DIVERSITY AND DISTRIBUTION OF RAPTORS AT GUNUNG HALIMUN NATIONAL PARK WITH PARTICULAR REFERENCE TO JAVAN HAWK- EAGLE

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ABSTRACT

Although the role of raptors as the top predators in the food chain is important to maintain the balance of an ecosystem, in Indonesia they have rarely been studied. This paper presents the most comprehensive study on the diversity and distribution of raptors with emphasize on Javan Hawk-eagle at Gunung Halimun National Park, the largest remnant forest in Java.

The raptor study has been done by field surveys, long watches at selected observation sites and collecting information from previous reports. The results showed that there are 17 raptor species recorded in the area. Furthermore, the Crested Serpent eagle *(Spilornis cheelo),* Black Eagle *(Ictinaetus malayensis),* and Javan Hawk-eagle *{Spizaetus bartelsi)* were recorded in many locations. However, the Black-winged Kite *{Elanus caeruleus),* Brahminy Kite *(Haliastur Indus),* Lesser Fish-eagle *(Ichthyophaga ichthyaetus),* Japanese Sparrowhawk *(Accipiter gularis)* and the White-bellied sea-eagle *(Haliaeetus leucogaster)* were observed only in one location. In addition, the Javan Hawk-eagle was recorded at 14 locations namely G. Halimun Utara, G. Buligir Putih, Pasir Cangkuang, G. Malang, West Halimun, G. Bodas, G. Tumpeng, G. Citimur, G. Bengreng, G. Batu, Cadas Mahpar, G. Kempul, G. Kendeng and G. Botol. The number of observed Javan Hawk-eagle individuals at G. Botol was higher than in other locations.

Key words: Keanekaragaman/diversity, raptor/raptor, predator/predators, rantai makanan/food chain, habitat/habitat.

INTRODUCTION

In the last century raptors all over the world have been suffered from human prosecution, pollution like pesticides and habitat destruction (Fergusson-Lees and Christie, 2001). Therefore, their population which was already low, declined and their habitat was getting smaller and fragmented.

Although all raptor species in Indonesia are protected, threats to their population are always present. One of the most important raptor species which has been used as the national symbol, is the Javan Hawk-eagle *Spizaetus bartelsi.* The Javan Hawk-eagle is categorized as endangered species by IUCN Red Data List with the degree of extinction about 20% in 20 years (Collar *et al,* 1994). It is endemic to Java island and occupies forest area. Since the Javan forest has been fragmented, the Gunung Halimun range is believed to be the best habitat for the Javan Hawk-eagle because it is the largest remnant forest in Java (Sozer *et al,* 1998). Indeed, since 1999 the Javan Hawk-eagle has been stated as the flagship species of Gunung Halimun National Park.

The presence of Javan Hawk-eagle at Gunung Halimun range was first recorded by Thiollay and Meyburg (1988) around the Nirmala Tea Estate during brief survey on Java island in 1986. Following this, other sightings were recorded from Cikotok (Liley in van Balen *et al.,* 1999) and West Halimun (UEA 1994). Intensive surveys recorded the species in southern range (Rov *et al.,* 1997; Hapsoro *et al.,* 1998; Prawiradilaga and Adiputra, 2000; Adiputra, 2001). This paper presents the most comprehensive study on the diversity and distribution of raptors at Gunung Halimun National Park in particular the Javan Hawk-eagle. The important objectives of the study are:

1. To investigate the number of raptor species at the Gunung Halimun National Park area including Javan Hawk-eagle
2. To assess the distribution of each species in the area
3. To gather data on the population number of Javan Hawk-eagle in the studied area

