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Corella, 1990, 14(5): 169–171

DAILY FOOD CONSUMPTION OF TWO CAPTIVE LITTLE EAGLES

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Received 12 April, 1989

Two Little Eagles *Hieraaetus morphnoides* were fed *ad libitum* over two and 12 months in an outdoor enclosure in which they could exercise. In winter, daily food consumption averaged 122 g (10% of body weight) for the female and 78 g (11% of body weight) for the male. The female's mean daily food consumption ranged between 122 g and 163 g (10–15% of body weight, $\bar{x}$=12%) in the other three seasons, during which she was gaining weight, replacing feathers, or both.

Daily food consumption rates are of ecological interest, but have been obtained for few Australian raptors (Swamp Harrier *Circus approximans:* Baker-Gabb 1982; Wedge-tailed Eagle *Aquila audax:* Brooker and Ridpath 1980) and not previously for the Little Eagle. I therefore took the opportunity to measure the daily food intake of two wild Little Eagles, a male and a female, while they were being held in captivity following injury.

MATERIALS AND METHODS

Two eagles were kept sequentially (female April 1986 to April 1987, male June to August 1987) in an outdoor enclosure at the University of New England, Armidale, New South Wales. The aviary measured approximately 7 m long × 3 m wide × 3.5 m high, with the western third enclosed by fibro sheeting against the prevailing winds. The remainder was wire mesh lined inside with hessian. Perches were provided at each end, and fresh water was provided *ad libitum* in a dish large enough for the birds to bathe in. Accommodation was less than optimum (cf. Olsen and Olsen 1981), but the birds did have access to sun and rain and were able to exercise, and environmental conditions thus approximated those in the wild.

The eagles were fed *ad libitum*, for convenience mainly on freshly killed adult wild rabbits (>1 300 g), although these were larger than prey items normally taken in the wild (<1 000 g: Debus 1984). They were occasionally fed on fresh road-killed rabbits or birds. The eagles were fed once per day on more of a rabbit carcass (gutted) than they could consume. Each portion of rabbit (forequarters or hindquarters, complete with fur) was weighed before being given to an eagle, and

the remains (skin, bone and uneaten flesh) were weighed before the next meal was provided; daily records were kept of the mass of food eaten.

The female, a first-year bird successfully treated for a broken leg, weighed 970 g on arrival in April 1986, and rapidly gained weight. She subsequently weighed 1 300 g (mid July), 1 235 g (early November), 1 105 g (mid February 1987), and 1 240 g upon release in early April 1987. Intermediate (weekly) weights were extrapolated from a linear graph of these data points. The male, an unreleasable adult treated for a broken wing, weighed 720 g on arrival in mid June 1987 and 690 g in mid August, when he was transferred to another facility. His weekly weight changes were assumed to be linear over this two-month period.

From extrapolated weekly body weights and the mean daily food intake for each week, I calculated the mean daily food consumption as a percentage of body weight for each month. There were periods in August (week 4), September (weeks 1–3), November (week 4), December (all) and January (weeks 1–3) when no records were kept by caretakers during my absence, and when a scavenging rat inflated the amount of food consumed in late November–early December. Because the birds could feed on exposed flesh and skin their food, they ingested little fur and produced only a few pellets, which were smaller than those of wild birds (pers. obs.) and difficult to find in the grass and litter of the cage floor. Plucked fur and castings were a negligible proportion of food remains and were not included in the calculations.

RESULTS AND DISCUSSION

The female eagle's daily food intake ranged from 0–260 g (Table 1). She sometimes voluntarily fasted for a day when food was available, although she did not do so in winter nor in the weeks following an accidental ten-day fast in late December, when there was a problem with feeding arrangements. Her mean daily food consumption ranged between 10 and 15 per cent of body weight over the seasons, high (14%) during her initial period of rapid weight gain, and also (15%) in summer when she was moulting her rectrices and outer primaries (Debus 1989). Her late December fast, in concert with energy demands during moult, may have increased her subsequent summer food consumption rate; she was still moulting secondaries in March while she was also

TABLE 1

Daily food consumption of two captive Little Eagles. Range is minimum and maximum intake per day over the month. Means are the mean daily food intake for each month and season. Mean daily consumption as a proportion of body weight is also given as monthly and seasonal mean.

