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SHORT COMMUNICATION

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SUNDA PANGOLIN *MANIS JAVANICA* (MAMMALIA: PHOLIDOTA: MANIDAE) OF GAYA ISLAND, SABAH

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Abstract: The Sunda Pangolin *Manis javanica* is naturally present in Gaya Island, Sabah, but its population status is largely unknown. Results from a recent survey using camera traps indicated the presence of a few individuals, who were strictly nocturnal. There is a strong indication that the population in Gaya Island is in danger of local extinction. There is also an urgent need to conduct an in-depth study to gather scientific information for further conservation action.

Keywords: Camera trap, Gaya Island, North Borneo, population, Sunda Pangolin.

The Sunda Pangolin *Manis javanica* (Pholidota) is one of eight extant species of pangolins, with a home range in Southeast Asia (Lim & Ng 2008; Phillipps & Phillipps 2016). All pangolin species have recently been classified from schedule II to schedule I in CITES, as they have become Critically Endangered due to poaching and international illegal trade (CITES 2017), including the Sunda Pangolin (Phillipps & Phillipps 2016). Payne et al. (1985) reported that the Sunda Pangolin can be found

in the mainland and throughout the islands of Borneo. Phillipps & Phillipps (2016) reported that Sunda Pangolin population in Sabah is on the verge of extinction due to poaching. The status of the Sunda Pangolin population of Gaya Island is still largely unknown. This paper documents the presence of the Sunda Pangolin on Gaya Island and describes their activity patterns based on the results of a recent camera trap survey.

MATERIALS AND METHODS

Study area

Gaya Island is 1,465ha in size, and more than three quarters falls under the jurisdiction of Sabah Parks (Figure 1), one of the five islands gazetted as the Tunku Abdul Rahman Marine Park. Gaya Island is a 15 minute boat ride from the Capital of Sabah, Kota Kinabalu City. It is well known as a tourist destination for its beautiful beach, marine life and water activities such as scuba diving and snorkelling. Terrestrial habitat on this island

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Competing interests: The authors declare no competing interests.

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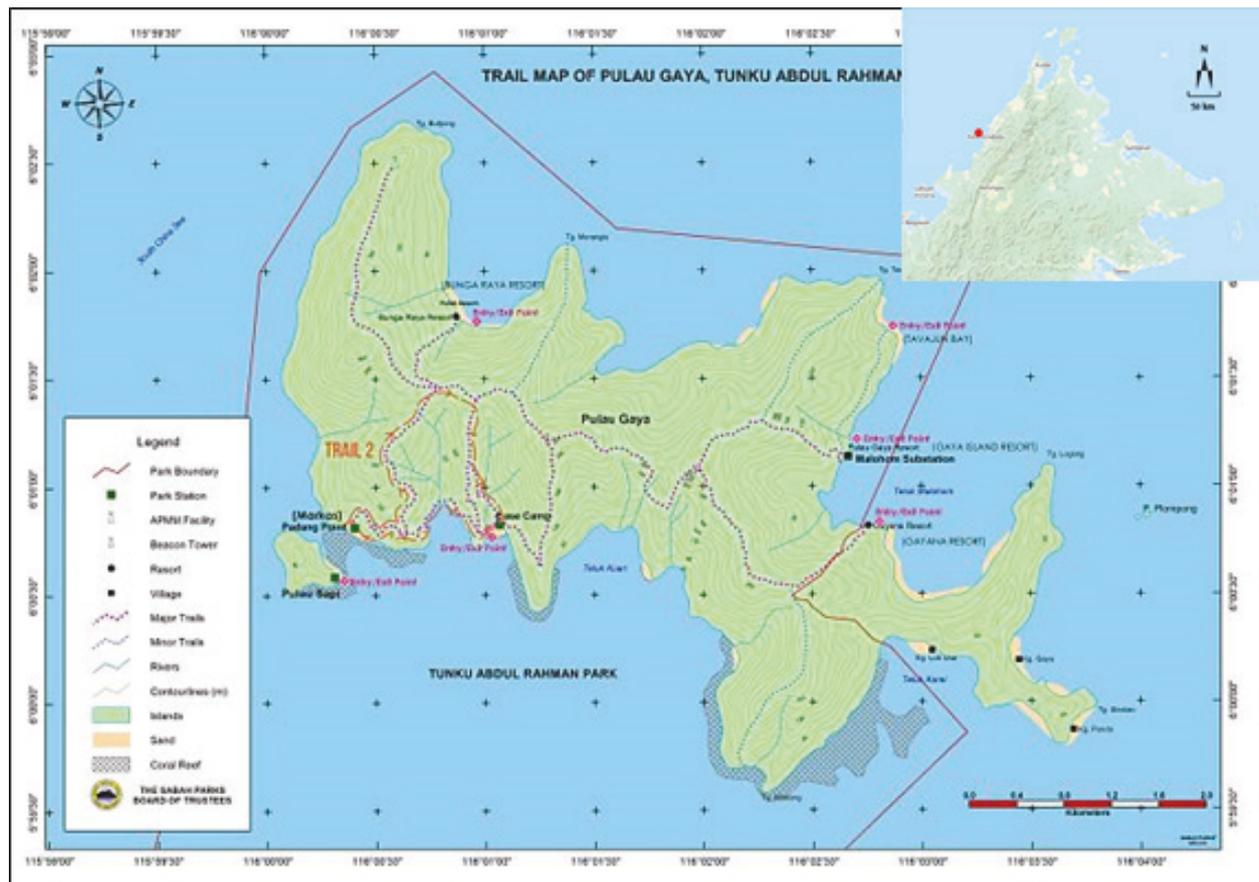