METHODS

Study area

Gunung Halimun National Park was established in 1992 and lies between 106°21' - 106°38' E and 6°37* - 6°51' S (Niijima, 1997). It is located in West Java and Banten Provinces covering three districts: Bogor, Sukabumi (West Java) and Lebak (Banten). Its size is approximately 40,000 ha which extends a wide range of altitudes from 500 m to 1929 m above sea level. It consists of a wide range of habitat types and land use including mountain forest (1500 - above 1800 m), submontane (1000 - 1500 m) and collin zone (lower than 900 m) (Simbolon and Mirmanto, 1997). However, most of the forest occurs in altitude range 1000 - 1400 m. This is submontane forest dominated by the huge rasamala *(Altingia excelsa),* puspa *(Schima wallichi)* and oaks *(Lithocarpus* sp.) (Takahashi, 1997). Within the national park there are enclaves with tea plantations, settlements, gardens and rice fields. Tree plantations such as pine *(Pinus* sp.) are found adjacent to the forests. There has been a continous degradation along the edge of the forests. Because of needs for cultivated land, the forests are gradually transformed into gardens and ricefields. Annual rainfall is between 4000 and 6000 mm and during large part of the year the uppermost mountains are covered by mists and clouds.

Data Collection and Analysis

Data were collected by conducting field surveys and repeated census. Field surveys were carried out in South Halimun on 25 September - 1 October 1999 and 11-15 April 2000 and in North Halimun 13-16 August 2001. The census to count Javan Hawk-eagle and other raptors were conducted by simultaneous observations using binoculars and telescopes on 10-14 August 2000, 10-14 October 2000, 13-17 November 2000, 27 April-1 May 2001, 3-6 September 2001, 1-4 November 2001 in Central Halimun (Figure 1). Five observation points were selected between G. Kendeng/Cikaniki and G. Botol along 12 km (Table 1). Most of these points had a wide view except the third point (Waning Odang) had restricted view towards a valley in G. Kendeng. The observations were conducted by long watches between 08.00 and 16.00 hours. At least there were three observers staying in each point. The number of the Javan Hawk-eagle and other raptors seen flying around and perching were recorded. In order to avoid error in identifying and counting the raptors in the area, communication between sites using handy talkies were made as soon as the observers sported the raptors until disappeared.

Additional data on the raptor species were gathered from interviews with local people and previous studies in West Halimun (for a review see UEA 1994) and in South Halimun (Rov *et al.* 1997; Hapsoro *et al.* 1998; Prawiradilaga and Adiputra 2000). All collected data were then compiled and analysed.

Table 1. Observation points between G. Kendeng/Cikaniki and G. Botol

Point No.	Names	Coordinates	Altitude (m)
I	Pasir Banteng/G. Botol	6°43'46.6"S;106°29'48.4"E	1518
II	Neglasari	6°43'45.7"S;106°31'837"E	1143
III	Waning Odang	6°44'09.6"S;106°31'42.8"E	1176
IV	Lapangan Bola	6°44'22.4" S; 106°31'58.4" E	1170
V	Cikaniki/Timbangan	6°44'37"S;106°32'10.2"E	1095

RESULTS

Raptor species and distribution

There were 17 raptor species of two families recorded in the study area (Table 2).

Family: ACCIPITRIDAE

Jerdon's baza *(Avicedajerdoni)*

The present of this species was the first record for Java island. Its detailed description will be presented elsewhere (Prawiradilaga and Wijamukti in preparation). It was recorded from private owner of one captured young individual at Legok Jeruk in July 2000. This young individual was then confiscated by the National Park ranger. The owner informed that the Jerdon's baza was collected from the forest near G. Malang. This confiscated eagle was able to hunt and feed by itself. It was kept at the Cikaniki Research Station for a few days until flew away without returning to the station after feeding time.

Oriental Honey-buzzard *(Pernis tilorhynchos)*

The species was recorded flying above G. Kendeng and Neglasari. The number of records during census were five times and the numbered of encountered individuals 1-15.

Black-winged Kite *(Elanus caeruleus)*

The species was recorded flying around Neglasari area during raptor census conducted on 12 October and 15 November 2000. The number of encountered individuals was between 1 and 2.

