration in Poland has been presented. The species so far considered was relatively settled. Relatively numerous

migrations indicate that in Poland Natterer's bats have regular, medium-distance migrations.

Repeated observations indicate a strong attachment of Greater mouse-eared bat and Natterer's bat to roosts in the forests and in hibernation sites.

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Tab. 1. Bat migration between forests of Milicka Basin and Szachownica Cave

No.	Species	Sex	No. of ring	Dates of ringing and consecutive registrations	Dates of registration in cave	Return flights	Ringing person / Register
1.	<i>Myotis myotis</i>	M	FMZ DRESDEN A56056	28.08.2004, observed 42 times in 2004-2012	29.01.2010, 07.03.2010	X	G. Wojtaszyn/ M. Ignaczak
2.	<i>Myotis myotis</i>	M	FMZ DRESDEN A56063	28.08.2004, 14.05.2005, 11.06.2005, 15.08.2005	24.10.2005, 24.03.2006		G. Wojtaszyn/ J. Hejduk
3.	<i>Myotis myotis</i>	F	FMZ DRESDEN A56066	28.08.2004, 15.08.2005	06.01.2009		G. Wojtaszyn/ T. Postawa
4.	<i>Myotis myotis</i>	F	FMZ DRESDEN A56087	29.08.2004	10.11.2005, 24.03.2006		G. Wojtaszyn/ J. Hejduk
5.	<i>Myotis myotis</i>	M	FMZ DRESDEN A56132	18.09.2005, observed 8 times in 2005-2009	01.11.2007, 29.12.2009, 07.03.2010	X	G. Wojtaszyn/ M. Ignaczak/ T. Postawa
6.	<i>Myotis myotis</i>	M	FMZ DRESDEN A56200	18.09.2006, observed 10 times in 2006-2011	29.01.2011	X	G. Wojtaszyn/ M. Ignaczak
7.	<i>Myotis myotis</i>	M	FMZ DRESDEN A61416	09.05.2008	06.01.2009		G. Wojtaszyn/ T. Postawa
8.	<i>Myotis myotis</i>	M	FMZ DRESDEN A80050	27.04.2009	05.03.2010, 07.03.2010, 29.01.2012, 03.03.2013		G. Wojtaszyn/ M. Ignaczak
9.	<i>Myotis myotis</i>	F	FMZ DRESDEN A80155	22.08.2010, 08.09.2013, 13.09.2014, 22.08.2015	21.11.2010	X	G. Wojtaszyn/ W. Gubała
10.	<i>Myotis myotis</i>	M	FMZ DRESDEN A80079	16.09.2012, 07.09.2013, 13.09.2014, 03.10.2015, 03.09.2016	19.10.2013	X	G. Wojtaszyn/ M. Ignaczak
11.	<i>Myotis myotis</i>	F	FMZ DRESDEN A80137	15.09.2012, 14.09.2014, 23.08.2015	07.03.2015		G. Wojtaszyn/ M. Ignaczak
12.	<i>Myotis myotis</i>	F	FMZ DRESDEN A80138	15.09.2012	03.03.2013		G. Wojtaszyn/ M. Ignaczak
13.	<i>Myotis myotis</i>	M	FMZ DRESDEN A80190	04.08.2012	26.01.2013		G. Wojtaszyn/ M. Ignaczak

No.	Species	Sex	No. of ring	Dates of ringing and consecutive registrations	Dates of registration in cave	Return flights	Ringing person / Register
14.	<i>Myotis myotis</i>	M	FMZ DRESDEN A80128	15.09.2012, 07.09.2013, 23.08.2015, 04.10.2015	27.07.2013, 05.03.2016	X	G. Wojtaszyn/ M. Ignaczak
15.	<i>Myotis myotis</i>	M	FMZ DRESDEN A80083	16.09.2012, 07.09.2013, 13.09.2014, 03.10.2015, 03.09.2016	05.03.2016	X	G. Wojtaszyn/ M. Ignaczak
16.	<i>Myotis myotis</i>	F	UAM PO122	07.09.2013	07.03.2015, 05.03.2016		G. Wojtaszyn/ M. Ignaczak
17.	<i>Myotis myotis</i>	F	UAM PO440	13.09.2014	05.03.2016		G. Wojtaszyn/ M. Ignaczak
18.	<i>Myotis myotis</i>	M	UAM PO791	23.08.2015, 03.10.2015	05.03.2016		G. Wojtaszyn/ M. Ignaczak
19.	<i>Myotis nattereri</i>	F	FMZ DRESDEN O27039	13.05.2006, 12.05.2007, 09.05.2008	04.03.2007	X	G. Wojtaszyn/ M. Ignaczak
20.	<i>Myotis nattereri</i>	M	FMZ DRESDEN O27153	06.08.2006, 13.05.2007, 30.07.2007, 22.08.2015, 03.09.2016	29.01.2012	X	G. Wojtaszyn/ M. Ignaczak
21.	<i>Myotis nattereri</i>	F	FMZ DRESDEN O41139	19.09.2008, 04.08.2012, 13.09.2014, 22.08.2015, 03.09.2016	15.03.2009, 05.03.2016	X	G. Wojtaszyn/ T. Postawa
22.	<i>Myotis nattereri</i>	M	FMZ DRESDEN O41044	02.08.2008	19.10.2013		G. Wojtaszyn/ M. Ignaczak
23.	<i>Myotis nattereri</i>	F	FMZ DRESDEN O41371	04.08.2012	29.08.2012, 31.01.2015		G. Wojtaszyn/ M. Ignaczak