

ATYPICAL COMMUTING FLIGHTS OF FEMALES MOUSE-EARED BAT (*MYOTIS MYOTIS*) IN THE UNDERGROUNDS OF THE „NIETOPEREK“ BAT RESERVE (WESTERN POLAND)

Wawrocka K., Kokurewicz T.

Institute of Biology, Wrocław University of Environmental and Life Sciences, Koźuchowska 5b, 51-631 Wrocław, Poland

E-mail: kamila.freeme@gmail.com

ABSTRACT

The observations were made in the underground fortifications of the Międzyrzecz Fortified Front (MFF) (Western Poland) during preparation of Management Plan of Natura 2000 site PLH080003 "Nietoperek". Heretofore daily migrations of mouse-eared bat between maternity colony and foraging areas were noticed as fast flights (max. 50km/h) occurring ca. 10 m aboveground. Our observations made by use of radio-tracking and bat counts performed both under and aboveground made possible to identify atypical commuting flights taking place in the corridors of underground fortification system. The main benefits of underground flights could be: (1) predation avoidance, (2) increase the time of foraging by starting the emergence before darkness and (3) saving energy by avoiding flights in unfavourable weather conditions. The results show high adaptations abilities of this species.

Key words: *Myotis myotis*, radio-tracking, commuting flights, Natura 2000 site "Nietoperek"

Acknowledgments: We are very grateful to Marcin Rusiński ("ANSEE " Consulting, Poland), Jan Boratyński (Poznań University of Life Sciences, Poland) John Haddow (Auritus Wildlife Consultancy Ltd, UK), Joanna Nalewalska (Wrocław University, Poland) for invaluable help during the field study.

INTRODUCTION

Mouse-eared bats leave maternity roost ca. 20 minutes after sunset and perform direct flights (*commuting flight*) straight to foraging areas situated up to 25 km from the roost. Commuting flights of this species were described as fast flights (max. 50 km/h) occurring ca. 10 m aboveground (Arlettaz, 1999; Drescher, 2004; Zahn et al., 2005). We can assume that earlier flight of lactating females to feeding grounds extends the time of foraging and in consequence could increase the growth rate of juveniles. During the commuting flights bats are endangered by avian and mammalian predation (Speakman, 1991). Traveling long distances to foraging areas in bad weather conditions e.g. rain and low ambient temperature could cause the extra energy expenditure, unfavorable especially for lactating females. According to that, all adaptations increasing the foraging time of lactating females, minimizing the predation risk and making possible to avoid the bad weather condition could be favored by natural selection. During our observations we tried to find the most important benefits of flying underground for lactating females of mouse-eared bat.

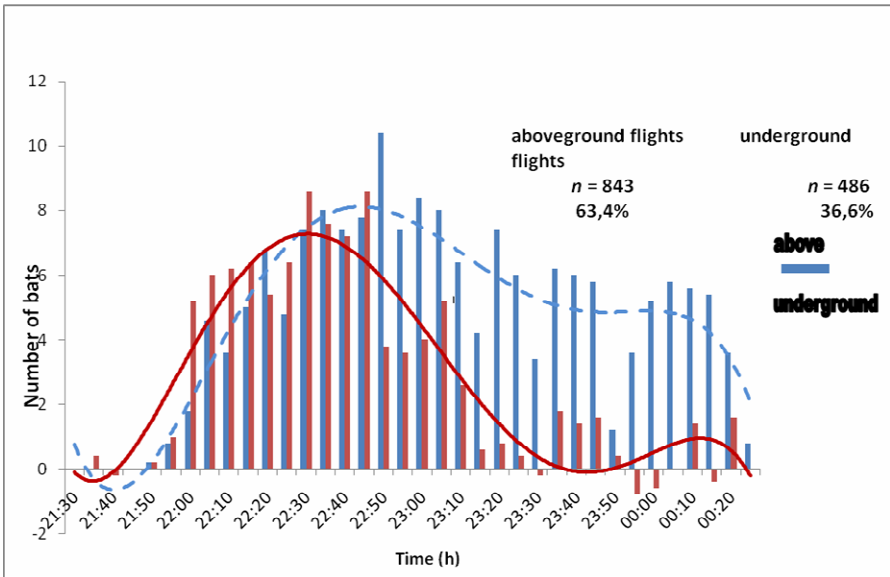
MATERIAL AND METHODS

The Central Sector of MMF was built during the Second World War to protect Germany from the invasion from the east. It is composed of 35 aboveground bunkers connected by underground railway tunnels of total length of 32 km. In 2007 the Natura 2000 site "Nietoperek" (area: 7377.37 ha) was established to protect bats hibernating underground, their foraging areas and maternity colonies. Undergrounds of MMF are largest winter colony of bats in Central Europe composed of at least 40 000 individuals of 13 species. Five lactating female have been marked by use of LB-2 transmitters (Holohil Systems Ltd., Canada). The weight of the radio-tags (0.52 g) did not exceed the 5 % of body mass of bats. The non-toxic *Torbot* surgical glue – improved *SkinBond* formula – was used to make possible the transmitters to fell off from bats after ca. two weeks. Two Australis 26K Scanning receivers and three-element Yagi collapsible antenna (Model AY/C) were used to monitor bat activity. On 12/13 of July the count of bats emerging from maternity colony situated underground was made by 2 groups of observers counting simultaneously bats emerging under and aboveground.

RESULTS AND DISCUSSION

We have found that 36,6 % of counted bats were commuting underground, while 63,4 % were emerging aboveground. The results obtained by use of radio-tracking showed similar proportion (60 % underground, 40 % aboveground). During the observation the weather was rainy and windy, which could explain the obtain results. The first underground commuting flights started 12 min earlier than emergence aboveground, however the earlier emergence was noticed in only 1,23 % of all bats commuting underground.

Fig. 1. Proportion of aboveground and underground flights of females mouse-eared bats from maternity colony in Natura 2000 site "Nietoperek" (12/13 of July 2009)



CONCLUSION

The results indicate that the main benefits of underground commuting flights of lactating females of mouse-eared bat are probably avoidance of predation and bad weather conditions. The earlier emergence from the colony could be less important because was performed only by very small proportion of the bats. Additionally, the results evidenced the high adaptation abilities of this species, able to benefit by use of main-made constructions as commuting corridors.

REFERENCES

- Arletaz, R. (1999). Habitat selection as a major resource partitioning mechanism between the two sympatric sibling bat species *Myotis myotis* and *Myotis blythii*. *Journal of Animal Ecology*, 68: 460-471.
- Drescher, C. (2004). Radiotracking of *Myotis myotis* (Chiroptera, Vespertilionidae) in South Tyrol and implications for its conservation. *Mammalia*, 68(4): 387-395.
- Speakman, J.R. (1991). The impact of predation by birds on bat populations in the British Isles. *Mammal Review*, 21(3): 123-142: 1185-1194.
- Zahn, A., Haselbach, H. and Güttinger, R. (2005). Foraging activity of central European *Myotis myotis* in a landscape dominated by spruce monocultures. *Mammalian Biology*, 70(5): 265–270.