Brahminy Kite *(Haliastur indus)*

Present study has not observed this species. However, the previous survey recorded it in West Halimun (for a review see UEA 1994).

Lesser Fish-eagle *(Ichthyophaga ichthyaetus)*

This species was only recorded in the previous survey in West Halimun (for a review see UEA 1994). However, the present study did not obtain any data.

Besra *(Accipiter virgatus)*

This species has never been observed during raptor census. Only one individual was captured from G. Kendeng (see Adhikerana *et al.*, 1998).

Crested Goshawk *(Accipiter trivirgatus)*

The species was found in West Halimun (UEA 1994), G. Botol, G. Kendeng and Cihanjawar. During census only one individual was recorded in each observation in October and November 2000. Also, one captured young individual was released back to its habitat at the pine forest at Cihanjawar in May 2001.

Chinese Goshawk *(Accipiter soloensis)*

It was observed in West Halimun (UEA 1994), Neglasari, G. Kempul and G. Kendeng. During census only one individual was recorded in each location (October and November 2000).

Japanese Sparrowhawk *(A ccipiter gularis)*

Only one individual was recorded once during census on 16 November 2000 at G. Kendeng.

Crested Serpent eagle *(Spilornis cheela)*

The species was common and recorded in many locations (Table 2). It can be found in the primary and secondary forest, production forest and tea plantation. The number of observed individuals during census varied between 4 and 19.

Black eagle *(Ictinaetus malayensis)*

This species is also common and recorded in many locations (Table 2). It was found in various habitat types including primary forest, production forest, tea plantation, farm land and open landscape. The number of observed individuals in each location ranged from 1 to 13.

Rufous-bellied eagle *(Hieraaetus kienerii)*

The species was not common and recorded in three locations: G. Kempul, Neglasari and Cigaronggong. The number of observed individuals kv eacn location was between 1 and 5.

Changeable hawk-eagle *(Spizaetus cirrhatus)*
The species was less common. It was recorded in West Halimun (UEA, 1994), G. Botol, Neglasari, G. Bodas, Cigaronggong, G. Batu and Cadas Mahpar. The number of observed individuals in each location was between 1 and 2.

Javan hawk-eagle *{Spizaetus bartelsi)*
It was recorded in many locations (Tables 2 and 3) and found in the primary and secondary forest and the forest edge. The number of observed individuals in each location was from 1 to 6.

White-bellied Sea-eagle *(Haliaeetus leucogaster)*
Present study has never recorded this species. It was reported in the previous survey in Southern G. Halimun (Rov *et al.,* 1997)

Family FALCONIDAE

Black-thighed Falconet *(Microchierax ringillarius)*
This species was present in West Halimun (UEA 1994), Cisarua (North Halimun), G. Kendeng and Cigaronggong (South Halimun). During survey, it was recorded three times and found in the primary forest and plantation areas. The number of encountered individuals ranged between 2 and 4.

Spotted Kestrel *(Falco moluccensis)*
The species was recorded at G. Botol and Neglasari. One young Spotted kestrel was found in the bird cage at Cisarua (North Halimun).

The Observed Javan Hawk-eagle

The presence of Javan Hawk-eagle has been recorded in 14 locations (Tables 2 and 3). Most locations were primary and secondary forest, except Cadas Mahpar was open landscape dominated by ricefield and surrounded by montane forest. The total number of Javan Hawk-eagles in the studied areas excluding West Halimun ranged between 36 and 37 individuals consisting of 16 pairs and 4 or 5 young (Table 3). The highest number of individuals present during census was recorded at G. Botol and single individual was recorded only from G. Buligir Putih (North).

DISCUSSION

Diversity and distribution of raptors

There were 17 raptor species recorded at Gunung Halimun National Park which took about 85 % of the total raptor species in Java and Bali (MacKinnon 1988) or 24% of the total of Indonesian raptors (Prawiradilaga, in preparation). Among those species, the Jerdon's baza *{Aviceda jerdoni),* Oriental Honey-buzzard, Black-winged Kite, Japanese Sparrow-hawk, Rufous-bellied Eagle and Spotted Kestrel are the new record for the area (Prawiradilaga *et al.,* in preparation). Even the Jerdon's Baza is the new record for Java island.

