

# Owls killing and killed by other owls and raptors in Europe

*Heimo Mikkola*

It is well known that owls (Strigiformes) and diurnal raptors (Falconiformes) sometimes prey on one another, but the records have been scattered through the literature. Arising out of a study of the prey of certain owls, particularly Great Grey, Ural, Eagle and Hawk\* in Fenno-Scandia (Mikkola 1970, 1972, etc.), I have checked all the publications available to me on the foods of birds of prey in Europe, as well as certain unpublished sources (e.g. Merikallio archives), and have collated the records of owls as predators or prey of other owls and diurnal raptors. The results are summarised here, but it must be emphasised that the owls are the common denominator and that this paper does not include records of diurnal raptors killing other diurnal raptors; nor does it embrace cannibalism, which is a not uncommon habit of many owls and diurnal birds of prey. I have not attempted any survey of records outside Europe, though a few from North America are mentioned where these seem relevant.

The text deals with the 13 European species of owls in decreasing order of size (maximum total length). There are generally two paragraphs in each case, the first covering the species as predator and the second as victim, but the three smallest owls have not been recorded killing any other bird of prey and so their treatment is confined to one paragraph. The records for each species are totalled in tables 1 and 2. As, however, there are 1,165 records in all (604 of owls killed by raptors, 330 of owls killed by other owls, and 231 of raptors killed by owls), I have had to be highly selective in the text, which should therefore be read throughout in conjunction with the tables. Similarly, the bibliography at the end excludes many owl and raptor food studies which contain no relevant records and, even so, I have not put every reference in the text because too many names there would make it awkward to follow and some would appear under every species.

Finally, many of the records relate to remains found in pellets or at nests. In such cases, of course, there is no absolute certainty that the birds concerned were taken as prey. Many may have been killed during defence of nest sites or as food-competitors and, where raptors which scavenge are involved, a few may even have been found dead. At the same time, some may have been taken unfledged from the nest and others may have been sick or injured.

\*Scientific names are used in the body of the text only if the species does not appear in tables 1 or 2



Table 2. Numbers of records of diurnal raptors killed by owls in Europe

Predators and prey are both listed in decreasing order of size (maximum total length). A dash indicates that the prey is smaller than the predator, but that there is no record of its being killed by the larger species. The Eagle Owl/White-tailed Eagle records appear in brackets because they are not conclusive and because the eagles were well-grown young in the nest; and the Ural Owl because there was no proof that it killed the Honey Buzzard. These records are excluded from the totals which do, however, include four unidentified buzzards *Buteo spp* and one unidentified hawk *Accipiter sp* taken by Eagle Owls

OWL PREDATORS	DIURNAL RAPTORS AS PREY														TOTALS
	White-tailed Eagle <i>Haliaeetus albicilla</i>	Red Kite <i>Milvus milvus</i>	Rough-legged <i>Buteo lagopus</i>	Buzzard Goshawk <i>Accipiter gentilis</i>	Osprey <i>Pandion haliaetus</i>	Honey Buzzard <i>Pernis apivorus</i>	Black Kite <i>Milvus migrans</i>	Buzzard <i>Buteo buteo</i>	Gyr Falcon <i>Falco rusticolus</i>	Peregrine <i>Falco peregrinus</i>	Sparrowhawk <i>Accipiter nisus</i>	Hobby <i>Falco subbuteo</i>	Kestrel <i>Falco tinnunculus</i>	Merlin <i>Falco columbarius</i>	
Eagle Owl <i>Bubo bubo</i>	(2+)	2	10	26	1	5	1	65	1	19	11	2	55	4	207
Snowy Owl <i>Nyctea scandiaca</i>	-	1	-	-	-	-	-	-	1	-	-	-	-	-	2
Ural Owl <i>Strix uralensis</i>	-	-	-	-	-	(1)	-	-	-	-	-	-	-	-	-
Tawny Owl <i>Strix aluco</i>	-	-	-	-	-	-	-	-	-	9	1	11	1	-	22
TOTALS		2	11	26	1	5	1	65	2	19	20	3	66	5	231

On the other hand, some may have been killed but not actually eaten. These various possibilities often cannot be distinguished in the records, however, and so for the purpose of this paper such words as 'predator', 'prey', 'food', 'killing' and 'eating' are used indiscriminately.

