

FIRST RECORD OF NICOBAR PIGEON (*Caloenas nicobarica*) IN PULAU TINGGI, JOHOR, MALAYSIA

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Submitted final draft: 15 February 2022 Accepted: 6 April 2022

<http://doi.org/10.46754/jssm.2022.11.010>

Abstract: Being surrounded by many islands, Malaysia is blessed as it may own an endemic, endangered and migratory species in its islands. Pulau Tinggi is one of the islands located in Southeast Peninsular Malaysia. It is one of the biggest islands in Johor, Malaysia. However, the avifauna has not yet been documented in Pulau Tinggi. This paper discusses the first record of the Nicobar Pigeon (*Caloenas nicobarica*) in Pulau Tinggi, Johor, Malaysia. Nicobar pigeons were recorded in camera traps installed around the island from June to October 2019. Besides the Nicobar pigeon, our camera traps also recorded another five avian species, which are the Emerald dove (*Chalcophaps indica*), White-rumped shama (*Copsychus malabaricus*), Changeable hawk-eagle (*Nisaetus cirrhatus*), White-bellied sea eagle (*Haliaeetus leucogaster*) and Grey-headed fish-eagle (*Ichthyophaga ichthyaeetus*). The record of the Nicobar pigeon is exceptional as this species is restricted to small islands and absent from the mainland. It has unique behaviour and enticing morphology. This species is globally threatened and has recently been declared an endangered species. Nicobar pigeon's discovery proved a high potential to develop ecotourism or a key site for avian conservation in Pulau Tinggi.

Keywords: Camera trap, Nicobar Pigeon, Pulau Tinggi, Johor.

Introduction

The Nicobar pigeon (*Caloenas nicobarica*) captured on a camera trap was the first recorded in Pulau Tinggi, Johor. It is classified as the extinct dodo-bird family and listed as near-threatened species on IUCN red list (BirdLife International 2016). In 2018, it was declared an endangered species (Ijaz Rashid, 2018). Its large size and tricolour feathers are unique: Blue, green and red. It has long hackles and whitetail cover with black tail feathers, long wings and long legs (Goodwin, 1983), its body length is estimated at 41 cm (Ali & Ripley, 1969). They have a greyish body covered with metallic blue-green and copper-bronze feathers, purple or purple-red legs, and claws with yellow or light brown (Goodwin, 1983). The morphology of the male and female species is almost undifferentiated.

In females, the colour is darker, hackles are shorter and smaller cere (Ali & Ripley, 1969). The juvenile is nearly identical to the females and they have no neck hackles in the immature stage and bronze-green tails.

Islands sustain around 19% of avian species on Earth (Bernie, 2015). Small population size and smaller ranges in island biodiversity possess a higher risk of extinction than the mainland (MacArthur & Wilson, 1967) due to the less genetic diversity (Frankham, 1997), less behavioural (Blumstein & Daniel, 2005), limited life history (Köhler & Moyà-Solà, 2009) and morphological (Bowen & Vuren, 1997) defences against human harm and non-native predators (Terborgh *et al.*, 2001). The Nicobar pigeon is only active on a certain island. It prefers dense forests below 500 m from sea level, forages on

the forest floor and nesting on trees in its habitat range. During nesting season, it breeds on the smaller island and forages on larger islands. It moves between the nesting and feeding islands, these two islands are usually close (Gibbs *et al.*, 2001; Pratt & Beehler, 2015). During the non-nesting season, it inhabits larger islands that contain a large number of fruiting trees. Both males and females build the nest together. They forage on fallen fruit or invertebrates they find on the forest floor. Its gizzard with thick muscular walls allows it to feed on hard seeds and nuts (Gibbs *et al.*, 2001). Nicobar Pigeon forms solitary or small groups of two to three birds when searching for food. They flock up to 30 birds when moving to other islands (Gibbs *et al.*, 2001). Most of the time, they forage on the forest ground. They roost and nest on trees of 2 m to 12 m in height (Gibbs *et al.*, 2001). They prefer thick coastal forests and breed on tiny uninhabited islands.

