

SHORT COMMUNICATIONS

J. Raptor Res. 30(2):99–100

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HABITAT PREFERENCE OF CRESTED SERPENT EAGLES IN SOUTHERN JAPAN

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KEY WORDS: *conservation; crested serpent eagle; Spilornis cheela; habitat preference; wet grasslands; Japan.*

The crested serpent eagle (*Spilornis cheela*) is a medium-sized raptor whose range includes most of the Indo-oriental region (Brown and Amadon 1968). Over 20 subspecies are recognized, all of which are associated with forests of tropical and subtropical regions (Brown and Amadon 1968). The Japanese race (*S. c. perplexus*) is of uncertain taxonomic status but considered a separate species by some authors (Devillers et al. 1993). The serpent eagle's Japanese range is restricted to the subtropical islands of Ishigaki and Iriomote, where it is typically associated with the wet grasslands of the southern end of Japan's Ryukyu Island chain. Because the population contains as few as 100 eagles (Hanawa et al. 1985), it has been listed as a "Species of Concern" by the Environment Agency of Japan (Environment Agency of Japan 1991). Lack of information on the habitat requirements of serpent eagles in this rather unusual habitat has delayed the development of management plans for its conservation. Herein, we provide evidence for the winter habitat preference of this eagle on Ishigaki and Iriomote Islands.

STUDY AREA AND METHODS

Ishigaki and Iriomote Islands (24°N, 124°E) of southern Japan are subtropical islands of continental origin. Recently, Ishigaki Island has undergone widespread conversion of its natural forest and historical wet rice agriculture to sugar cane production. On Iriomote Island, less of this conversion has occurred and it continues to support intact mangrove (*Rhizophora* spp.) and tropical broad-leaved forests.

We collected data on the distribution of perched crested serpent eagles along survey routes from 10–15 February 1993. We rode motorcycles at 20–30 km/h to survey for eagles. On Iriomote, two routes (9.9 and 14 km each) were surveyed twice a day by two observers between 0700–1000 H (a total of 4 times/d) for 3 d. On Ishigaki Island, one circular route (34.5 km in length) was surveyed in the same way. We plotted all eagle locations on maps, and recorded the perch habitat, perch structure, and the distance from the nearest forest edge for each

perched eagle observed. Habitats were separated into six categories: wet grasslands (including wet grass fields and wet meadow/rice cultivation), dry grasslands (including dry, grass fields and vegetable farms), grazed pastures, forests, sugar cane fields, and residential areas.

Dominant land use within 50 m of either side of the survey routes was estimated visually during surveys and compared to published maps of land use (Environment Agency of Japan 1981).

RESULTS AND DISCUSSION

We observed 97 perched serpent eagles during surveys. The most commonly used perch structures were trees ($N = 58$) followed by utility poles ($N = 39$). Eagles typically were perched within 10 m of the forest edge, and were less frequently observed 10–50 m from the closest forest edge (Fig. 1). Average distance from forest edge was 4.3 m (SD = 10.9 m, $N = 77$) on Iriomote Island, and 11.9 m (SD = 20.3 m, $N = 20$) on Ishigaki Island, but this difference was not significant (Mann-Whitney $U = 602$, $Z = 1.73$, $N_1 = 76$, $N_2 = 20$, $P > 0.05$).

Perching habits of eagles were similar on the two islands (Fig. 2). Most eagles perched in wet grasslands on Iriomote (67.5%) and Ishigaki (80%) Islands. Based on the estimated availability of wet grasslands, serpent eagles used this habitat more than expected (Iriomote Island

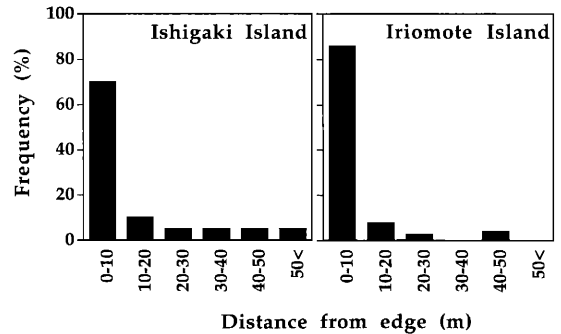


Figure 1. Perch sites of crested serpent eagles and distance categories from forest edges of Ishigaki ($N = 20$) and Iriomote Islands ($N = 77$), southern Japan.

