

Predation on Koalas by Breeding Powerful Owls

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Summary

We report observations of predation on Koalas *Phascolarctos cinereus* by a pair of Powerful Owls *Ninox strenua* breeding in the Venman Bushland National Park, south-eastern Queensland, during 1998–2002, based on 13 sightings of Owls holding prey at their diurnal roosts. Seven predation events on Koalas were recorded, all in the period during June–August. On the five occasions when Koalas could be aged, the captured individuals were juvenile or subadult.

Introduction

The Powerful Owl *Ninox strenua* is Australia's largest nocturnal avian predator. An endemic species, its range extends along the eastern coast from central Queensland into western Victoria (Higgins 1999). Pairs of Powerful Owls occupy extensive home-ranges estimated to be 800–1000 ha in tall coastal forest (Kavanagh 1997) and up to 4774 ha in dry open forest and woodland (Soderquist & Gibbons 2007). The species captures a wide diversity and size range of prey; however, it is noted for its preference for arboreal marsupials of adult body mass of >0.5 kg (Higgins 1999; Kavanagh 2002; Bilney *et al.* 2006; Cooke *et al.* 2006).

The Koala *Phascolarctos cinereus* occurs across most of the range of the Powerful Owl and occupies the same vegetation types (e.g. Menkhorst & Knight 2001). Although it is nocturnal, arboreal and relatively widespread, there are few records of predation on this marsupial by Powerful Owls. The first documented illustration of the Powerful Owl, by H.C. Richter and John Gould (Gould 1840), shows an Owl holding a small Koala (Plate 19). Pavey (1994) reported predation on Koalas by the Powerful Owl in south-eastern Queensland, and Conole (1981) observed it in the Steiglitz area, Brisbane Ranges, Victoria, during the Owls' nesting season. Four Koala predation events were recorded on the central coast of New South Wales from a sample of 1201 prey items across 19 Owl territories, a frequency of 0.3% (Kavanagh 1997, 2002). Apart from these records, there appear to be no other reports of predation on Koalas by Powerful Owls.

Maximum body mass of adult Koalas (7–14 kg; Menkhorst & Knight 2001) is over four times that of adult male Powerful Owls (average body mass 1.45 kg; Higgins 1999). This is greater than that of typical arboreal prey of the Owls, and may preclude predation on adult Koalas. However, when young Koalas emerge from the pouch and begin riding on the mother's back at about 7 months old, their average body mass is 0.61 and 0.60 kg for males and females, respectively (Tobey *et al.* 2006). This mass is within the prey size range of Powerful Owls.

Here we report observations of predation on Koalas by Powerful Owls at a breeding site in south-eastern Queensland. We describe the timing of predation and estimate the age of the Koalas captured.



Plate 19

Powerful Owl at its day-roost holding a Koala

Painting: John Gould and H.C. Richter

Study area and methods

The study took place in the Venman Bushland National Park, 40 km south-east of the Brisbane Central Business District in south-eastern Queensland. This reserve forms part of the Koala Bushland Co-ordinated Conservation Area, which is Queensland's first co-ordinated conservation area linking conservation reserves and roadside reserves between Brisbane and the Gold Coast to protect an area of nationally significant Koala habitat. The vegetation consists of open forest, codominated by *Eucalyptus* and *Angophora* species with a well-developed understorey of flowering shrubs. Patches of vine-thicket occur along Tingalpa Creek and its tributaries which flow through the Park.

One of us (BH) carried out a field study on a breeding pair of Powerful Owls over a 5-year period (1998–2002). Observations were made between April and November each year, with most effort concentrated between May and August inclusive. The period May to August is when Powerful Owls incubate eggs and subsequently feed chicks in south-eastern Queensland (Pavey *et al.* 1994) and is, therefore, the time when roosting Owls are likely to be most reliably located. On most visits daytime searches were carried out for roosting Owls and subsequently, if the nest had been located, observations were made of activity around the nest-tree within the hour immediately after sunset.