Nicobar pigeon can be found in Small forested islands from the Andamans and Nicobars in the Indian Ocean east throughout the Indonesian Archipelago and the Philippines to New Guinea and the Solomons in the western Pacific (Jeyarajasingam & Pearson, 2012). This species is found in the Indonesian Gampong Baro village and the Con Dao Islands (Hung, 2009). In Malaysia, the Nicobar pigeon inhabits Perhentian Besar Island (Gertrude David *et al.*, 2016), Sipadan Island (Lambert, 1993) and Mantanani Island (Mojiol & Yongoi, 2019). This species was threatened as its population declined due to its range. It is marked as a rare species on Bornean offshore islands mainly because fewer support forests. However, it may be common in its habitat range on the mainland of large islands and a few smaller islands in the Indonesian archipelago (Lambert, 1993). Malaysia possesses two separate territories, which are Peninsular Malaysia and Malaysia Borneo. The geographical condition and tropical environment are the main factors of the rich bird diversity. Malaysia's high diversity of bird species makes this country one of the hotspots for avitourism.

According to the deputy director-general of Tourism Malaysia, around 12,000 spots in 218 countries, Malaysia have been named an Important Bird Area (IBA) (Zulkifly Md Said, 2019). Malaysia is one of the listed countries as the locations and diversity of bird species have conservation value.

There are 795 species of bird in Malaysia. Bird watching and bird photography in avitourism is the main attraction for tourist visitation. Malaysia is recognized as one of 12 mega biodiversity countries and the beauty of nature increases the potential to promote ecotourism (Tourism Malaysia, 2015). Ecotourism is a nature-based activity that includes avitourism. Avitourism is one of the subsets of ecotourism. It is also called bird watching or birding tourism (Biggs *et al.*, 2011). It can be defined as a tourist carrying out an activity away from their usual place and travelling to a different place to view birds in their natural habitat assisted by a binocular (Nicolaidis, 2014). Avitourism was getting popular in Malaysia, increasing the economic level (Gertrude David *et al.*, 2017). However, there was limited research on avitourism. In the 1950s, there was a survey of seabirds in the Seribuat Archipelago islands; thus, the following research was conducted almost after 70 years in 2019 (Bryan, 2019).

Materials and Methods

62 different islands form the Seribuat Archipelago. It is situated in the southern part of the South China Sea (Grismer *et al.*, 2006) along the Pahang and Johor mainland on the southeast coast of Peninsular Malaysia (Figure 1). The size of the islands is between 0.01 to 110 km² and expands from the north of Pulau Cebeh until 50 km to the south in Pulau Tokong Yu. The southern section of this archipelago extends from Pulau Tinggi Marine Park south to Pulau Tokong Yu. The area contains several important seabird habitats, including islands, outcrops and rich open waters for foraging. Pulau Tinggi was located in the middle part of the archipelago.

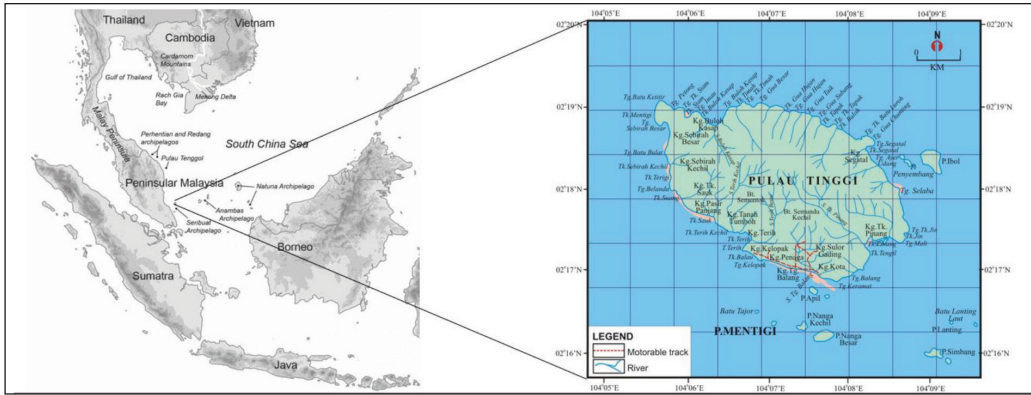


Figure 1: Map of Gunung Semudu Pulau Tinggi: (a) Pulau Tinggi is located in the middle arc of the Seri buai archipelago, (b) The location of Gunung Semudu