#### EAGLE OWL *Bubo bubo*

Food records include 275 owls of 11 species (table 1) and 207 diurnal raptors of at least 13 species (table 2). The Eagle Owl is known to kill the majority of the other birds of prey dealt with in this paper, but easily its most numerous victims are Long-eared Owl (118 records), Tawny Owl (62), Buzzard (65) and Kestrel (55). Then come six species with around 20 records: Short-eared, Tengmalm's, Hawk and Little Owls and, more surprisingly, Goshawk and Peregrine. Birds of prey form as much as 3-5% of the total food of the Eagle Owl and 23-36% of its bird food (e.g. März 1953, Emmett *et al.* 1972). The number of owls and raptors it takes is thus considerably greater than their share of bird populations. It

is well known that this species does not tolerate other birds of prey in its territory (e.g. Höglund 1966, Sulkava 1966); indeed, in some areas of Norway Eagle Owls kill almost all the other birds of prey (Hagen 1952). Also in Norway, they are suspected of even having sometimes taken fairly large young of White-tailed Eagles from their eyries (Willgohs 1961).

On the debit side, only two raptors have been recorded killing this species: in Sweden there are single records of White-tailed and Golden Eagles preying on an Eagle Owl, and in Finland a Golden Eagle has been seen eating one (Merikallio archives).

#### GREAT GREY OWL *Strix nebulosa*

Despite its large size, the Great Grey Owl is highly tolerant of other birds of prey in its territory and my analysis of pellets of this species in Finland showed a single adult Tengmalm's Owl as the only such victim (Mikkola 1972a). There is a Swedish record of a Great Grey Owl attacking a Rough-legged Buzzard which came into its territory, but the hawk was not even injured (Wahlstedt 1969).

Nor are there many records of Great Grey Owls as prey. Golden Eagles have taken this species at least twice (Sulkava 1966) and in North America a Great Horned Owl *Bubo virginianus* is believed to have killed a Great Grey Owl on one occasion (Oeming 1955). I once saw a female Goshawk fly at a Great Grey Owl which was diving at me, but she saw me and turned away when still a few metres from her intended victim.

#### SNOWY OWL *Nyctea scandiaca*

Portenko (1972) referred to single records of Snowy Owls killing a Short-eared Owl, a Rough-legged Buzzard and an adult Gyr Falcon in Eurasia, and a Peregrine in North America. From this it would be easy to believe that the species not infrequently takes smaller birds of prey, but I know of no other records. The reason may be that, in general, there are few other birds of prey on the nesting grounds of Snowy Owls: they and Short-eared Owls sometimes overlap in periods of rodent abundance, but the food of Snowy Owls during southward invasions at such times has been little studied. In Shetland a Merlin was the only raptor sometimes seen in the Snowy Owl's nesting area, but this species is too fast to be captured; once this particular bird was even watched hovering over the head of the brooding female Snowy Owl (Tulloch 1968).

Again perhaps because of lack of opportunity, there are only four records of Snowy Owls being eaten by other birds of prey; the predators in all cases have been Eagle Owls. Willgohs (1974) found the remains of one in a pellet in Norway, while in Merikallio's archives it is recorded that an Eagle Owl was seen eating a

freshly killed Snowy Owl in Norway in December and that the stomach of another which was shot in Finnish Lapland contained the remains of two of these birds.

#### URAL OWL *Strix uralensis*

The Ural Owl seems to present more of a threat to smaller owls than does the Great Grey or the Snowy and the records include eleven owls of five species: at least one immature Hawk Owl in Norway; a Tawny Owl in Czechoslovakia; and an adult Long-eared, seven Tengmalm's and a Pygmy Owl in Finland. Unlike some other owls, this species has been little studied and that may be the reason why no diurnal raptors have certainly been recorded in its food: its size and the large size of some of its other prey animals make it very probable that the Ural Owl sometimes takes the smaller falcons and even buzzards. Indeed, when Ural Owls and Honey Buzzards nested 30 metres apart in Finland, one of the owls was believed to have killed a Honey Buzzard found dead between the nests (Kellomäki 1971).

