

FEEDING ECOLOGY OF THE JAVAN HAWK-EAGLE (*Spizaetus bartelsi*) DURING THE NESTLING PERIOD

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ABSTRAK

Ekologi pakan burung elang Jawa (*Spizaetus bartelsi*) disaat musim bertelur. 2001. Dewi Malia Prawiradilaga, Nils Rov, Jan Ove Gjershaug, Hapsoro, Adam Supriatna. Zoo Indonesia 28: 19-25.

Elang Jawa termasuk salah satu elang yang belum banyak diketahui di dunia, populasinya terancam punah dan burung pemangsa endemik yang hidup terbatas di hutan di Pulau Jawa. Ukuran tubuhnya sedang, berkisar antara 60-70 cm dan betinanya berukuran lebih besar dari yang jantan. Penurunan populasinya telah menjadi sebab untuk memperhatikan ketersediaan mangsanya. Perilaku makan dan mangsanya diteliti dengan melakukan pengamatan sarang dan menganalisa muntahan serta sisa mangsanya. Di Jawa Barat, mangsanya terdiri dari berbagai jenis satwa, termasuk mamalia berukuran kecil dan sedang, burung dan reptilia. Jenis mangsa yang umum adalah bajing (Sciuridae), tupai (Tupaidae), binatang pengerat (Muridae) dan kelelawar (Chiroptera). Selama masa bersarang (memelihara anak disarang), kedua induk membawa mangsa ke sarang, tetapi induk jantan lebih sering membawa mangsa pada pagi hari dan induk betina lebih banyak membawa mangsa sore hari. Perkiraan jumlah mangsa yang dibawa ke sarang selama 68-72 hari berkisar antara 109 dan 116 ekor.

Kata kunci : Elang Jawa, ekologi pakan, perilaku makan, burung pemangsa, mangsa, masa pemeliharaan anak di sarang

ABSTRACT

Feeding ecology of the Javan Hawk-eagle (*Spizaetus bartelsi*) during the nestling period. 2001. Dewi Malia Prawiradilaga, Nils Rov, Jan Ove Gjershaug, Hapsoro, Adam Supriatna. Zoo Indonesia 28: 19-25.

The Javan Hawk-eagle is one of the least known raptors in the world, an endangered and endemic bird of prey limited to forest on the island of Java, Indonesia. It is a medium-sized eagle (length 60-70 cm), with females slightly larger than males. The decline in its population has prompted concerns about the availability of prey. Its feeding behaviour and diet were

studied by observations and analysis of regurgitated pellets and prey remains. In West Java, the diet consisted of a wide range of animals, including small and medium-sized mammals, birds and reptiles. The most common prey species were squirrels (*Sciuridae*), treeshrews (*Tupaia*), rodents (*Muridae*) and bats (*Chiroptera*). During the nestling period, both parents brought prey to the nest, the males more often in the mornings and the female more often in the afternoons. The estimated total number of prey brought during the 68-72 day nestling period ranged between 109 and 116 animals.

Key words : Javan hawk-eagle, feeding ecology, feeding behaviour, raptor, preys, nestling period

INTRODUCTION

Feeding is the essential activity for all animals (McFarland 1981). Basically, it involves the behaviour to obtain food, diet and food processing. In raptors who are predominant meat eaters, food influences breeding activities. Further, it may limit their survival and population number (Newton 1991).

Although there are 67 raptor species recorded in Indonesian region (Prawiradilaga in preparation), in the last decade lots of attention has been given to the Javan Hawk-eagle (*Spizaetus bartelsi* Stresemann, 1924). This is because it resembles the Garuda which is the national symbol of Indonesia (Sözer *et al.* 1998).

The Javan Hawk-eagle is one of the least known raptors in the world and endemic to rain forest on Java, Indonesia. In the last few decades, its population is thought to have declined and now the species is classified as endangered, according to current IUCN threat categories (Collar *et al.* 1994).

Many factors may be implicated in the decline of the Javan Hawk-eagle, including loss of habitat and prey, and illegal trapping by people. The role of prey-supply in the declining population is still obscure, because the diet of the Javan Hawk-eagle is poorly documented. Casual observations indicated that domestic chicken (*Gallus sp.*), a large fruit bat (*Cynopterus sp.*), stink badger

(*Mydaus javensis*) (Bartels 1924; Becking 1989), squirrels (Linsley in Sözer and Nijman 1995), lizards (van Balen 1991), snakes and medium-sized mammals (Sözer and Nijman 1995) are eaten. In this paper, we present recent information gained on the diet and feeding behaviour, and estimate the total number of prey items taken during the nestling period.

STUDY AREA AND METHODS

Data on the diet was gathered by analysing regurgitated pellets and prey remains, by interviewing local people and by field observations.

Study area

General observations on feeding behaviour to identify prey species were conducted during nest surveys in West Java particularly at G. Halimun (6°50'S and 106°32' E), G. Salak (6°43'S and 106°42' E) and Cibulao Protected Forest, Puncak (6°42'S and 106°59' E) in 1997.

Pellet collections and analysis

Twelve samples of regurgitated pellets and prey remains were collected from under a roosting tree at Cibulao, Puncak and from inside the nest at G. Salak. In the laboratory, samples were sometimes washed with water to remove dirt, and then dried in the oven for analysis. Prey items were identified by comparison with museum collections and in consultation with the staff.