Figure 1. The National Park Boundary in Gaya Island in Sabah, East Malaysia (Sabah Parks 2013).

consists of primary forest and a small patch of mangrove (Said 2008).

Data collection

Ten Bushnell trophy Aggressor Brown (Model #119776) camera traps were deployed for a survey from 01 September 2016 to 30 June 2017. Camera traps were borrowed from Sabah Parks under the Research Unit. The camera traps were installed according to the techniques recommended by Acrenaz et al. (2012). In order to effectively survey pangolin, camera traps were frequently shifted to new locations. A total of 69 camera-trapping stations were established to cover most of the park area. The number of trapping days for each station varied from 22 to 109 days, with an average of 36.9 (SD=19.6) days. A total of 2,545 trapping days were undertaken by all stations.

Nine images of Sunda Pangolin were recorded during the 2,545 trapping days. The earliest image was recorded a day after the installation of the camera trap. The encounter rate was calculated using the number of images recorded per 1,000 camera working hours (the

Occurrence Index, OI-value; Pei & Chiang 2004). Sunda Pangolin encounter rate in Gaya Island was 0.147 for this survey. They were strictly nocturnal, and all the images were recorded between 8.21 night to 2.22 past midnight (Table 1).

All nine images of Sunda Pangolin are shown in Figure 2. Good images of a pangolin that was probably searching for food at the decomposing large tree trunk were successfully recorded (Figure 2A and 2G). Figure 2.B shows an individual near a large tree that has a burrow at its base. The third image captured a single Sunda Pangolin walking towards the base of a large tree with a protruding large root (Figure 2C). The fourth image recorded an individual Sunda Pangolin that was coming out from a burrow at the base of a large tree (Figure 2D).

The locations of the Sunda Pangolin images that were recorded during the survey were scattered within an area approximately 310ha in size (Figure 3). The pangolins were distributed almost throughout the whole park area.