There are six records of Ural Owls among the food remains of three other species: Golden Eagle, Goshawk and Eagle Owl.

#### HAWK OWL *Surnia ulula*

Like the Great Grey, the Hawk Owl seems to be tolerant of other birds of prey nesting in its territory (Mikkola 1972b). In fact, there are no records of its killing any owl or raptor in the breeding season, but during winter Hawk Owls have taken Tengmalm's Owls on three occasions in Finland.

On the other hand, there are 22 records of Hawk Owls among the prey of other species and it is clear that the Eagle Owl, responsible in 17 cases, is their main enemy. The only other owl predator involved has been a Ural Owl, but there are also two records of Golden Eagle and one each of Rough-legged Buzzard, Gyr Falcon and Peregrine eating Hawk Owls. This species has a fast, hawk-like flight, which may be the reason why there are few records, compared with other owls of comparable size, of its being killed by diurnal raptors. There is also a Finnish observation of a Hawk Owl fleeing into the shelter of a thick spruce on sighting a Goshawk in its territory (M. Rikkonen *in litt.*).

#### TAWNY OWL *Strix aluco*

Like the Ural Owl, the Tawny is very aggressive towards smaller birds of prey in its territory and, perhaps because it has been more widely studied, there are records of its eating 32 other owls and 22 diurnal raptors, of four species in each case. The owls have comprised three each of Long-eared and Pygmy, six Tengmalm's

and 20 Little; apart from single records of Hobby and Merlin, all the raptors have been Sparrowhawks (nine) and Kestrels (eleven).

In turn, however, the Tawny Owl frequently falls victim to other birds of prey and there are no fewer than 63 records among the food remains of two other species of owls and 114 records among the prey of six species of raptors. Almost all the owl predators of this species have been Eagle Owls, but there is a single record of a Ural Owl killing and eating a Tawny in Czechoslovakia (Sladek 1962); it is perhaps surprising that there are not more because where Ural and Tawny Owls overlap in range, with resulting competition for food and nest sites, the stronger Ural drives away any Tawny that comes into its territory. Similarly, the diurnal raptor predators of this species are chiefly Goshawks, with no fewer than 92 records, but there are also significant numbers of records involving Buzzards (twelve), Red Kites (four) and Peregrines (four).

**SHORT-EARED OWL** *Asio flammeus*

So far as I know, there are no records of Short-eared Owls killing or eating any other bird of prey. This is hardly surprising as they feed largely on small mammals and some small birds taken on the ground.

On the other hand, the species has quite commonly been recorded among the food of other owls and raptors, though, as it is a bird of open country, the predators which hunt mainly in woodlands do not take it anywhere near as often as they do the Long-eared. Apart from a single instance of a Snowy Owl, the only known owl predator involved is the Eagle Owl, with 23 records. By far the commonest threat to this species is, however, the Goshawk with no fewer than 65 records and it is also sometimes taken by the Peregrine (14 records), Rough-legged Buzzard, Golden Eagle and Gyr Falcon.

**LONG-EARED OWL** *Asio otus*

Although the Long-eared Owl kills considerable numbers of small birds, there are only three records of its taking other birds of prey: Little Owl (two) and Tengmalm's (one). The Little Owls were both in England (Glue 1972, Glue and Hammond 1974).

In contrast, it is by far the commonest victim of all and I have been able to find no fewer than 429 records, 122 relating to three other owls and 307 to seven diurnal raptors. The vast majority of these concern two predators: the Eagle Owl with 118 records and the Goshawk with the remarkable total of 283. The only other owls involved, which probably kill this species mainly as a result of territorial competition, are the Tawny and the Ural, but there is a considerable range of diurnal raptors with Peregrine, Red and Black Kites, Buzzard and Rough-legged Buzzard, and even two Sparrowhawks.

BARN OWL *Tyto alba*

Barn Owls feed mainly on rodents and, although they do not infrequently catch small birds, there are only two records of their taking birds of prey, both Little Owls in southern England in 1971 (personal analysis of pellets).

