CHARACTERISTICS OF DUSKY MEGAPODE NESTING GROUNDS IN THE COASTAL AREA OF RUMBERPON ISLAND, WEST PAPUA, INDONESIA

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Introduction

There are 22 species of megapodes (Megapodiidae, Galliformes) that rely on external sources of heat to incubate their eggs, e.g. by burying the eggs in volcanic soils, in soils heated by the sun or in mounds of rotting leaves (Jones *et al.*, 1995). Fifteen species of megapode were found to occur in Indonesia (Argeloo and Dekker, 1996). *Megapodius freycinet* (Gaimard), known as Dusky scrubfowl (Sujatnika *et al.*, 1992) or Dusky megapode (Argeloo, 1997), is classified as an Indonesian endemic bird that is geographically distributed among the North Mollucas, New Guinea and its satellite islands (Rand and Gilliard, 1967; Sujatnika *et al.*, 1992).

Previous studies (Dekker, 1990; Argeloo, 1994; Dekker and McGowan, 1995) showed that the maleo (*Macrocephalon maleo*), one of the megapode species of Sulawesi, is threatened by loss of habitat, egg predation and hunting, and it is listed as vulnerable to extinction (Collar *et al.*, 1994). Threats to the maleo's nesting grounds around the coastal area have been affected by habitat degradation with a detrimental effect on the maleo population (Baker and Butchart, 2000).

Egg harvesting is another threat that occurs not only at easily accessible coastal nesting grounds close to human habitations, but also at remote sites (Argeloo, 1994), and there is no evidence that harvesting at traditionally managed sites is sustainable (Baker and Butchart, 2000). Other disturbances by humans (e.g. shooting, trapping and snaring) of maleos at or adjacent to nesting grounds were also reported as having serious consequences for the dwindling populations at the remaining active sites.

According to Heij (1997), the nesting grounds are generally near trees and bushes and the woods around the nesting ground are important to this bird as they mainly consist of trees bearing fruit, which can be consumed by the bird. Mountfort (1988) as cited by Shannaz *et al.* (1992) reported that the megapodes' nest appearance is unique and built from mounds.

Considering threats to the bird nesting areas such as agriculture development, secondary plant invasion, uncontrolled egg harvesting, and habitat loss (Shannaz *et al.*, 1992), it was decided to conduct observations of the nesting ground along the coastal area of Rumberpon islands, and identify the possible threats that may occur at the sites.

This paper concentrates on the nesting ground situation, referring to the criteria for assessment of conservation status of nesting grounds used by Dekker (1990) and Argeloo (1994), and it is hoped that the findings could later serve as baseline information for the megapode research in West Papua in the development of a future conservation program for this species.

Methods

The study was conducted on Rumberpon Island, Manokwari (134°8'-134°15'E, 01°44'-01°75'S). The study site was an approximately 18,000 ha upland tract in the northern part of Cenderawasih Bay. The mean annual rainfall is 2,648 mm, daily temperature is about 21.1-31.1°C and the humidity is 83%. The vegetation of the coastal area is comprised of various families such as Areceae, Fabaceae, Combretaceae and Rhizoporaceae, whereas Verbanaceae, Sapindaceae and

Malvaceae are found from the foothills up to the hills.

The methods included a series of activities starting with observation and measurement of some characteristics around the Dusky megapode's nesting ground. In addition, the local people familiar with the presence of this bird were interviewed about the nesting ground location and condition.

The fieldwork commenced with a comprehensive reconnaissance of the area with the aid of a map of the area. A vegetation analysis was carried out to determine the composition. The measured characteristics were height and diameter, the material composition, temperature and humidity around the nest. Visual observations were also carried out to assess the nesting appearance.

Results

1. Description of the nesting ground

Irian Jaya and its satellite islands have a variety of topographic conditions that are influenced by the equatorial climate and humidity. These conditions allow the wet tropical vegetation to grow easily in most parts of Irian Jaya. Around 70% of the vegetation covered a dry part of this island which supported an endemic bird in Irian Jaya. The area was dominated by mangroves which provided a habitat for sea-birds. From the sea line and stretching inland, sago and members of the Pandanaceae are grown. Other vegetation included *Malaeuca* sp., *Eucalyptus araucaria* and dipterocarps, which are known as a natural habitat of birds.

