

THE BEHAVIOUR OF THE MOLLUCAN MEGAPODE, *EULIPOA WALLACEI* (AVES: MEGAPODIDAE) IN NESTING GROUNDS

by

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ABSTRACT

The moluccan megapode, *Eulipoa wallacei* is the only hole digging megapode in the island of Haruku. The birds lay eggs in a communal nesting ground exposed to the heat of the sun. The eggs collected between 1987 and 1995 showed an increase in number. The factors influencing the increase in number were not fully known, but it seems the social economic activities of the local peoples influenced the intensity of searching the eggs. There were also differences in number of eggs collected in wet and dry season.

The birds lay eggs at the depth of 60-90 cm in soil, the average eggs length 78.1 mm, average width 48.9 mm. The average soil temperature 27° - 35°C. The eggs in the incubation boxes resulted in 92.7% hatchlings, average incubation time 74.2 days, and the hatchlings found on the soil surface have an average weight of 57 gr. The behaviour of the bird in detail is indicated.

INTRODUCTION

Jacobs (1974) wrote that on January 4th, 1576, the priest Nicolau Nunes was wondering about the behaviour of the hatchlings of about a bush hen which digs a hole in the ground and laid an egg in it and filled it up, and remarked that the eggs as well as the birds were very tasty. In 1860, Gray made a description of the Megapode collected by Wallace in 1858 on the island of Halmahera, later named as *Eulipoa wallacei*, but the sex of the holotype was not mentioned. After his travel through the Moluccas; Martin (1894) reported two breeding places of *Eulipoa wallacei*, i.e. Tanjung Maleo on the island of Haruku and the small island named Kasa in the Bay of Piru, west of Ceram. De Wiljes-Hissink (1953) also reported two big nesting grounds on the island of Haruku and Meiti (north-east of Halmahera). Since then there has been not any report about the breeding behaviour of this species, until Dekker (1991) rediscovered the breeding place on Haruku.

The Moluccan (Wallace) Megapode, *Eulipoa wallacei*, is the only hole-digging Megapode which lays its eggs on communal nesting grounds exposed to the heat of the sun. But there has been little known about this vulnerable species (Collar et al., 1994), it is necessary to study this bird.

From June 1994 - June 1995, 100 years after Martin, Heij studied the breeding behaviour of the species on their nesting grounds in Kailolo, as well as the incubation time and the abiotic influences on breeding behaviour. The way of collecting of eggs by the locals of Kailolo and the accompanying rituals were also studied. Recommendations to protect and reintroduce the species are also subject of the study (Heij in prep). The present studies were made on the behaviour on the nesting grounds, the incubation of the eggs and the hatchlings. Other nesting grounds on the Moluccas were also observed. Anthropological aspects of the species for the village communities were studied. Further educational and conservation aspects of the survival of the species were described.

STUDY SITES

The island of Haruku, Ambon, Saparua and Nusa Laut (Figure 1) belong to the Lesser Sunda islands. The islands is located in the Banda Sea between 128°24' and 128°32' eastern longitude and between 3°30' and 3°35' southern latitude (de Graaff, 1918). The island measured 4,200 km² and possess twelve small villages (desa). Desa Kailolo is a short hop from Ambon and can be reached only by boat. Near Kailolo there is a cape, called Tanjung Maleo, with sun-drenched beaches. Connecting the beach there is a small forest with four sandy plains behind the forest. On these sites the birds dig their holes and lay their eggs. The sites are bordered on the landside by an islamic burial place. It is forbidden by the Adat to cut wood in the surrounding forest.

METHODS

Most time of the period between June 1994 and June 1995 was spent on the nesting sites of Kailolo to collect data. Night observations (i.e. 25 observations, from 21.00-06.00 hrs) were also carried out to collect data. Further we did field experiments with eggs in incubation boxes. We also measured temperature data on different depths of holes. The weight of eggs and hatchings were noted and other nesting grounds known from the literature were visited. Every year after the muslim fasting and the beginning of the wet season on 31st March there is an auction on which the highest bidder may collect the eggs between 1st April till 31st March. About 75% of the price is given to the mosque and 25% is for the village-council. Because I was living in the house of the lease holder who became the source of all information I need and after some months other lease holders gave me their harvest results of the years 1987-1994.

