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Nest Records of Wreathed Hornbill (*Rhyticeros undulates*) in Gunung Gentong Station, Mount Ungaran Central Java

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Abstract. The remaining forest of Mount Ungaran, Central Java is the suitable habitat of Wreathed Hornbill (*Rhyticeros undulatus*), especially for a nesting site. The objective of the study was to analyse the nest record and characteristics of habitat around the nest, especially in Gunung Gentong station. The research was conducted from 2010-2016 using exploration method. The method habitat profile of the vertical structure tree canopy was taken by plot size 60 x 20 m. Measurements were taken to the standing of vegetation, canopy closure, the direction of the canopy, height canopy, a former branch of the vegetation height, and stem diameter. The Result of the study showed that Gunung Gentong is one of the research station that we have been recorded for nesting site on 2010-2015. A total of the nest record on Gunung Gentong station was 10 nests. Estimate the elevation of nest location between 939-1240 AMSL. The tree species that used for nesting was *Syzygium glabratum*, *Syzygium antisepticum*, *Ceratoxylon formosum*, and *Ficus* sp

1. Introduction

Three of Hornbills species (Fam. Bucerotidae) existing in Java, one of them, Wreathed Hornbill (*Rhyticeros undulates*) was found in Mount Ungaran [1]. Mount Ungaran area has the last remaining forest area especially in Central Java and established for Important Bird Area (IBA) [2] and also The Alliance for Zero Extinction (AZE). The main factors that Hornbills' species in the world are under the threat of extinction because they are specialised about habitat, food and nesting sites. Hornbills have a very important role in the forest ecosystem as seed dispersers [4]-[6]. The population of Wreathed Hornbill especially in Java was tendency threatened by habitat loss because of illegal logging, fragmentation, hunting pressure, and trading of the bird. Based on the last research of the Wreathed Hornbill on Mount Ungaran [1][7] showed that Mount Ungaran is a suitable habitat for the availability of food, water, shelter, perching and nesting site for Wreathed Hornbill species. But, Based on the landcover data on 1991-2009 the research also showed that the natural forest on Mount Ungaran was decreased almost 53.31%, while the secondary forest, plantation and the settlement became increase [8]. Hornbills nesting in cavities, usually in large trees, they cannot excavate their nest holes.

Hornbill usually used nest cavities by created capable excavators (e.g. woodpeckers and barbets), or natural cavities that form after branches breaks or after other injuries are inflicted upon forest tree [9]. When the breeding season, the female enters the nest and while sitting within the nest cavity. The female has prepared the cavity and plastering of the cavity entrance. The female keeps her bill sliding over the cavity entrance with the mud lump being smeared into layers of semi-solid soil. Only a narrow opening hole for male will allow delivery feed for female and the chicks [10]. Hornbills rely entirely on the availability of natural tree cavities for nesting and also depend on their food resource, any loss of habitat means loss not only food resources but also breeding sites [11] There for the study of hornbill ecology in Mount Ungaran must be intensive and sustainability, including for the nest



record and their habitat. The objective of the study was to analyse the nest record and characteristics of habitat around the nest on Gunung Gentong station.

2. Material and Methods

The study was carried out in Gunung Gentong station, Mount Ungaran 07009'26.8" S 110020'11.8" E (Figure 1) and was conducted from 2010-2016. The materials and equipment for this research are GPS Garmyn e-Trex 12 channel, camera, tally sheet, label, climbing equipment, glove, and stationeries. Data Nest characteristics especially vegetation structure and profile of the habitat. Nest record method by exploration survey especially in Gunung Gentong and information from the citizen which live around Gunung Gentong village. The method of vegetation structure was taken nested plot sampling, and habitat profile by the vertical structure of tree canopy closure used plot size with measuring 60 x 20 m. Measurements were taken to the standing of plant canopy closure, the direction of the canopy, height canopy, a former branch of the plant height, and stem diameter.