The most common species in the area were the Crested Serpent Eagle, Black Eagle and Javan Hawk-eagle. These species are resident and also have wide distribution area. The Crested Serpent Eagle and the Black Eagle can be found in various habitat types including primary and secondary forests, tea and tree plantations and open landscape.

The other species such as the Black-winged Kite, Brahminy Kite, Lesser Fish-eagle, Besra, Rufous-bellied Eagle, Changeable Hawk-eagle, Spotted Kestrel, Crested Goshawk and White-bellied Sea eagle are rare. The number of observed individuals of these species was very small.

Chinese Goshawk and Japanese Sparrow-Hawk are migrants (MacKinnon, 1988, Ferguson-Lees and Christie, 2001). These species were recorded only during migration season between October and November 2000.

The Oriental Honey-buzzard can be migrants or residents (MacKinnon 1988, Ferguson-Lees and Christie, 2001). During observation in November 2000, migrating individuals were observed flying together in high number (between 8 and 15). However, resident birds were observed flying alone or in small number.

Javan Hawk-eagle Population

Although the current study has covered only some part of the Gunung Halimun National Park area, the present of Javan Hawk-eagle has been

recorded in 14 locations. Possibly, the number of locations would increase if more intensive survey is being carried out in the whole range. Then, if it is assumed that the population of Javan Hawk-eagle in those recorded locations are safe and there would be addition to the population data from the intended survey areas, so there would be an increase in the estimated number of population 16-25 pairs proposed by van Balen *et al.* (1999) for Gunung Halimun and Salak.

Table 3 showed that the number of encountered individuals in G. Botol (6 individuals) is higher than in any other locations. This could be caused by the prey availability in the area. Previous studies on small mammals at Gunung Halimun National Park indicated that in G. Botol, the diversity and density of small mammals which are the most preferred prey of the Javan Hawk-eagle (Prawiradilaga *et al*, 2000) were the highest (Suyanto and Maharadatunkamsi, personal communication).

CONCLUSION

1. There were 17 raptor species recorded at Gunung Halimun National Park.
2. The Crested Serpent-eagle, Black Eagle and Javan Hawk-eagle were common and recorded in many locations.
3. The Javan Hawk Eagle distributed widely and was recorded at 14 locations: G. Halimun Utara, G. Buligir Putih, Pasir Cangkuang, G. Malang, West Halimun, G. Bodas, G. Tumpeng, G. Citimur, G. Bengreng, G. Batu, Cadas Mahpar, G. Kempul, G. Kendeng and G. Botol.
4. The total number of Javan Hawk-eagles in the studied areas excluding West Halimun ranged between 36 and 37 individuals (16 pairs and 4 or 5 young).

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Table 2. Raptor species and its distribution at Gunung Halimun National Park