Field observations found that the vegetation growing around the nesting places were tree plants of the families Piperaceae, Malvaceae, Arecaceae, Fabaceae, Combretaceae and Rhizoporaceae. It was assumed that the vegetation provided a place for the birds to rest, play and forage. Atmawidjaja (1997) described that food sources such as fish, insects, worms and fruits required by the birds were sufficient around the nesting ground habitat.

According to Petocz (1987), the natural vegetation in the endemic bird area (EBA) was tropical rain forest dominated by *Pometia, Alstonia, Garcinia* and *Terminalia*. Heij's research (1997) noted that plants growing near the nesting ground of *E. wallacei* included grave-trees, "pohon Sambodja", *Plumeria acuminata* and fruit-bearing trees.

Temperature and humidity were influenced by the environmental conditions and vegetation around the nest. Like other regions in Papua province, the Rumberpon Islands have a wet tropical climate which does not register a significance difference between the dry and rainy seasons.

Sea areas with an open sand plain nesting ground could be easily reached by sunlight during the day time. Temperatures around the nesting ground ranged from 32-36°C with 60-65% humidity. Argeloo (1997) stated that 32-35°C was the optimum temperature for burying megapode eggs under ground. Heij (1995) as cited by Rompas (1997) quoted that *E. wallacei* laid their eggs in places with temperatures ranging from 31-35°C.

2. Nesting appearance

During the study period three new nests were found, approximately 60-100 m from the sea line. The nests were located on the sand surface, 1 m in height above sea level. The nest sizes are presented in Table 1

Table 1. Nest Sizes

No.	Diameter (m)	Height (m)
1.	6.0	0.5
2.	3.5	0.5
3.	4.5	1.5
Mean	4.6?5	0.8?1

Rand and Gilliard (1967) indicated that nesting mounds are frequently found in low open vegetation within 150 feet of the seacoast. They further described that nests are up to six feet in height with flattened tips (some are at least fifteen feet in diameter) and very broad bases (some reaching at least thirty feet).

Burnie (1992) reported that generally the bird nests are dish-shaped. In the current study it was observed that the Dusky megapode nests were shaped like a volcano. It is probable that this shape is useful in keeping the nest temperature stable in order to successfully incubate the bird eggs. Moreover, this shape helps to protect the eggs from predators due to the huge size of the eggs (48x43 mm).

Heij's research (1995) as cited by Rompas (1997) described that the egg of *Eulipoa wallacei* (one of Megapode family) had an average length of 78.1 mm, a diameter of 48.9 mm and weighed 101.7 grams. Visual observations and a material analysis were carried out after a random sample specimen of nesting material was taken. The composition is given in Table 2.

Table 2. The average composition of nesting materials

Material	Weight (gram)
Roots	0.28
Leafs	2.60
Oyster fragment	6.22
Chopping woods	63.35
Sand	180.81

Data showed that the nesting material was dominated by sand (180.81 g) and the smallest part was roots (0.28 g). This composition confirms that the nesting material is easily found around the site, with sand the dominant component, possibly because it can easily be formed into a volcano shape to provide an alternative source of heat for hatching the eggs. Other materials in small parts added to the heat source through the decomposition process.

According to Petocz (1987), the Megapode family build their nests from heaps of sand and litter. Jones, *et al.*, (1995) described that the eggs are put in the sandy places near the beach and are not incubated by the birds.

Conclusion

The nesting location was on the sand surface, 1 m above sea level. The dominant vegetation around the nesting ground was comprised of *Piperaceae, Malvaceae, Arecaceae, Fabaceae, Combretaceae* and *Rhizoporaceae*. The ambient temperature around the nest ranged between 23-26°C with 55-65% humidity.

Measurements were taken of three new nests and it was found that the nests were constructed approximately 60-100 m from the sea line, 0.5-1.5 m in height, and 3.5-6 m in diameter. Nests were formed into a volcano shape and composed of roots, leaves, oyster fragments, chopped wood and sand.

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