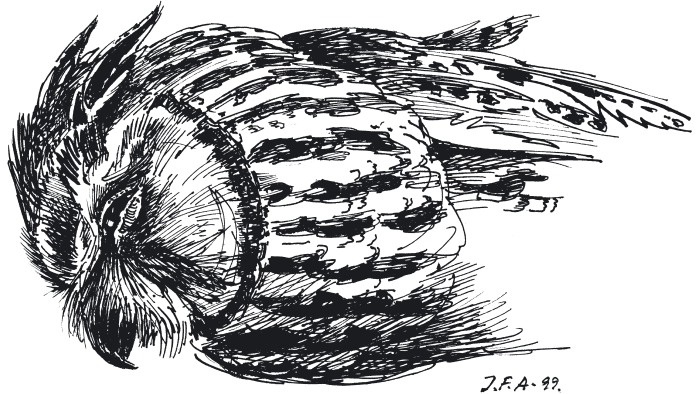


Causes of mortality in the Long-eared Owl *Asio otus*

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(Med et dansk resumé: Dødsårsager hos Skovhornuglen)

Introduction

Being a nocturnal predator, the Long-eared Owl *Asio otus* is particularly vulnerable to mortality through collision with fast-moving vehicles at night. This study, based on dead owls brought to a taxidermist for preparation, provides new data to show that road kills are an important cause of mortality in the Long-eared Owl. Since it is a fairly large species and often lives in close proximity to man, carcasses are frequently found. Moreover, motorists driving at night will notice striking an owl, and may stop to collect it.

The paper also presents an overview of causes of mortality derived from ringing recoveries.

Material and methods

The study is based on 87 Long-eared Owls brought to the author's house in Taps, Jutland in Denmark (55°23'N, 09°29'E) between January 1986 and the spring of 1997. Information on the circumstances of the find was obtained from the finder, and a post-mortem examination of each bird was performed to determine the cause of death as accurately as possible. In addition, ringing recoveries from the following countries were consulted: Denmark 1950-1991 (a total of 84 recoveries); Sweden 1921-1996 (296 recoveries); Norway 1944-1994 (42 recoveries); Finland 1927-1996 (639 recoveries); and Russia 1952-1990 (113 recoveries).

Results

Of the 87 birds, 67 were reported to have been killed by collision with a vehicle, or were found near a road with visible traces of collision damage; 15 were found dead in circumstances not obviously attributable to road-death, three were killed by collision with a window, and two were killed by collision with a train (Tab. 1). One traffic casualty had a fungus-induced disease in the lungs and liver, and one from the "found dead" group had a black substance in its intestine. Nothing unusual was apparent in the rest of the birds. Most of the owls (57) died during the first quarter of the year, January-March.

Reported mortality causes of recovered ringed birds are shown in Tab. 2.

Discussion

That traffic accidents are responsible for much mortality in owls has been asserted many times. For the Long-eared Owl, Wyllie et al. (1996) and Scott (1997) reported figures of 40% and 37%, respectively, primarily using ringing recovery data. However, according to Glue (1971) only 10% of Barn *Tyto alba*, Tawny *Strix aluco* and Little Owls *Athene noctua* were road killed.

In the study by Wyllie et al. (1996) 123 dead Long-eared Owls from Britain 1963-1995 were examined. 25% of the birds had died of "natural" causes and 40% as a result of collisions with cars;

February, March and April were the months with the highest mortality. The even larger proportion (77%) of road-kills in the present study may be due to an arrangement by the author with local highway workers to recover all avian corpses encountered. In both studies the months with most road-kills correspond with the period when winter visitors are moving out of the country and residents are establishing breeding territories. In Sweden, ringing recoveries suggest that road-kills peak in March (this study), and February was the month with most collisions in a German study (Bosch 1989).

During winter, voles (the normal prey of Long-eared Owls) may be difficult to obtain, so the owl may turn to small birds (e.g. Mikkola 1983) which are often found along snow-free roads by night. This, and the long and dark nights of winter, may explain the heavy mortality observed in January-March. In addition, birds found in these months are often very lean (own unpubl. data).

The low incidence of collisions in October and November is rather surprising, given that most southward-migrating owls in autumn are first-year birds (Moritz & Schonart 1976, Preuss 1982, own unpubl. data). In many bird species, juveniles exhibit a higher road-associated mortality than adults (Hansen 1969, 1982; Sharma 1988). Perhaps newly arrived Long-eared Owls prefer to hunt in fields in the autumn and only move to roadside habitats when prey becomes scarce later in the winter.

The percentage of railway deaths probably underestimates the true mortality, since access to railway areas is restricted. Terrain along railways provides favourable open hunting areas for owls (Glue 1971).

The largest group of recovered ringed birds was the "found dead" class (Tab. 2). Some of these were undoubtedly road-kills, perhaps in the same proportion as for the birds with known mortality

Tab. 1. Cause of death of 87 Long-eared Owls received by the author, 1986-1997.
Dødsårsag for 87 Skovhornugler modtaget af forfatteren, 1986-1997.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Traffic casualty <i>Trafikdræbt</i>	15	18	16	5	4	0	2	1	1	0	3	2	67
Killed by train <i>Dræbt af tog</i>	1	1	0	0	0	0	0	0	0	0	0	0	2
Window collision <i>Fløjet mod vindue</i>	0	0	0	0	0	0	1	0	0	0	0	2	3
Unknown cause <i>Dødsårsag ikke kendt</i>	6	0	0	3	0	2	2	0	1	1	0	0	15

Tab. 2. Cause of death among 1174 ringing recoveries of Long-eared Owls from Denmark 1950-91 (84), Sweden 1921-96 (296), Norway 1944-94 (42), Finland 1927-96 (639), and Russia 1952-90 (113).
Dødsårsag for 1174 gemeldte Skovhornugler fra Danmark 1950-91 (84), Sverige 1921-96 (296), Norge 1944-94 (42), Finland 1927-96 (639) og Rusland 1952-90 (113).