They also figure less as victims than do other medium-sized owls, with Eagle Owls, Goshawks and Buzzards having taken them a total of 14 times. In addition, there is a North American record of a Golden Eagle eating a Barn Owl (Gordon 1955).

TENGMALM'S OWL *Aegolius funereus*

This is the smallest owl recorded feeding on another bird of prey: though not very big itself, there have been two instances of its killing the still smaller Pygmy Owl in its territory (Scherzinger 1970). On the other hand, there is a Finnish record of Tengmalm's and Pygmy Owls nesting peacefully in the same tree (Kellomäki 1970).

The many records at all seasons of a wide range of predators on Tengmalm's include 39 of six other owls and 31 of six diurnal raptors. Goshawk and Eagle Owl emerge as the main threats to this species, with 25 and 21 records respectively, the others being Ural, Tawny, Hawk, Great Grey and Long-eared Owls, and Peregrine, Gyr Falcon, Sparrowhawk, and White-tailed and Golden Eagles.

LITTLE OWL *Athene noctua*

Slightly smaller than Tengmalm's, the Little Owl falls victim about as often and to a similar range of species, with the Goshawk again the most frequent predator, but with the Eagle Owl ousted for second place by the Tawny. I have found 40 records of four owl predators, comprising Tawny (20), Eagle (16), Long-eared and Barn, and 25 records of four diurnal raptors, involving Goshawk (21), Rough-legged Buzzard, Peregrine and Sparrowhawk.

SCOPS OWL *Otus scops*

Unlike other owls, most Scops leave Europe in winter. I have no information to show whether they are eaten by birds of prey in the African savannas, but they are certainly sometimes killed on passage through the Mediterranean by Eleonora's Falcon (two records) and they also feature in the prey lists of Eagle Owl (six).

PYGMY OWL *Glaucidium passerinum*

This tiny owl, easily the smallest bird of prey in Europe, is hardly capable of killing any other species itself, but it is quite frequently a victim. I have found seven records of it in the prey remains of

four other owls, these being Eagle, Ural, Tawny and Tengmalm's; and 14 records in the food of three diurnal raptors, involving Goshawk (ten), Gyr Falcon and Sparrowhawk.

#### DISCUSSION

From table 1, the Goshawk and Eagle Owl stand out as by far the most important predators of owls, together accounting for 83.4% of the records. The Tawny Owl, Peregrine, Buzzard, Golden Eagle and Ural Owl, in that order, are the only other species with more than ten records of owls in their food. Table 2 does not include the diurnal raptors as predators but, among owls, the dominance of the Eagle Owl over a wide range of raptors and the significance of the Tawny Owl in connection with the smaller species are again borne out. Apart from these two, it can be concluded that most owls do not kill diurnal raptors, though they do occasionally take other owls. One reason for this difference is presumably the degree of overlap in activity patterns: as a broad principle, nocturnal and crepuscular hunters will tend to clash with one another, but less so with diurnal species.

The tables also show, as one would expect, that birds of prey do not generally kill others larger than themselves. Apart from the suspected instances of Eagle Owls taking young White-tailed Eagles from the nest, the two exceptions (Goshawk/Ural Owl and Sparrowhawk/Tawny Owl) are very marginal in that the raptors may have been large females equal in size to their prey. It is possible, however, that as records accumulate there will be occasional instances of smaller species killing larger ones, particularly where the latter are sick or injured.

In any case, where owls are concerned, size is not the most important factor, but rather their life habits. It is significant that the three owls most recorded as predators, Eagle, Tawny and Ural, are all highly territorial sedentary species with a varied diet. They are much more aggressive towards other birds of prey, especially during the breeding season, than are such nomadic species as the Great Grey, Snowy, Hawk and Short-eared, most of which feed largely on small mammals. Nomadic owls tend to concentrate in areas where there is an abundant food supply, thus often nesting close to other birds of prey and even forming loose colonies; the territory seems to consist of only the nest site and its immediate surroundings, so the hunting range may be common to other pairs and other species (Mikkola 1972). In contrast, territorial species guard their home ranges as well and try to prevent other birds of prey from settling in them. In cases of sudden food shortage, nomadic species invade new areas in search of a sufficiency of suitable prey. At such times, starving individuals will attack



competitors for reasons different from those of territorial species, for which the nutritional value of another predator is probably of secondary importance. When a territorial fight ends in the death of the intruder or weaker individual, sometimes only the head of the loser is eaten.