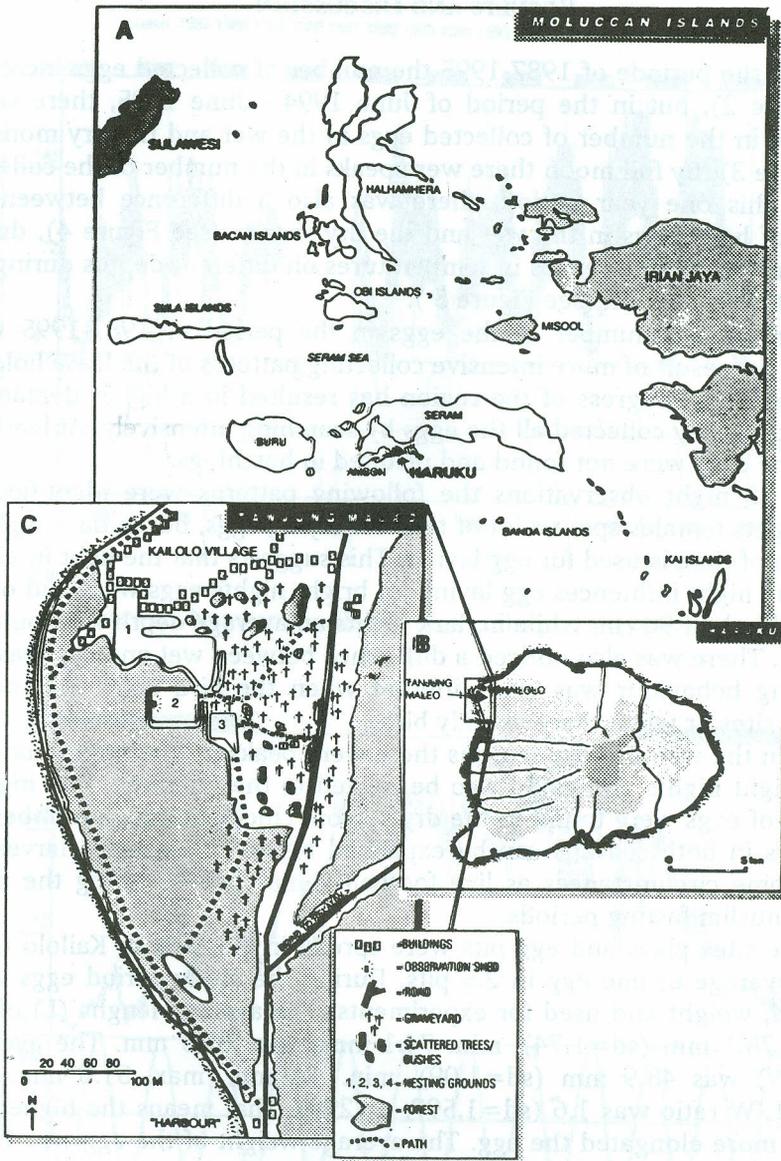


Figure 1. Map of the study area: A, the Moluccan Islands and the bordering islands of Sulawesi, Misool and western Irian Jaya (Indonesia) with the location of Haruku Island; B, Haruku Island with the location of Kailolo village and Tanjung Maleo; C, Tanjung Maleo (the main study area) with the location of the nesting grounds (map graphics: Jaap van Leeuwen Design)

RESULTS AND DISCUSSION

During the periode of 1987-1995 the number of collected eggs increased (see Figure 2), but in the period of June 1994 - June 1995, there was a difference in the number of collected eggs in the wet and the dry monsoon (see Figure 3). By full moon there were peaks in the number of the collected eggs. In this one year period, there was also a difference between the number of hatchlings in the wet and the dry season (see Figure 4), during which there were differences in temperatures on different depths during the wet and the dry season (see Figure 5).

The increasing number of the eggs in the period of 1987-1995 were probably the result of more intensive collecting patterns of the lease holders. The economical progress of the region has resulted in a higher demand of eggs, so that they collected all the eggs by searching intensively. At least 10-15% of the eggs were not found and resulted in hatchlings.

From 25 night observations the following patterns were identified. In bright nights females spent a lot of time for laying eggs, but in dark nights a minimum of time is used for egg laying. This suggests that the light intensity during the night influences egg laying. In bright nights eggs were laid on an average depth of 90 cm, while in dark nights an average depth was found to be 60 cm. There was also noticed a difference between wet and dry seasons. The laying behaviour was also different when the bird arrived alone on breeding sites or when there already birds.

Even in the wet and dry seasons there were peaks in the number of eggs in the bright nights and could also be related to the fullmoon. The highest numbers of eggs were found in the dry seasons. Incidental high numbers of hatchlings in both seasons can be explained by less intensively harvesting due to some circumstances as live football games on TV during the night and the muslim fasting periods.