Found dead, cause unknown <i>Fundet død af ukendt årsag</i>	581
Shot, trapped or poisoned <i>Skudt, fanget eller forgiftet</i>	271
Collision with vehicle or train <i>Kollision med bil eller tog</i>	146
Killed by predator <i>Dræbt af rovdyr</i>	81
Found sick or wounded <i>Fundet syg eller skadet</i>	32
Caught and released at ringing place <i>Kontrolleret ved ringmærkningssted</i>	26
Collision with overhead wire <i>Kollision med el-ledning el. lign.</i>	23
Other known cause <i>Anden kendt dødsårsag</i>	14

cause. The ringing department at the Zoological Museum, Copenhagen, does not usually investigate the cause of death of a bird "found dead", and other institutions may follow a similar protocol (K. T. Pedersen pers. comm.).

The most important known cause of mortality in the ringing recovery data was shooting, trapping or poisoning (Tab. 2). It must be born in mind, however, that the data were collected during an extended period and partly stems from the early part of the century, when owls and raptors were widely regarded as pests.

The rather small size (87) of the sample of birds examined by the author makes the data set vulnerable to chance events. More specifically, 12 of the 67 road-killed Long-eared Owls were from the period mid-February to mid-March 1997, constituting more than a third of the all road-kills from these months. The period was unseasonally mild, which might have induced the species to initiate the northward migration earlier than usual (cf. Olsen 1992). The 12 Long-eared Owls were found along 75 km of highway between the German border and Kolding, along which were also found two Barn Owls, one Short-eared Owl *Asio flammeus*, and one Tawny Owl, as well as 15-20 flattened owl corpses not collected. Furthermore, most of the owls were concentrated to an about 20 km long stretch of road near Skovby south of Haderslev, a forested area with three small moors.

Acknowledgments

I am grateful to all who have sent me dead owls, including my colleagues Thorkil Duch and Hugo Christensen. My special thanks go to Marius Nørgård, who contacted highway workers and obtained many road-killed owls for me in that way. I also want to thank all who sent me ringing recoveries: Niels Otto Preuss and Kjeld T. Pedersen, Zoologisk Museum, Copenhagen, Jarmo Ruoho, the Finnish Museum of Natural History, Helsinki, Bo Sällström from Ringmärkningscentralen in Stockholm, Olav Runde from Ringmærkningscentralen in Stavanger, and Irina Kharitonova from Moscow Bird Ringing Centre. I am very grateful to Dr Jon Fjeldså for constructive comments and corrections to the manuscript, and to Bent Sunesen and Richard Fuller for correcting my English.

Resumé

Dødsårsager hos Skovhornugler

Grundlaget for denne artikel er dels 87 Skovhornugler, som mellem 1986 og foråret 1997 blev indleveret til udstopning hos forfatteren (Tab. 1), dels genmeldningslisterne for ringmærkede Skovhornugler i Danmark, Sverige, Norge, Finland og Rusland (Tab. 2).

Af de indleverede ugler var hele 67 (77%) blevet påkørt af motorkøretøjer – eller 69 (79%), hvis kollisio-

ner med tog medregnes. Blandt ringfundene skyldtes i alt 146 trafikdrab, svarende til 25% af fundene med kendt dødsårsag. Det er henholdsvis betydeligt mere og mindre end de ca 40%, der blev fundet i to britiske undersøgelser (Wyllie et al. 1996, Scott 1997). I hvert fald en del af disse forskelle skyldes, at forfatteren havde indgået en aftale med vejarbejdere i Sydøstjylland om at få indleveret fundne ugler, mens på den anden side ringfundene er akkumuleret gennem det meste af århundredet og for en stor del stammer fra områder med væsentlig lavere trafiktaethed end Danmark. Desuden varer hele 12 af de indleverede Skovhornugler fra den korte periode med februar – med. marts 1997, hvor de sammen med ca 20 andre ugler (to Slørugler *Tyto alba*, én Mosehornugle *Asio flammeus*, én Natugle *Strix aluco* og et antal ikke-indsamlede fladkørte ugler) blev fundet langs 75 km motorvej mellem Padborg og Kolding, flest omkring Skovby syd for Haderslev.

Trods de forskellige og uundgåelige skævheder i de analyserede og refererede materialer er der ingen tvivl om, at trafikken er årsag til mange dødsfald blandt ugler, og at en væsentlig del af denne dødelighed sker om vinteren, specielt sensvinteren (Tab. 1). I den nævnte undersøgelse af Wyllie et al. (1996) var dødeligheden størst i februar-april, mens der i det svenske ringmærkningsmateriale var flest trafikdræbte Skovhornugler i marts, og februar var topmåneden i en tysk undersøgelse (Bosch 1989).

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Accepted 7 October 1998

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