

HOMES FOR SUMATRAN HORNBILLS

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ABSTRACT. – Nest boxes of three designs for hornbills were built and in 2008 were erected on large trees within a sector of the Harapan Rainforest in southern Sumatra, Indonesia, which is a 101,000-hectare ecosystem restoration initiative. The forest contains all nine of Sumatra's hornbills, of which six are considered Near Threatened. As of early 2009, a few visits by hornbills had been recorded, but with no nesting attempts. A monitoring programme is being put in place, with training and incentives for local people so as to integrate the scheme into the conservation plans and activities for the area.

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KEYWORDS. – Hornbills, nest-boxes, Sumatra, Indonesia, Harapan Rainforest.

INTRODUCTION

Harapan Rainforest is a 101,000 ha ecosystem restoration initiative in South Sumatra, and the first of its kind in Indonesia. A 100-year licence has been secured for restoring this previously logged site to its original condition through protection and restoration activities. Site protection will support natural regeneration, while restoration actions, such as tree planting, will augment this process in specific areas. In doing so, it will conserve 20% of the remaining Sundaic dry lowland forest of Sumatra.

All nine Sumatran hornbill species have been recorded in the site: Bushy-crested Hornbill (*Anorrhinus galeritus*), Wreathed Hornbill (*Aceros undulatus*), Oriental Pied Hornbill (*Anthraceros albirostris*); and the Near Threatened (IUCN, 2008) White-crowned Hornbill (*Aceros comatus*), Wrinkled Hornbill (*Aceros corrugatus*), Black Hornbill (*Anthraceros malayanus*), Rhinoceros Hornbill (*Buceros rhinoceros*), Great Hornbill (*Buceros bicornis*) and Helmeted Hornbill (*Rhinoplax vigil*).

Hornbills are identified as key species for assisting forest regeneration within the site due to their feeding ecology and seed-dispersing capabilities (Kitamura et al., 2002,

2005; Kinnaird & O'Brien, 2007). However, while hornbills continue to use the site, it is feared past logging activities have impacted upon local populations through the removal of large, possible nest trees, potentially limiting breeding success (Poonswad et al., 2005), and/or the loss of key food resources damaged or felled during logging activities (Anggraini et al., 2000).

The provision of artificial nest boxes is one approach to supporting hornbill populations in degraded or regenerating forests (Kemp, 1995). In turn, this helps maintain the ecological services they provide (Kinnaird & O'Brien, 2007), including assisting forest restoration. In South-east Asia, they have been used with some success in Thailand (C. Pasuwan, pers. comm. 2008), the Philippines (e.g. Curio, 2004), and Brunei (J. Henrot, pers. comm. 2009).

In 2008, an artificial nest-box scheme for hornbills was started at Harapan Rainforest using funds secured from the Disney Worldwide Conservation Fund. This project will test various nest box designs and assess their potential for increasing breeding success, so maintaining local populations while appropriate natural nesting habitat regenerates. Since July 2009, this work has been supported by the Seaworld and Busch Gardens Conservation Fund (SWBGCF).

Table 1. Summary of nest box dimensions (showing minimum and maximum values, mean±standard deviation).

Box design	Dimensions of box (cm)			Dimensions of nest box hole (cm)		
	Height	Width	Depth	Height above box floor	Height	Width
Plywood (n= 10)	50–100 (x=67±19)	30–80 (x=51±18)	30–80 (x=51±18)	9–25 (x=16±5)	18–35 (x=23±6)	10–20 (x=17±4)
Plastic drums (n=5)	56	37	37	8–16 (x=12±4)	14–19 (x=17±2)	10–21 (x=13±5)
Oil drums (n=5)	89	57	57	11–20 (x=16±3)	23–30 (x=26±3)	18–32 (x=25±5)

METHODS

Nest boxes were constructed based on current knowledge of nest-hole characteristics (Poonswad, 1995; Datta & Rawat, 2004; Thienongrusamee et al., 2005) and nest-box design (M. Handschuh, P. Hospardarsky, P. Poonswad, S. C. Ng & R. Wilkinson, pers. comm. 2008). We used three basic designs: waterproofed plywood boxes (two sizes); plastic cylindrical drums; and recycled metal oil drums (summary data in Table 1; the box dimensions for targeting specific species broadly follow Gelama et al., 2002). All boxes had an overhanging roof to protect the entrance from direct sunlight and rain (Gelama et al., 2002) and an elliptical or oval shaped entrance hole, as these are frequently used by hornbills in the wild (Poonswad et al., 1987; Gelama et al., 2002). A number of adaptations were made to the boxes to improve the likelihood of usage, e.g. thickening the depth of the entrance holes to aid nest sealing (Gelama et al., 2002), painting with clay paint, adding leaf litter or saw dust as a nest substrate, and adding rungs inside enabling birds to climb away from the entrance if threatened (Kemp, 1995). Eight locally-recruited project staff underwent a two-month training programme covering a range of rope and tree climbing skills, and enabling them to erect the nest boxes safely and securely.

RESULTS

In December 2008, and in time for the main hornbill nesting season on Sumatra (see Kinnaid & O'Brien, 2007, and references therein), the nest boxes were erected within a 500 ha section of the site. Boxes were mounted in trees of 50–150cm diameter ($x = 82 \pm 29$ cm). They were positioned randomly according to aspect (Poonswad et al., 2005) and at heights ranging from 19–32m ($x = 24.4 \pm 4.1$ m).

Since then, boxes have been monitored on a weekly basis to check for any occupancy or general hornbill interest. There has been one positive visitation when a male Rhinoceros Hornbill (*B. rhinoceros*) perched on the branch in front of one of the nest boxes. Two Black Hornbills (*A. malayanus*) have perched next to another box but did not show any specific interest in it. Although none of the nest boxes have been used by hornbills yet, this is not surprising since, based on similar studies in Thailand (C. Pasuwan, pers. comm. 2009), we anticipate that hornbills will take some time to adjust to and familiarize themselves with the nest boxes.

FUTURE DIRECTIONS

The project will continue to work to identify nest box designs that are successful in attracting hornbills, while keeping them lightweight and cost-effective (see Kinnaid & O'Brien, 2007). Based on further input from the Hornbill Research Foundation (C. Pasuwan, pers. comm. 2009), and with funds from the SWBGCF, some of the old boxes will be modified and new boxes built in October 2009 (natural log boxes have since replaced all the metal drum boxes). Audio-visual monitoring equipment will be bought to record any positive hornbill activity at a nest box.

The need to have skilled tree climbers is cited as a limiting factor to nest box schemes (Kinnaid & O'Brien, 2007). The project now has a highly trained core tree climbing team with appropriate climbing equipment which will support the ongoing nature of this work, including checking and maintaining existing boxes and mounting new boxes.

Poaching pressures in the site are low, so the provision of (obvious) nest boxes is not seen as a threat to hornbills in the site (see Kinnaid & O'Brien, 2007). However, to help prevent this becoming a problem in the future the project is now working with local communities to develop a nest-finding and nest box checking scheme that will be rewarded with small incentives.

The nest box scheme is one component of research activities at the site that aim to better understand the role hornbills play in forest regeneration. Other areas of work include phenology studies in combination with forest restoration approaches, and feeding ecology and seed dispersal studies, including seed rain and germination. Key to all this is how hornbills can assist forest restoration in a degraded landscape. It is anticipated that results of this project will be applicable to the conservation of hornbills and forest restoration work elsewhere in Indonesia and South-east Asia.

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