

**Observation of the mobbing behaviour of insectivorous bats (Chiroptera: Vespertilionidae) towards *Falco peregrinus* (Aves: Falconiformes)**

Pozorování mobbingu netopýrů (Chiroptera: Vespertilionidae) vůči sokolu stěhovavému (*Falco peregrinus*) (Aves: Falconiformes)

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**Abstract.** Mobbing is a kind of antipredator behaviour which occurs when individuals cooperatively attack a potential predator. In bats, mobbing behaviour is mainly related to the completion of intra- or interspecific interactions, or is applied as an antipredator strategy. In this short note, we describe the first observation of cooperative bat mobbing (attacking and harassing) of the peregrine falcon, a daytime predator of flying prey with an active daytime foraging strategy.

**Keywords.** Mobbing, antipredator behaviour, chiropterans, peregrine falcon.

Many aspects of animal behaviour are affected by the risk of predation. One of the behavioural antipredator strategies is mobbing – an intentionally aggressive animal's behaviour performed against potential predators posing a threat to them or to their offspring (LIMA & DILL 1990, LIMA & O'KEEFE 2013). This behaviour is important in inter- or intraspecific competitive interactions (HURD 1996, ALTMANN 1956). As an antipredator strategy, mobbing has been frequently observed in avian species (ALTMANN 1956, PETTIFOR 1990), in the bluegill, a cooperatively nesting fish (DOMINEY 1983), or in some mammal species, e.g. primates (BARTECKI & HEYMANN 1987), squirrels (OWINGS & COSS 1977) and some bat species (RUSS et al. 2004, KNÖRSCHILD & TSCHAPKA 2012, LUČAN & ŠÁLEK 2013). In bats, existence of mobbing was inferred based on behavioural responses to an experimentally play-backed agonistic vocalisation (RUSS et al. 1998, 2004), which has a structurally convergent design among different bat species, similarly as in birds (ROHWER et al. 1976, RUSS et al. 2004). Nevertheless, reports on direct observation of bat anti-predator behaviour are only very poorly represented in the zoological literature, which probably reflects their cryptic (nocturnal) life style (KNÖRSCHILD & TSCHAPKA 2012, LUČAN & ŠÁLEK 2013). In this short note, we describe the first observation of cooperative bat mobbing of the peregrine falcon, a daytime predator of flying vertebrates.

On 24 August 2014 (7 p.m.), we observed mobbing behaviour of a rather large bat species, most probably the common noctule (*Nyctalus noctula*) in the Prague periphery near Cholupice (49° 99' N,

14° 45' E), Czech Republic. The bats attacked a young female of the peregrine falcon (*Falco peregrinus*) during falconry training. The flying falcon was harassed simultaneously by three bats at the height of approximately 50–80 m above the ground for ca. 10 minutes during the sunny day. Although the peregrine falcon tried to chase the bats, they did not try to escape, avoided its attacks by manoeuvring and repeatedly attacked the falcon from behind. The harassment ended after a few failed predatory attacks by the falcon, when the bats were repelled. Subsequently, the bats fled around and warned.

Although daytime flight activity of bats has been recorded quite often, reports describing interactions between bats and their potential avian predators are rarer (SPEAKMAN 1990, 1991). Many of these interactions end by killing of the bat. However, predatory attacks on small bats are more successful than those on larger bat species when flying in daylight (SPEAKMAN 1991). To our knowledge, this is the first direct observation of bats mobbing their daytime avian predator. The observed behaviour clearly demonstrates that the bats were aware of the presence of their predator. Bats (in Europe often the noctule bats) are a common part of the diet of the peregrine falcon (DREWITT 2014, STEVENS et al., 2009, BYRE 1990) and the reported high success rates (sometimes well in excess of 50%; LEE & KUO 2001) make them much easier prey than the falcon's typical diet, i.e. birds (DEKKER 1988, ZORATTO et al. 2010). Our observation thus not only brings a new record of the mobbing behaviour in bats, but extends the knowledge of this phenomenon by the ability of bats to mob daytime predators (e.g. during autumn migration). Last but not least, it brings further evidence favouring the hypothesis that mobbing behaviour may be a constituent part of the antipredator behaviour of bats, though it is hard to observe in the wild (LUČAN & ŠÁLEK 2013).

## SOUHRN

V tomto krátkém příspěvku popisujeme pozorování opakovaného mobbingu netopýřů rezavých (*Nyctalus noctula*) vůči samici sokola stěhovavého (*Falco peregrinus*) během sokolnického tréningu.

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