No.	Species	Locations	Sources
1.	*Avicedajerdoni* Jerdon's Baza	Cihanjawar	This study
2.	*Pernis ptilorhynchos* Oriental Honey-Buzzard	G.Kendeng, Neglasari	This study
3.	*Elanus caeruleus* Black-winged Kite	Neglasari	This study
4.	*Haliastur indus* Brahminy Kite	West Halimun	UEA(1994)
5.	*Ichthyophaga ichthyaetus* Lesser Fish-eagle	West Halimun	UEA(1994)
6.	*Accipiter virgatus* Besra	G. Kendeng	Adhikeranaetal. (1998)
7.	*Accipiter trivirgatus* Crested Goshawk	West Halimun, G. Botol, G. Kendeng, Cihanjawar	UEA (1994), Adhikerana et al. (1998), this study
8.	*Accipiter soloensis* Chinese Goshawk	West Halimun, Neglasari, G.Kempul, G. Kendeng	UEA (1994), this study
9.	*Accipiter gularis* Japanese Sparrowhawk	G. Kendeng	This study
10.	*Spilornis cheela* Crested Serpent eagle	West Halimun, G. Botol, G. Kendeng, G. Kempul, Nirmala Tea plantation, G. Batu, Cigaronggong, G. Bodas, Cadas Mahpar	UEA (1994), Prawiradilaga & Adiputra (2000), This study
11.	*Ictinaetus malayensis* Black eagle	West Halimun, G. Botol, G. Kempul, Nirmala Tea plantation, G. Halimun Utara, G. Bengreng, G. Bodas, G. Batu/G. Tumpeng, Cadas Mahpar	UEA (1994), This study, Adiputra (2001)
12.	*Hieraaetus kienerii* Rufous-bellied Eagle	G. Kempul, Neglasari, Cigaronggong	Adiputra (2001), This study
13.	*Spizaetus cirrhatus* Change-able Hawk-eagle	West Halimun, G. Botol, Neglasari, G. Bodas, Cigaronggong, G. Batu, Cadas Mahpar	UEA (1994), Adiputra (2001), This study
14.	*Spizaetus bartelsi* Javan Hawk-eagle	West Halimun, G. Halimun Utara, G. Buligir Putih, Pasir Cangkuang, G. Malang, G. Bodas, G. Ciawitali, G. Citimur, G. Bengreng, G. Tumpeng, G. Batu, G. Botol, G. Kendeng, G. Kempul,	UEA (1994), Rov et al. (1997), Sinaga (pers. com.), Hapsoro et al. (1998), Adiputra (2001), Prawiradilaga et al. (unpublished data), This study, Marakarmah & Wijamukti (pers.com.) ...
15.	*Haliaeetus leucogaster* White-bellied Sea-eagle	South Halimun	Rov et al. (1997)
16.	*Microchieraxfringillarius* Black-thighed Falconet	West Halimun, Cisarua (North Halimun) .Cigaronggong (South Halimun), G. Kendeng	UEA (1994), This study
17.	*Falco moluccensis* Spotted Kestrel	G. Botol, Neglasari, G. Halimun Utara/Cisarua	This study

Table 3. The number of observed individuals Javan Hawk-eagle at G. Halimun National Park

No.	Location	Recorded time	No. Observed individuals	Sources
1.	G. Halimun Utara (North)	August 2001	2	This study
2.	G. Buligir Putih (North)	August 2001	1	This study
3.	Pasir Cangkuang (North)	August 2001	2 (1 pair)	This study
4.	G. Malang (North)	June/July 1997	2 (1 pair)	Sinaga (pers. comm.)
5.	West Halimun (Ciusul/Cikuya)	7 1994	NA	UEA (1994)
6.	G. Bodas (South)	August-September 1997, September 1999, January-May 2000	2 (1 pair)	Rovetal. (1997), Hapsoroetal. (1998), Prawiradilaga & Adiputra (2000), Adiputra (2001)
7.	G. Tumpeng (South)	August-September 1997, January-May 2000	2(1 pair)	Rovetal. (1997), Hapsoroetal. (1998), Adiputra (2001)
8.	G. Citimur (South)	August-September 1997, September-October 1999, April 2000	2 (1 pair)	Rovetal. (1997), Hapsoro et al. (1998), This study
9.	G. Bengreng (South)	September-October 1999, April 2000	3(1 pair+ 1 young)	Wijamukti & Marakarmah (pers.comm.), This study
10.	G. Batu (South)	August-September 1997	2 (1 pair)	Rovetal. (1997), Hapsoroetal. (1998)
11.	Cadas Mahpar	January- May 2000	4 (1 pair + 1 subadult + 1 young)	Adiputra (2000)
12.	G. Kempul (East)	August 2000, October 2000, November 2000, April-May 2001,	2-3	This study
13.	G. Kendeng	March 2000, August 2000, October 2000, November 2000, April-May 2001, September-November 2001	4 (1 pair+ 1 young + 1 adult)	This study
14.	G. Botol	August 2000, October 2000, November 2000, April-May 2001, September 2001	6	This study