Source: Mersing Islands Johor National Park, <http://mersingislandsjohornatonalpark.blogspot.com/2011/11/map-for-6-cluster-of-mersing-islands.html>

The forest zone OF Pulau Tinggi comprises tropical rainforests dominated by dipterocarp trees. The lower forest edge includes degraded secondary forest and abandoned plantation land. As the elevation increases, one can find primary forest filled with tall vegetation reaching up to 30 m or more in height and contains typical primary forest species mainly from the family Dipterocarpaceae and Myristicaceae. A total of ten camera traps were randomly placed in Gunung Semudu from June 2019 until October 2019 throughout the waterfall area, which mainly aims to record the mammal species. Remotely triggered infrared camera trap, Reconyx HyperFire HC500 model was used. The camera trap automatically recorded the picture’s information such as the date, time and location. The images were used for identification and the behaviour of the fauna was recorded as well. The bird was identified following Jeyarajasingam and Pearson (2012).

Results and Discussion

A total of six avian species were recorded from the camera traps that were placed in the waterfall area of Pulau Tinggi from June to October 2019. They are the Emerald dove (*Chalcophaps indica*), White-rumped shama (*Copsychus malabaricus*), Changeable hawk-eagle

(*Nisaetus cirrhatus*), White-bellied sea eagle (*Haliaeetus leucogaster*), Grey-headed fish-eagle (*Ichthyophaga ichthyaeetus*) and Nicobar Pigeon (*Caloenas nicobarica*). Nicobar pigeon was an important finding in this survey. They were captured by a camera trap in September when the weather was turning from dry to wet season before the monsoon. In Figure 2 (right), three individual species were captured in one camera with a total of 20 captured pictures. Nicobar pigeons were photographed foraging in groups on Mount Semudu. The picture of the Nicobar pigeon was captured on 22 September 2019, 1400 h.



Figure 2: Nicobar pigeon (*Caloenas nicobarica*)

Based on a previous report, a Nicobar pigeon was found in Peninsular Malaysia. Pulau Perhentian has been a habitat area for this species. It was reported as a resident bird on Perhentian Besar Island (Gertrude *et al.*, 2016). In Sabah, five individuals have been observed on Sipadan Island (Lambert, 1993). Sipadan was a reserved area in 1933 for a bird sanctuary to protect the migratory Nicobar pigeons (James, 2006). One individual has been observed in Borneo, Mantanani Island (Mojiol & Yongoi, 2019). In Southeast Asia, one individual was spotted in the mangroves at Gampong Baro village, Mesjid Raya district, Aceh Besar Regency. This species is only active in small islands and is absent from mainland sites in Sumatra, Java and Malaysia (Bartels, 1964; van Marle & Voous, 1988; Wells, 1999). In Vietnam, the Con Dao Islands are the only place where the Nicobar pigeon has been recorded, even though none of the previous records of this species existed for over half a century (Hung, 2009).

This study has shown that there is still a considerable knowledge gap that needs to be filled by conducting research in Pulau Tinggi. Previous research only focused on herpetofauna (Escobar *et al.*, 2003; Grismer, 2006; Grismer, 2011), Urothoe (Azman *et al.*, 2008), plant (Turner *et al.*, 1997), Dugong (Louisa *et al.*, 2015) and seagrass (Jillian, 2011). Pulau Tinggi is home to several rare species, including *C. nicobarica* and conservation was urged to protect the biodiversity on the island as climate change affects the species that inhabit the coastal forest (Sacatelli, Lathrop & Kaplan, 2020). The number of individual species decreased due to deforestation and poaching (Putra, Murhun & Bashari, 2021). Ex-situ conservation is needed to protect this species and its genus in the future (Singh, 2018). There is an immediate urge to conserve the marine and terrestrial ecosystems while planning and developing the island, as this archipelago is a tourist destination in Malaysia. An additional survey is required during the peak breeding season to determine avian species diversity (Abdulmaula, 2018). The presence of the Nicobar pigeon in Pulau Tinggi indicates that Pulau Tinggi is still unthreatened with the

rapid development, making it a favourable area for this species to live.

