Chapter 1

Introductory Chapter: Bats Eaten by Owls

Heimo Mikkola

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.76099

1. Introduction

Bats and owls are very popular hoppy and research subjects of nature loving people as shown by BatLife and Owler groups all around the world but what is the relation of bats and owls in the wild. An assessment of owl dietary studies and anecdotal accounts was made but the huge material (well over 10 million prey animals) is in print elsewhere [1]. However, the role played by owls in the mortality of Eurasian bats is shortly reviewed for this book.

2. Bat-eating owls

The owl diet studies revealed that most owls are sometimes eating the bats although none makes a living out of them as other prey are much easier to capture. Well-studied European owl species ate a total of 19,864 bats [1]. At least 49 bat species have been identified in the diet samples (**Table 1**).

Barn Owl *Tyto alba* and Tawny Owl *Strix aluco* have captured most of all bats (47.1 and 42.6%), and Long-eared Owl *Asio otus* comes next (7.3%). Short-eared Owl *Asio flammeus* and Eagle Owl *Bubo bubo* take similar amounts of bats (1.2 and 1.3% respectively). For Tengmalm's *Aegolius funereus*, Ural *Strix uralensis* and Little Owls *Athene noctua* bats were fairly rare prey item, with less than 0.1–0.4% of this material [1]. Scops Owl *Otus scops* and Pygmy Owl *Glaucidium passerinum* ate less than 10 bats, so they are not included in **Table 1**.

Bat species	Weight of the bat species in g	No of owl species as predators	Percentage of the Total
Pipistrellus pygmaeus	5.1	1/8	0.26
P.pygmaeus or *P.pipistrellus*	5.3	1/8	0.19
Pipistrellus pipistrellus	5.5	6/8	16.02
Myotis mystacinus	6.1	7/8	1.51
Myotis brandtii	6.5	3/8	0.87
Pipistrellus abramus	6.5	2/8	3.41
Murina huttoni	6.7	1/8	0.01
Rhinolophus hipposideros	6.9	4/8	1.07
Pipistrellus sp.	6.9	5/8	1.57
Murina hilgendorfi	7.0	1/8	0.02
Pipistrellus kuhlii	7.3	4/8	11.85
Hypsugo savii	7.5	3/8	0.10
Asellia tridens	8.0	3/8	0.27
Myotis nattereri	8.3	6/8	3.18
Myotis emarginatus	8.7	3/8	0.52
Myotis capaccinii	8.8	2/8	0.19
Plecotus auritus	9.3	6/8	3.19
Myotis petax	9.5	1/8	0.01
Myotis annectans	9.7	1/8	0.01
Barbastella barbastellus	9.7	3/8	2.46
Plecotus sp.	9.8	3/8	0.25
Rhinopoma microphyllum	10.0	2/8	0.05
Pipistrellus nathusii	10.2	4/8	0.82
Myotis bechsteinii	10.2	4/8	0.87
Plecotus austriacus	10.3	3/8	1.52
Myotis daubentonii	10.9	5/8	1.17
Nycteris thebaica	11.5	1/8	0.02
Eptesicus nilssoni	11.6	6/8	0.48
Miniopterus schreibersii	11.9	4/8	0.50
Myotis sp.	12.1	5/8	1.40
Rhinolophus blasii	12.5	1/8	0.02
Rhinolophus eyryale	12.9	3/8	0.27
Myotis dasycneme	13.2	2/8	0.25

Bat species	Weight of the bat species in g	No of owl species as predators	Percentage of the Total
Rhinolophus sp.	14.6	2/8	0.02
Rhinolophus bocharius	15.1	1/8	0.03
Nyctalus leisleri	16.0	2/8	0.16
Vespertilio murinus	16.6	5/8	9.82
Vespertilio sp.	16.8	1/8	0.01
Vespertilio sinensis	17.0	1/8	0.06
Rhinolophus mehelyi	17.6	1/8	0.01
Eptesicus sp.	18.5	1/8	0.01
Hesperoptenus sp.	18.8	1/8	0.01
Otonycteris hemprichii	19.0	3/8	0.40
Eptesicus bottae	20.5	3/8	0.17
Myotis blythii	21.3	5/8	1.64
Eptesicus serotinus	23.4	5/8	7.31
Rhinolophus ferrumequinum	23.5	3/8	0.93
Taphozous nudiventris	28.0	4/8	0.23
Nyctalus sp.	28.1	1/8	0.01
Nyctalus noctula	28.3	5/8	9.12
Myotis myotis	32.8	6/8	15.24
Tadarida teniotis	38.0	3/8	0.07
Nyctalus lasiopterus	40.1	2/8	0.02
Cynopterus sphinx	46.0	1/8	0.01
Scotophilus heathi	50.0	1/8	0.01
Rousettus leschenaulti	60.0	1/8	0.01
Rousettus aegyptiacus	135.0	2/8	0.49
Total number of bats eaten			**19,864**

Table 1. Occurrence of the bat species in increasing order of weight in the diet of eight most studied owls in Eurasia [1]. Bat weights from [2–10], as an average of values given. Sp. weight is the average of the species of that family. Owl diets included: *Aegolius funereus*, *Athene noctua*, *Asio otus*, *Tyto alba*, *Asio flammeus*, *Strix aluco*, *Strix uralensis* and *Bubo bubo*.