On the sites plays and egg pits were spread in clusters. In Kailolo there was an average of one egg in 2.5 pits. During the study period eggs were measured, weight and used for experiments. The average lengths (L) of the egg was 78.1 mm (sd=1.74), min. 74.1 mm, max. 85.5 mm. The average width (W) was 48,9 mm (sd=1.09), min. 42.0mm, max. 51.8 mm. The average L/W ratio was 1.6 (sd=1.597, n=299). That means the higher the L/W the more elongated the egg. The average weight of the egg was 101,7 gr, min. 59.0 gr, max. 124 gr. (sd=2.55; n=433). During the wet monsoon the average weight of the eggs was 103.6 gr., min. 86 gr, max. 120 gr. (n=130). In the dry monsoon the average weight was 109 gr, min. 59 gr, max. 124 gr. (n=303).

During the dry and wet seasons the average temperature was between 40 cm and 80 cm swings from 27° - 35°C during 24 hours. During the wet seasons

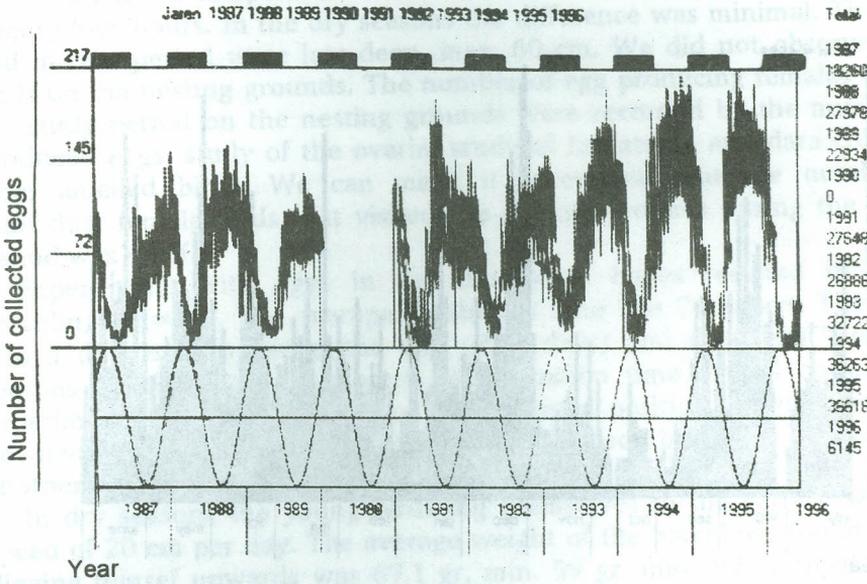


Figure 2. Number of collected eggs in the period 1987 - 1995.

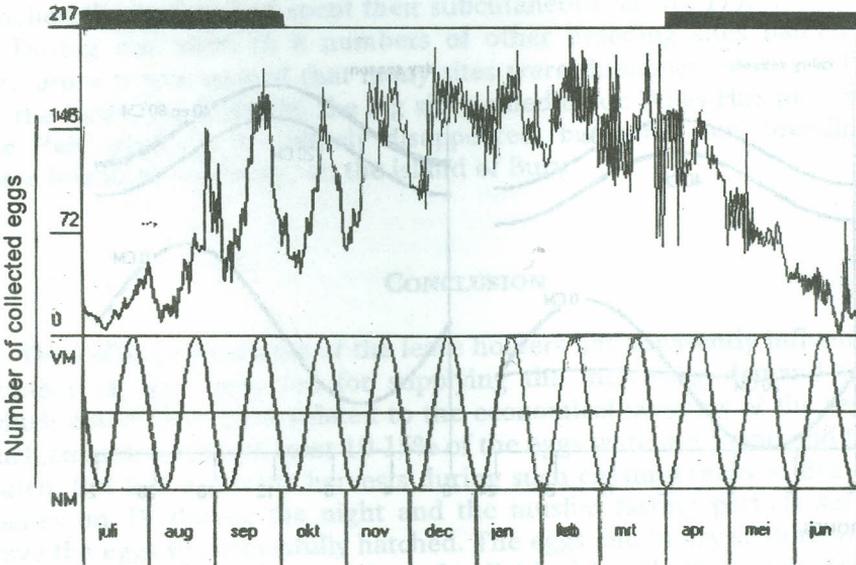


Figure 3. Number of collected eggs in the period of June 1994 and June 1995.