Month	Body weight (g)	Amount consumed per day (g) Range	Mean		Mean daily consumption (% body weight)	
Female:						
Apr.	970	90–180	132	131	14	14
May		0–200	129		13	
June		40–200	115		10	
July	1 300	40–190	107	122	9	10
Aug.		80–200	143		11	
Sept.		10–170	109		9	
Oct.		0–245	125	122	10	10
Nov.	1 235	0–260	132		11	
Jan.		130–160	145	163	13	15
Feb.	1 105	110–260	181		16	
Mar.		70–250	179	162	15	14
Apr.	1 240	90–230	145		12	
Male:						
June	720	50–145	82		12	
July		15–155	83	78	12	11
Aug.	690	20–125	68		10	

gaining weight. Her food consumption rate averaged 12 per cent of body weight per day over the whole year.

The male's daily food intake ranged from 15–145 g, averaging 11 per cent of body weight per day in winter (Table 1). As may be expected from his smaller body size (cf. Brown and Amadon 1968), his consumption rate was slightly higher than that of the female (11% vs 10% of body weight) over the same season.

It is surprising that the female's consumption rate was lowest in winter and spring, as Armidale has cold winters, which may increase metabolic demands. However, her weight was maximal in winter and declined in spring, and her higher food consumption rates in other seasons may have related to events in her life such as injury, food stress, weight increases and feather replacement.

No data were collected on the amount of rabbit wasted by the eagles, because feeding trials did not duplicate field conditions. Partly to ensure continuity of food supply, the eagles were re-fed portions of uneaten rabbit, provided that it was still fresh (in the cooler months), whereas in the wild, Little Eagles may be unable to consume part of a rabbit that is too large to carry. Although they sometimes return to a large kill or share it with their mate, they may lose it to scavengers. The female eagle consumed 49 per cent of a fresh 315 g road-killed Australian Magpie *Gymnorhina tibicen,* despite being hungry. A waste factor of up to c. 50 per cent for a single feed from bird prey of this size may be typical for the Little Eagle (cf. Baker-Gabb 1984: mean waste factor of 33 per cent for prey greater than 300 g in raptors of Little Eagle size). Rabbit was clearly a preferred food: on a subsequent occasion the well-fed female refused to eat a fresh Magpie over two days, but immediately fed when it was replaced with rabbit.

The data obtained in this study compare well with daily food consumption rates of 9–15 per cent of body weight for North American diurnal raptors of similar size (quoted in Johnson 1981). However, my sample was small and possibly biased by the factors discussed. A larger sample, covering all seasons for both sexes and taking into account weight changes and annual events such as moult, is desirable. Data could be obtained from Little Eagles (and indeed other Australian raptors) held in zoos, rehabilitation centres and other institutions. Daily food consumption (particularly as a proportion of body weight) may differ between captive and wild birds, because captives may be heavier, less active and require less food than wild birds. Nevertheless, for the purpose of ecological calculations a mean figure of 100 g or 12 per cent of body weight per bird per day may be appropriate for a wild pair of Little Eagles and their offspring (mean adult body weights: male 619 g, female 1 046 g, unpubl. data). This is the amount actually consumed, and the amount actually killed must be adjusted to include the waste factors of different-sized prey determined by Baker-Gabb (1984).

ACKNOWLEDGMENTS

Veterinary staff at Western Plains Zoo, Dubbo, NSW; Taronga Zoo, Sydney; and Macksville Vet Clinic, NSW ably treated the eagles. I am grateful to Bob Harden and John Robertshaw (Zoology Department, University of New England) for the use of facilities for holding the eagles, and the following people for assistance with the care, transport and/or feeding of the birds: Chris Baker, Pam Bristol, Peter Debus, Sarah Dick, Mal Dwyer (NPWS), Liz Notley (Taronga Zoo) and Fred Spiteri. A steady food supply for the eagles was facilitated by Shane Andrews and Malcolm Rowe, and storage was facilitated by Stuart Green, all of the University of New England. A permit to keep the birds was provided by the New South Wales National Parks and Wildlife Service. Penny and Jerry Olsen kindly provided the male eagle with a new home.

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