3. Bat prey species

Most commonly owls are taking *Pipistrellus pipistrellus* (16.0%), *Myotis myotis* (15.2%), *Pipistrellus kuhlii* (11.9%), *Vespertilio murinus* (9.8%), *Nyctalus noctula* (9.1%), and *Eptesicus serotinus* (7.3%), that is, six most eaten species make 70% of the material. All these mostly eaten

Figure 1. Eagle Owl has brought to its nest a *Rousettus aegyptiacus* ♀ with a sucking baby still alive when photo was taken in 2008. Courtesy of Ezra Hadad/prof. Motti Charter, Haifa, Israel.

bats weigh less than 33 g (**Table 1**). Rest of the numerous species represents less than 5% of each of this material, and bats heavier than 33 g represent only 0.6% of this material. None of the bat species are eaten by all eight European owl species but *Myotis mystacinus* is in the diet of seven out of eight owls, when *P. pipistrellus, M. myotis, M. nattereri, Eptesicus nilssoni* and *Plecotus auratus* are the prey of six owl species (**Table 1**). The heaviest bat species eaten by two owl species is 135 g weighing *Rousettus aegyptiacus* which is illustrated in **Figure 1** as a prey of the Eagle Owl.

4. Owl predation

Bats are captured by owls probably mainly during the periods of emergence or return from roosts, but owls are in general not well adapted for catching bats. An interesting calculation from the UK shows that the predation of birds (mainly owls) would account for about 11% of the annual mortality of bats despite the apparent low representation of bats in the diets of predatory birds [11]. Owls are regulated by the availability of their food, more bats there are in the territory more they can harvest, explaining why the bat predation is higher in the south. In Britain, bats comprised only 0.03% of prey taken by Barn Owl while in Morocco the percentage is 0.05% [11].

5. Bats can defend themselves

That bats could be dangerous if consumed whole is borne out by the report of the death of an Oriental Bay Owl *Phodilus badius* picked up dead disclosing the cause to be the wing bone of the bat protruding through the stomach [12]. In Poland, on its turn, a western barbastelle bat *Barbastella barbastellus* has been observed to attack an owl [13]. And in the same country, there is

an interesting observation on a Tawny Owl trying to catch *Nyctalus noctula* in the air but the bat "hid in the predator's shadow" by flying very close behind it and waiting until the owl gave up hunting. Finally, the bat flew away safely after the owl ceased searching for the lost prey [14].

6. Conclusion

It is safe to conclude that owls prey on bats rarely and opportunistically, but also that bat aggregations could be a locally important food source for some species and individual owls during certain periods. Also, the decrease in the main prey (rodent) abundance can lead owls to expand their diet and include bats.

Further work is needed to evaluate the possible effects of owl predation on bat populations, and to determine the ecological and environmental dynamics between owl species and their main prey species. Owl predation on bats deserves future research also because on one hand, it might contribute to our limited knowledge on bats biodiversity and distribution, while on the other hand, it can sometimes represent an additional risk for small populations of endangered bats.

Author details

Heimo Mikkola

Address all correspondence to: heimomikkola@yahoo.co.uk

University of Eastern Finland, Kuopio, Finland

References

[1] Sieradzki A, Mikkola H. A review of European owls as predators of bats. MS for Ibis (under revision). 2018

[2] Van Den Brink FH. A Field Guide to the Mammals of Britain and Europe. London: Collins; 1973

[3] Pérez-Barbería FJ. Patrones de Predacíon de la Lechuza Común (*Tyto alba*) sobre Murciélagos (*Chiroptera*): Especializacíon u oportunismo? Revista de Biologia de la Universidad de Oviedo. 1990;**8**:99-105

[4] Stuart C, Stuart T. Field Guide to the Mammals of Southern Africa. Cape Town: Struik Publishers; 1995

[5] Rydell J, Bogdanowicz W. Barbastella barbastellus. Mammalian Species. 1997;**557**:1-8

[6] Lindhe Norberg UM, Norberg RÅ. Scaling of wingbeat frequency with body mass in bats and limits to maximum bat sizes. The Journal of Experimental Biology. 2012;**215**:711-722

[7] Pande S, Dahanukar N. Reversed sexual dimorphism and differential prey delivery in barn owls (*Tyto alba*). Journal of Raptor Research. 2012;**46**(2):184-189

[8] Dietz C, Kiefer A. Die Fledermäuse Europas: Kennen, bestimmen, schützen. Kosmos-Naturführer, Franckh'sche Verlagshandlung, Stuttgart. 2014

[9] http://en.wikipedia.org/wiki/name_bat

[10] Petrželková KJ, Obuch J, Zukal J. Does the barn owl (*Tyto alba*) selectively predate individual great mouse-eared bats (*Myotis myotis*)? Lynx. 2004;**35**:123-132

[11] Speakman JR. The impact of predation by birds on bat population in the British isles. Mammal Review. 1991;**21**:123-142

[12] Ali S, Ripley SD. Handbook of the Birds of India and Pakistan. Vol. 3. New York: Oxford University Press; 1969. pp. 251, 254, 274, 275

[13] Krzanowski A. Bat attacking an owl. Przegląd Zoologiczny. 1958;**2**:44-45

[14] Boratyński J. Observation of the behaviour of noctule bat *Nyctalus noctula* during the escape from a predator – Tawny owl *Strix aluco.* Kn. Gxd. Notatki- Notes. 2011;**2010**: 47-48 (in Polish with Abstract in English)