Feeding observations and analysis

Feeding activities were recorded during intensive nest observations on a pair of breeding Javan Hawk-eagles with their single young at G. Salak between August and October 1997. The pair members were sexed by individual recognition based on plumage differences and size, the female being larger than the male. Data were analysed in one hour intervals. A chi-square test was used to examine whether the number of prey brought to the nest in the morning was the same as in the afternoon and a univariate ANOVA test was applied to see if the parents brought prey at mainly different times.

In order to estimate prey consumption, we recorded the rate at which various prey species were delivered to the eaglet. The nest was watched for 37 days, for a total of 276 hours.

RESULTS

Prey species

Small to medium-sized mammals, birds, snakes and lizards were identified either from prey remains, observations or interviews (Table 1). Small mammals in particular squirrels (Sciuridae), tree shrews (Tupaidae), rodents (Muridae) and bats (Chiroptera), were most commonly taken. Because during observations, squirrel and treeshrew were often difficult to tell apart, they were lumped in the analysis.

Predation pattern

Both male and female parents often came to the nest with prey. If the prey could not be eaten in one meal, they cached the remains in the nest. When feeding the eaglet, both parents seemed to feed the oldest prey first. Prey were often brought to the nest between 06.00 and 12.00 hours and between 14.00

and 16.00 hours (Figure 1), but at greater frequency in the morning than in the afternoon ($\chi^2 = 13.12$; $df = 1$; $p < 0.001$). The male brought prey more often in the morning and female more often in the afternoon ($F = 6.3$; $df = 1$; $p = 0.02$) (Table 2).

Estimate of total number of prey items taken during the nestling period

Prey were delivered to the nest during 13.4% of nest watches ($n = 276$ hours). Most prey taken were small mammals (Table 1). Assuming (1) that each watch when prey was brought to the nest represented a predation event, (2) that predation largely involved small mammals (3) that there were 12 hours of feeding during a day, and (4) that the nestling period ranged from 68 to 72 days, then each pair of Javan Hawk-eagles would kill about 109-116 individual small mammals to raise one single chick. The total prey killed is likely to have been much greater because parents also consumed prey themselves.

DISCUSSION

The diet of the Javan Hawk-eagle during nestling period consisted of a wide variety of animals, including mammals, birds and reptiles (Table 1). Evidently the species was an opportunist predator. However, small to medium-sized mammals, especially squirrels and treeshrews, were often taken. Such species are arboreal and live on low to high branches in primary, as well as in secondary, forests (PPA 1978). It seems that the Javan Hawk-eagle took birds less often than the Changeable Hawk-eagle (*Spizaetus cirrhatus*), but otherwise their diets are fairly similar (Hoogerwerf 1949). At the nest watched, the male brought prey more often in the mornings and female in the afternoon (Table 2), but

further study on sexed individuals is necessary to see whether this behaviour is general.

SUMMARY

Small mammals in particular squirrels and treeshrews were the most important prey for the Javan Hawk-eagle during nestling period. Both

parents brought prey to the nest for their nestling. However, the male did it more often in the morning and the female in the afternoon. The estimated number of prey brought to the nest during nestling period ranged between 109 and 116 individuals of small mammals.

Table 1. Prey of Javan Hawk Eagle (*Spizaetus bartelsi*).

Species	No. of observations	Method
Mammals		
Common Treeshrew (<i>Tupaia glis</i>)	3	1
Ebony Monkey (<i>Trachypithecus auratus</i>), young	1	3
Flying lemur (<i>Cynocephalus variegatus</i>)	1	3
Diadem Roundleaf Bat (<i>Hipposideros diadema</i>)	2	1
Fruitbat (<i>Cynopterus</i> sp.)	1	1
Bat (Chiroptera)	6	1
Black Giant Squirrel (<i>Ratufa bicolor</i>)	1	1
Black-banded Squirrel (<i>Callosciurus nigrovittatus</i>)	1	2
Plantain Squirrel (<i>Callosciurus notatus</i>)	1	1
Squirrel (<i>Callosciurus</i> sp.)	5	1 & 2
Squirrel or Treeshrew	24	1
Rat (<i>Rattus</i> sp.)	2	2
Small rodent (Muridae)	6	1
Total mammals	54	
Birds		
Domestic Chicken (<i>Gallus gallus</i>)	2	3
Barred Button-quail (<i>Turnix suscitator</i>)	1	2
Emerald Dove (<i>Chalcophaps indica</i>)	2	2
Dove (<i>Streptopelia</i> sp.)	1	2
Javan Frogmouth (<i>Batrachostomus javensis</i>)	1	2
Unidentified bird (Aves)	1	1
Total birds	8	
Reptiles		
Snake (Reptilia)	1	3
Lizard (Reptilia)	1	3
Total reptiles	2	

Method codes: 1 = field observation; 2 = identified prey remains from nest or perching site; 3 = information from local people

Table 2. Number of prey brought to the nest by each sex during 276 hours of observation.

Sex	Before 12 noon	After 12 noon
Male	16	5
Female	6	10
Total	22	15

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Figure 1. Estimated number of prey brought to the nest per hour during the nestling period.
Note: n = Total observation hours.