Any prey items that roosting Owls were holding at day-roosts, or which were brought to the vicinity of the nest-tree, were identified if possible. The stage of development of Koalas held by Owls was assessed as being either (a) juvenile, emerged from the pouch but still dependent on the mother (<50% adult size, between 7 and 12 months of age); or (b) subadult, weaned but not adult size (>50% adult size, >12 months of age). We assessed age by making a visual estimate of the size of Koalas held by the Owls and determining whether animals were <50% adult size (juvenile) or >50% adult size (subadult).

Results and Discussion

One or both Owls of the breeding pair were observed at the diurnal roost on 106 days over the course of the study. Roosting Powerful Owls were recorded holding prey on 13 separate occasions. On a further nine occasions, the male brought in prey to the nest-tree. It was not possible to positively identify the prey

Table 1

Summary of evidence of predation on Koalas by breeding Powerful Owls at Venman Bushland National Park, south-eastern Queensland, 1998–2002. Breeding phases follow Pavey *et al.* (1994).

<i>Date</i>	<i>Breeding phase</i>	<i>Details of sighting</i>	<i>Details of prey</i>
18 June 1999	Incubation	Male Owl holding Koala at day-roost	Subadult
17 August 1999	Fledgling	Adult Owl holding Koala at day-roost	Juvenile (50% adult size)
11 July 2002	Nestling	Female Owl holding Koala at day-roost	Not aged, partly consumed
13 July 2002	Nestling	Female Owl holding Koala at day-roost	Not aged, 50% consumed
19 July 2002	Nestling	Female Owl holding Koala at day-roost	Juvenile
25 July 2002	Fledgling	Adult Owl holding Koala at day-roost	Juvenile
1 August 2002	Fledgling	Fresh Koala hindlimb on ground below Owl roost-tree	Juvenile
24 August 2002	Fledgling	Adult Owl with prey	Juvenile (see Plate 20)



Powerful Owl holding a young Koala at the Owl's day-roost at Venman Bushland National Park, Qld, 24 August 2002

Plate 20

Photo: Jeff & Margaret Eller

items when they were brought in after dark by the male. However, 10 of the 13 prey items held at the diurnal roost were positively identified. The prey species and numbers were seven Koalas, one Common Ringtail Possum *Pseudocheirus peregrinus*, one Common Brushtail Possum *Trichosurus vulpecula*, and one fruit-bat *Pteropus* sp.

Predation on Koalas was noted during only two of the five years of the study and only during June, July and August. Four of the seven records of predation were during a 2-week span in July 2002 (Table 1). When enough of the Koala could be observed to attempt to age it by estimating its size relative to an adult Koala, all individuals were classified as juvenile or subadult (Table 1, Plate 20).

Our observations of predation on Koalas relied only on prey items held by Owls at diurnal roosts, rather than analysis of regurgitated pellets. As a consequence, our data represent only a small portion of the total prey captured by Powerful Owls during the 5-year study period. Although identifying prey held by Powerful Owls at diurnal roosts is biased towards large prey species (Pavey 1992; Pavey in press), the results presented here suggest that Powerful Owls regularly preyed on Koalas during the study. However, confirmation of this possibility will require pellet analysis.

Our observation of seven Koala predation events by Powerful Owls outnumbers the combined tally from all previous quantified research: a sample size of over 7000 prey items (Hollands 1991; Cooke *et al.* 1997; Higgins 1999; Kavanagh 2002; Bilney *et al.* 2006; Cooke *et al.* 2006). An additional record of Koala predation by Powerful Owls was noted on 5 August 2007, at a site occupied by another pair of Powerful Owls 5 km north of the study area (B. Hambling pers. obs.).

The restriction of Koala capture records to the period June–August coincides with the period when young Koalas are likely to emerge from the pouch. Koalas in south-eastern Queensland mate in spring and early summer and have a one-month gestation period. Births usually occur between November and February, and young emerge from the pouch at ~7 months and are weaned at ~1 year of age (Tobey *et al.* 2006). Young are therefore likely to emerge from the pouch between May and August. The small size of juveniles when they first begin riding on the mother's back suggests that this is when they are most susceptible to predation.

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