Note: NA = Estimated number not available

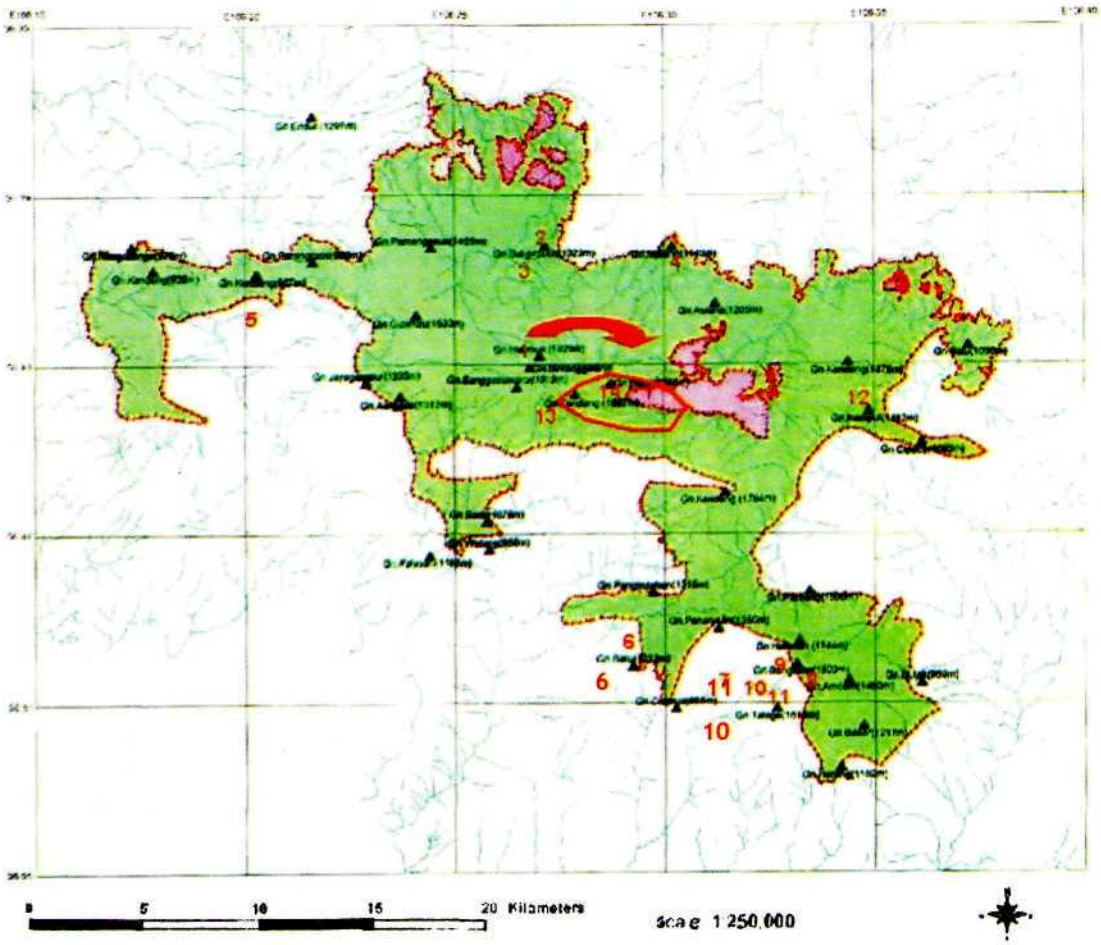

Figure 1. Location of raptor census at G. Halimun National Park (2000-2001)
The numbers indicate the locations where Javan Hawk-eagle occurred (see Table 3)