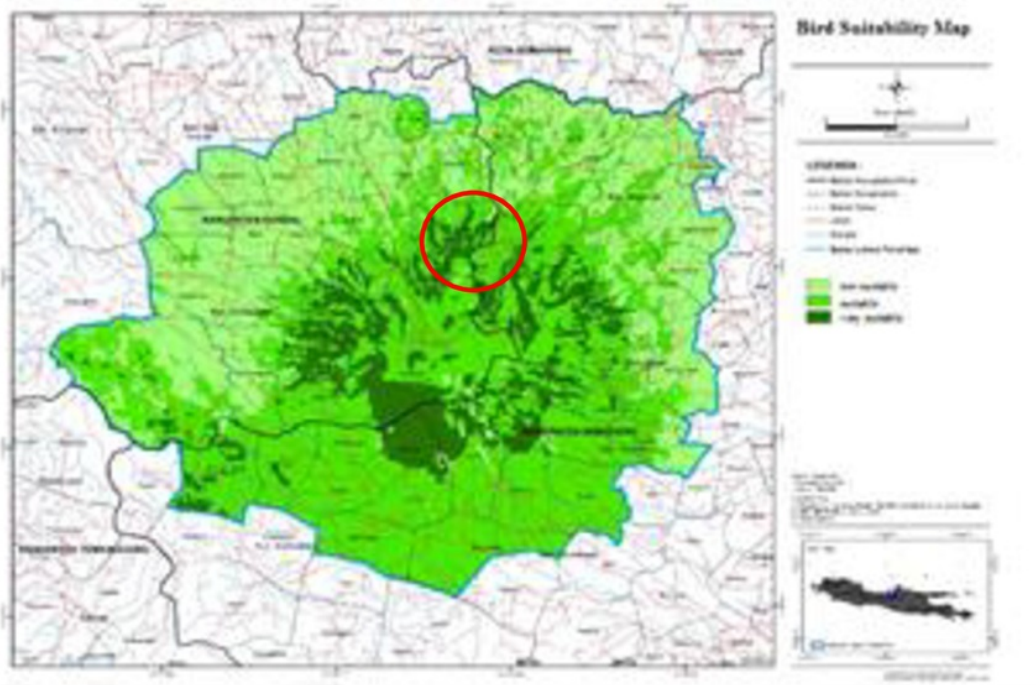


Figure 1. The location in Gunung Gentong, Mount Ungaran

3. Result and Discussion

The breeding period of Wreathed Hornbill in Mount Ungaran were reported on August-December. The Result of the study showed that total 10 nests had been recorded in Gunung Gentong since 2010-2015 (Table 1), six nests have been recorded in active and four nests not active. Estimate elevation of the nest was located between 939-1240 AMSL. According to Mackinnon et al. [12], the Wreathed Hornbill usually found at elevation 0-2000 meters AMSL. Tree height of the nest between 16-27 m, diameter 0.83-1.75 m, and the high of the nest 9-27 m. Meanwhile, some researchers explained that nesting trees for Wreathed Hornbill have height ranged more than 20 meters and diameter about 0.4-2.67 m [13]. The high tree was chosen because when there was a storm, the tree tend to be damaged

including broken branches and in some cases would naturally form a hole. Also, the strongest trees can survive longer than other trees, so the possibility of using it as a nest was higher than other trees [14]. The research also showed, the tree species that used for nesting was *Syzygium glabratum*, *Syzygium antisepticum*, *Ceratoxylon formosum*, and *Ficus sp.* Based on Poonswad recorded [14], higher and larger trees will attract hornbills including Wreathed Hornbill to use it as a nesting place and the selected tree was Dipterocarpus and *Eugenia*. While in Mount Ungaran, Wreathed Hornbill usually used the nests at *Syzygium glabratum* and *Syzygium antisepticum*. Both species are still the same family with *Eugenia sp.* (Fam. Myrtaceae).