Among the hole-nesting species, a shortage of suitable breeding places may lead to fights which have nothing to do with food. The records summarised in this paper include Ural killing Tawny, Barn/Little and Tengmalm's/Pygmy. It is difficult to think of any reasons for these other than competition for nest sites.

Nevertheless, it seems likely that Eagle Owls, and probably Tawny Owls, as well as Goshawks and some of the other diurnal raptors, do take a proportion of smaller birds of prey simply as food, whether or not they are possible competitors. Hunting owls and raptors, themselves concentrating on finding prey, are bold and careless, with the result that they may fall to bigger birds of prey more often in proportion to their total numbers than do other birds. For example, a conspicuous Buzzard, or a Tawny or Long-eared Owl, may be much easier to find and catch than, say, some gamebirds (Galliformes). Owls are also easily located by their calling in spring and one can imagine that it would not be difficult for an Eagle Owl to clear its territory of, for example, hooting Tawny Owls (62 records) or Long-eared Owls (118).

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#### SUMMARY

This paper considers the interrelationships of European birds of prey by summarising the published records of owls eating or being eaten by other species of owls and diurnal raptors; it does not take account of raptors killing raptors. It deals with a total of 1,165 records, comprising 934 of 13 species of owls killed by nine other owls and eleven raptors (table 1) and 231 of 13 or more species of raptors killed by three or four owls (table 2).

Two species stand out as significant predators of owls, together accounting for 83.4% of the records: these are the Goshawk *Accipiter gentilis*, with 504 records involving eight species, and the Eagle Owl *Bubo bubo*, with 275 records involving twelve species. The only other birds of prey with more than ten records of owls in their food are the Tawny Owl *Strix aluco* (32), Peregrine *Falco peregrinus* (27), Buzzard *Buteo buteo* (25), Golden Eagle *Aquila chrysaetos* (14) and Ural Owl *Strix uralensis* (11). The Eagle Owl is also much the most regular owl predator of raptors, with 209 records of at least 13 species, followed again by the Tawny Owl, with 22 records of four small species.

Certain species are also prominent in the lists of prey. By far the most frequently eaten owl is the Long-eared *Asio otus*, with 429 records mostly falling to Goshawk

and Eagle Owl but also to eight other species. Other common owl victims are Tawny (177), Short-eared *Asio flammeus* (112), Tengmalm's *Aegolius funereus* (70), Little *Athene noctua* (65), Hawk *Surnia ulula* (23) and Pygmy *Glaucidium passerinum* (21). The diurnal raptors most frequently taken by owls are Kestrel *Falco tinnunculus* (66), Buzzard (65), Goshawk (26, all to Eagle Owl), Sparrowhawk *Accipiter nisus* (20) and Peregrine (19, again all to Eagle Owl). In general, as one would expect, owls and diurnal raptors do not kill other birds of prey larger than themselves.

Although it seems likely that Eagle Owls, and probably Tawny Owls, as well as Goshawks and some of the other diurnal raptors, do take a proportion of smaller birds of prey simply as food, it is probable that most records of interspecific killing among owls result from competition for territory, food or breeding sites. Highly territorial and sedentary owls with varied diets, such as the Eagle, Tawny and Ural, are much more aggressive towards other birds of prey, especially during the breeding season, than such nomadic species as the Great Grey *Strix nebulosa*, Snowy *Nyctea scandiaca*, Hawk and Short-eared which feed mainly on small mammals. Among the hole-nesting owls, a shortage of suitable sites sometimes leads to fights in which the weaker individual may be killed and partly eaten, but such cases have little to do with food. Hunting owls and raptors are bolder and more careless than other prey animals and, perhaps for this reason, fall to bigger birds of prey more frequently in proportion to their total numbers than do other birds.

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*Heimo Mikkola, University of Kuopio, P.O. Box 138, SF-70101 Kuopio 10, Finland (until 1st August 1976; Centro Investigaciones Pesqueros, Apartado 2459, Cartagena, Bolivar, Colombia, South America)*