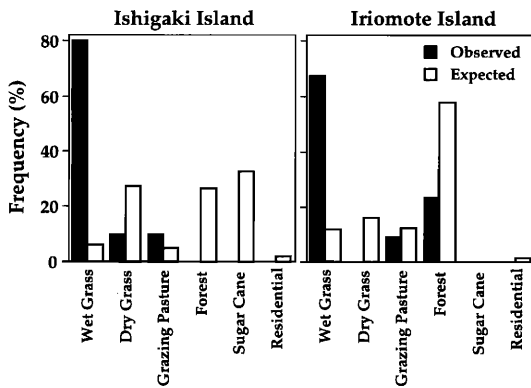


Figure 2. Habitat preference of crested serpent eagles on Ishigaki ($N = 20$) and Iriomote Islands ($N = 77$), southern Japan.

$\chi^2 = 225.4$, $P < 0.001$; Ishigaki Island: Binomial test, $P = 0.000$.

Our results showed that margins of forests and wet grasslands served as important perching habitats for crested serpent eagles wintering on the Iriomote and Ishigaki Islands of Japan. There were an estimated 10 000 ha of wet grasslands along survey routes on Iriomote Island and 12 500 ha on Ishigaki Island in 1981. In 1992, there were only 5600 and 7100 ha in the same areas of Iriomote and Ishigaki Islands, respectively. Most wet grasslands had been converted to sugarcane fields or pastures. It appeared that, if further conversion of wet grasslands occurred, it would threaten the future status of the serpent eagle in this portion of its range.

RESUMEN.—Se estudiaron las preferencias de hábitat de *Spilornis cheela* en las islas de Ishigaki e Iriomote, ubicadas

al sur de Japón. Las águilas prefirieron los márgenes de bosques y praderas húmedas como sitios de percha. Las praderas húmedas fueron convertidas en campos de caña de azúcar y de pastura. Esta águila está listada como una "especie de interés" por la Agencia del Medioambiente de Japón. Por lo tanto, futuras conversiones de praderas para uso agrícola deben considerar la importancia de este hábitat para *S. cheela*.

[Traducción de Ivan Lazo]

ACKNOWLEDGMENTS

We thank Yoichi Sakiyama and Naoshi Motonari for field support. Toshihiro Gomi of MKC Corporation for analyzing habitat data, and Yutaka Kanai for ideas that led to this work. A part of this study was supported by Environment Agency of Japan.

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Received 1 May 1995; accepted 11 December 1995

J. Raptor Res. 30(2):100–102

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A POSSIBLE CASE OF POLYANDRY IN MONTAGU'S HARRIER

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KEY WORDS: *polyandrous association*; *Montagu's harrier*; *Circus pygargus*; *Spain*.

Monogamy is the most common mating system among raptors (Newton 1979), although alternative mating systems such as polygyny have been described in several species (see Newton 1979). In contrast, polyandry is rare and has only been described in the Harris'

hawk (*Parabuteo unicinctus*) (Bednarz 1987), Galapagos hawk (*Buteo galapagoensis*) (Faaborg et al. 1980), and bearded vulture (*Gypaetus barbatus*) (Heredia and Donazar 1990). Polyandry has been described as occasionally occurring in species including kestrels (*Falco tinnunculus*) (Packham 1985), golden eagles (*Aquila chrysaetos*) (Berg 1988), pygmy falcons (*Polihierax semitorquatus*) (Thomsett 1991), and Egyptian vultures (*Neophron*