Table 1. Nest record in Gunung Gentong station

Nest no	Elevation	Tree species	Tree height (m)	Tree diameter (m)	Nest height	Year	Status of nest
1	939	<i>Syzygium glabratum</i>	27	1.75	18	2010-2013	active
2	1056	<i>Syzygium antisepticum</i>	24	1.15	9	2010-2013	active
3	1241	<i>Syzygium antisepticum</i>	32	1.37	14	2013-2015	active
4	1185	<i>Syzygium antisepticum</i>	30	0.83	16		active
5	1105	<i>Syzygium antisepticum</i>	26	0.89	16		active
6	1112	<i>Cratoxylon formosum</i>	34	1.62	17	2015	active
7	1039	<i>Syzygium antisepticum</i>	30	1.15	27	2015	non active
8	972	<i>Syzygium antisepticum</i>	16	1.10	12	2015	non active
9	982	<i>Ficus sp</i>	17	1.05	9	2015	non-active
10	950	<i>Ficus sp</i>	16	1.00	8	2015	non-active

In this study, we try to analysed the profile of vegetation around the tree of nest existing. Analysis of vegetation profiles in Gunung Gentong station showed the dominant tree vegetation is *Syzygium*, *Litsea sp.*, and *Ficus sp.* (Figure 2). Based on the study also showed that of the tree species was the main feed source for Wreathed Hornbill in Gunung Gentong. Therefore, the existence of tree species is important to the survival of the Wreathed Hornbill. Such as, *Ficus sp.* a primary species the source of food for Wreathed Hornbill. As seen during the study the *Ficus sp.* have been fruiting and Wreathed Hornbill often perching, resting on the tree and also looking for a feeding. The *Ficus sp.* holds many important roles for many species of fruit eater especially for the Wreathed Hornbill. Wreathed hornbill in Gunung Gentong always perched on the top canopy (A) and the second canopy (B), while in the third canopy (C) was used as a nesting site. Most fruit consumed by Wreathed Hornbill in Mount Ungaran is from family Lauraceae, Moraceae, Myristicaceae, Rutaceae, Myrtaceae, and Euphorbiaceae [15]. *Litsea sp.* include the family of Lauraceae and *Ficus sp.* include in the family of Moraceae. Hornbill from all studies combine especially in Asia ate 497 fruit species from 135 genera in 46 families [7]. The top five families ranked of species consumed are Lauraceae, Moraceae, Meliaceae, Myristicaceae, dan Annonaceae.

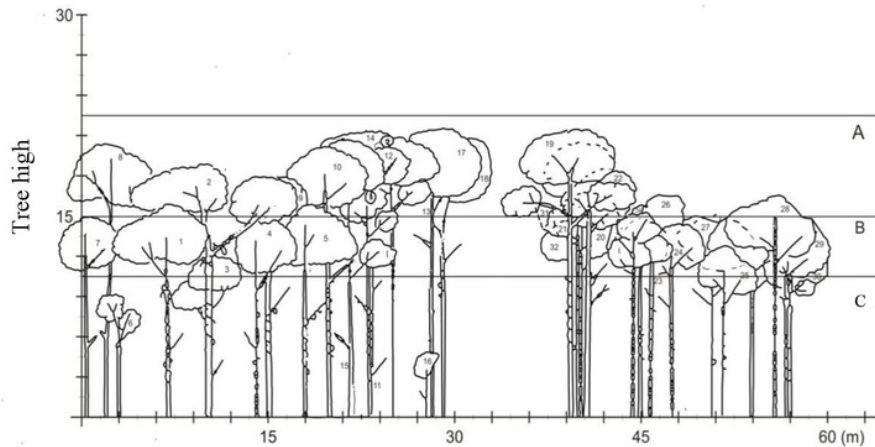


Figure 2. The vertical structure of tree habitat profile: (A) Top Canopy, (B) Second Canopy, (C) Top Third Canopy

The problem such as deforestation and habitat fragmentation poses the greatest threat to hornbills in Moun Ungaran. Unlimited demand, poor planning, and unsustainable use of this valuable and natural capital resource have resulted in a high depletion of forest resources and hence of hornbill habitat.

4. Conclusion

Gunung Gentong Station in Moun Ungaran Central Java was the suitable habitat for perching, roosting, food source from the some of fruit tree species, and nesting site. The tree species for nesting site are *Syzygium glabratum*, *Syzygium antisepticum*, *Ceratoxylon formosum*, and *Ficus* sp. Most fruit consumed by Wreathed Hornbill in Mount Ungaran is from family Lauraceae, Moraceae, Myristicaceae, Rutaceae, Myrtaceae, and Euphorbiaceae.

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