Education and awareness of the Nicobar pigeon should be considered in the resort's development as Pulau Tinggi is a tourist place within the Seribu archipelago. The enforcement of the Environmental Quality Act (EQA) and Wildlife Conservation Act (2010) should be tightened to protect the forest and threatened species, especially Nicobar Pigeon. The development pressure might endanger the population of Nicobar pigeons as Pulau Tinggi is a developing tourist destination. Conservation action must be taken because it is listed as endangered species on IUCN red list (Ijaz Rashid, 2018). The Nicobar pigeon's enticing morphology and behaviour were found to have the potential to develop as a tourism product. Ecotourism is the activity of tourism that involves nature. Good ecotourism can increase the effectiveness of conservation efforts. Ecotourism provides job opportunities and generates income for the local community (Khatijah *et al.*, 2018). Ecotourism is a nature-based activity that includes avitourism. Avitourism is one of the subsets of ecotourism. It is also called bird watching or birding tourism (Biggs *et al.*, 2011). It can be defined as a tourist carrying out an activity away from their usual place and travelling to a different place to view birds in their natural habitat assisted by a binocular (Nicolaidis, 2014).

Ecotourism classrooms and bird-watching are highly recommended to introduce tourism products and train local people to become green guides using the proper guidelines. Most birdwatchers are educational and economically prosperous (Nicolaidis, 2013). The development of avitourism would bring economic benefits to locals. Nicobar Pigeon is an outstanding tourism product. It has immense potential to be developed as an avitourism product. The first record of the Nicobar pigeon in Pulau Tinggi contributes significant information to stakeholders to focus on this species to develop as ecotourism. The chance of seeing them is low but their vocal can be frequently heard.

It is described as a silent species but in Pulau Tinggi, their cooing voice is usually heard when tourists go hiking in Gunung Semudu. A further breeding season study is needed to understand this species' peak appearance in Pulau Tinggi. Therefore, tourists can estimate visitation time to increase the chance of seeing. The condition of the forest of Pulau Tinggi, located away from urban areas, makes it has less disturbance and is rich with avian diversity. It sustains low tourism impact in the thick forest of this highly protected island. The Nicobar pigeon in Pulau Tinggi is worth developing as a breeding centre for conservation, education, breeding, tourism, research and future use.

Conclusion

A Nicobar pigeon, *Caloenas nicobarica*, has been recorded for the first time in Pulau Tinggi, Johor, Malaysia. Further research on the behavioural and breeding of Nicobar pigeons is crucial to understand the habitat used and conservation of this species fully. In addition, the Nicobar pigeon's enticing behaviour and enchanting morphology can be bonus criteria to boost the avitourism in Pulau Tinggi. Besides improving local people's economy, avitourism also be a tool for conservation purposes for avifauna species in Pulau Tinggi, Johor.

Acknowledgements

This project is funded by the Ministry of Higher Education Malaysia (MOHE) under the Malaysian Technical University Network (MTUN) grant scheme Vote K121 and Industrial Grant, by Shaz Resort Sdn. Bhd. (UTHM-SHAZ-M004), both grants awarded to Associate Professor Ts. Dr. Muhammad Abdul Latiff Abu Bakar (UTHM) as the Principal Researcher. This research was supported by GPPS-UTHM-2018-H288 postgraduate grant from Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia. We are grateful to Dato' Abdul Kadir Abu Hashim, Director General of the Department of Wildlife and National Parks, provided us with the necessary facilities and assistance. This research was conducted under a research permit

(JPHL & TN (IP): 600-6/1/4 (03)/M-00351-15-19). We are deeply indebted to the Department of Wildlife and National Parks Malaysia for granting permission to carry out this research. The authors acknowledge the Ministry of Higher Education Malaysia, Universiti Tun Hussein Onn Malaysia and Shaz Resort Sdn. Bhd. for providing the necessary funding, facilities and assistance.

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