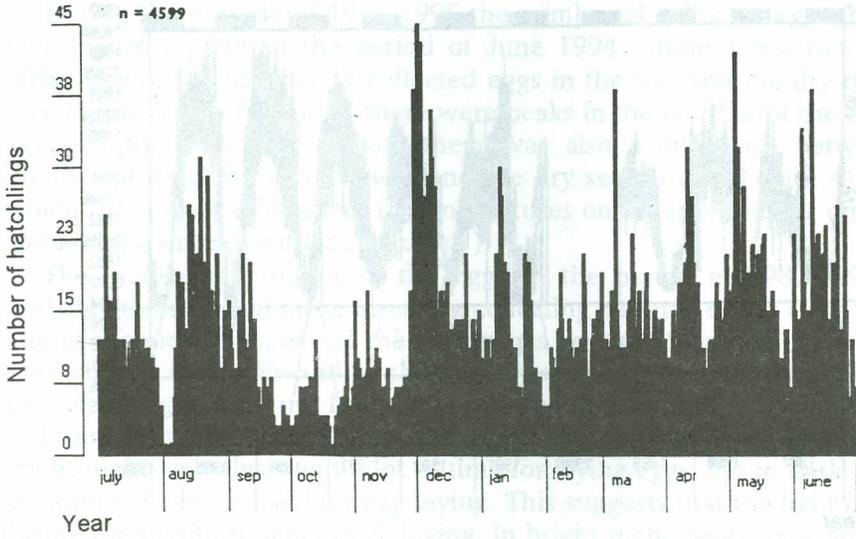


Figure 4. Number of hatchlings in the period of June 1994 until June 1995.

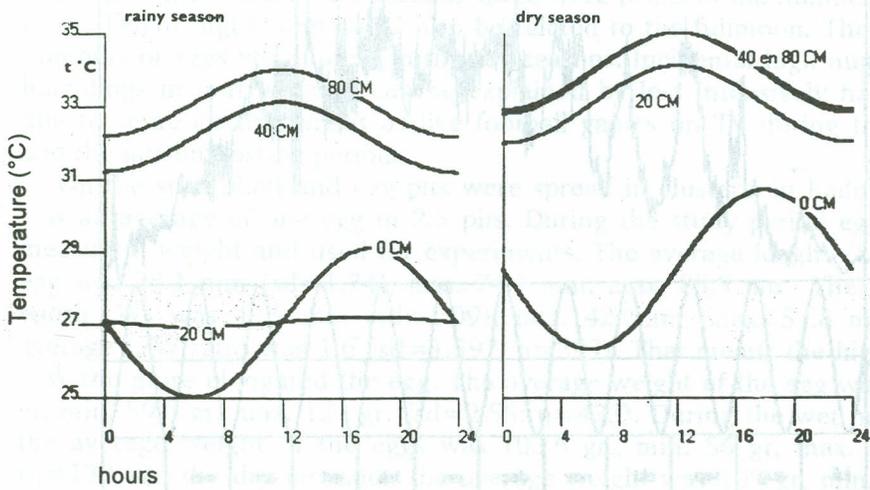


Figure 5. Soil temperatures an different depth during the wet and the dry season.

the difference of temperature between 20 and 80 cm was about 7°C within twenty-four hours. In the dry seasons the difference was minimal. The eggs laid in that period were less deep, max. 60 cm. We did not observe male birds on the nesting grounds. The number of egg producing females during the study period on the nesting grounds were recorded by the number of produced eggs, study of the ovaria, study of literatures and data collected from labelled birds. We can make it acceptable that the number of individual female birds that visited the nesting grounds during the study-period was 4,000.

Experiments with eggs in the incubation boxes resulted in 92.7% hatchlings (n=68). The average incubation time was 74.2 days. There was also a difference between the wet (73.2 days) and the dry (79.6 days) seasons (n=63). Five eggs hatch in incubation time of 164 days. In six experiments eggs were re-buried in horizontal position or with the blunt downwards. These eggs hatched in 90.9%. Already bred eggs re-buried on another place hatched in 72.6% (n=202).

In dry seasons the young birds dig themselves to the surface with the speed of 20 cm per day. The average weight of the hatchlings found during digging himself upwards was 69.1 gr, min. 59 gr. max. 92 gr (n=15). The hatchling which we found on the surface have an average weight of 57 gr, min. 48 gr, max. 79 gr (n=35). By section on hatchlings in the laboratory of the Natural History Museum of Rotterdam we found that hatchling who had reached the surface had spent their subcutaneous fat (n=17).

During our visits to a numbers of other breeding sites named in the litterature it was proved that many sites were dissappeared or hardly used by the birds. For example, the big site named by de Wijes-Hissink (1953) on the Heiti island is completely disappeared, but some new breeding sites were found, for example, on the island of Buru.

CONCLUSION

The collecting patterns of the lease holders has apparently influenced the number of eggs collected for supplying the increasing demand for eggs which could have been related to the economical progress of the region. In such circumstances, at least 10-15% of the eggs were not found and failed to hatch. But less intensive harvests during such circumstances as live football games on TV during the night and the muslim fasting periods seemed to have the eggs to successfully hatched. The eggs laid in dry seasons were less deep (max. 60 cm). The number of individual female birds that visited the nesting grounds during the study-period were accounted to 4,000 individuals.

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