This study conclusively shows that a Sunda Pangolin

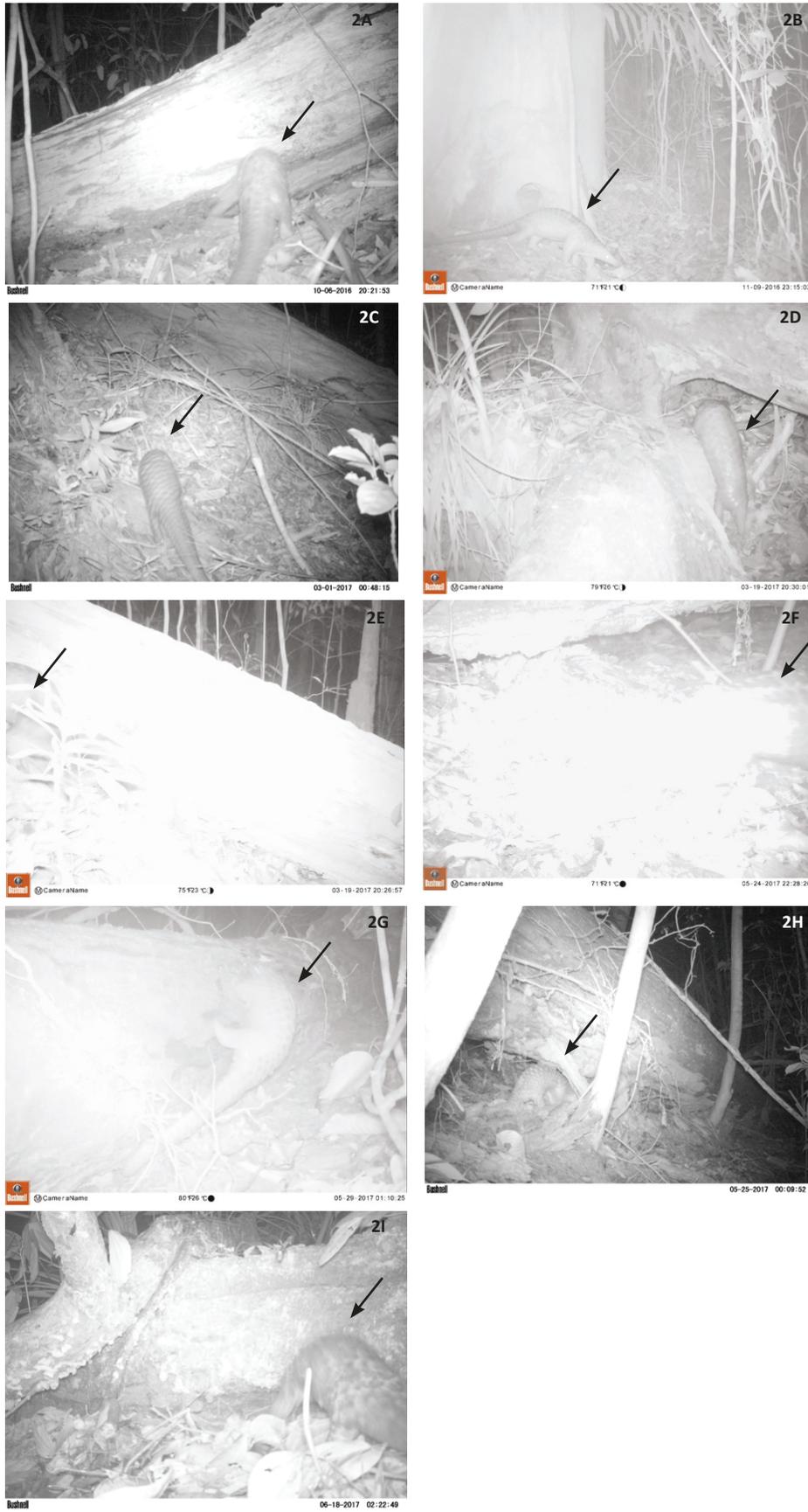


Figure 2. Nine images of Sunda Pangolin that were recorded during the survey.

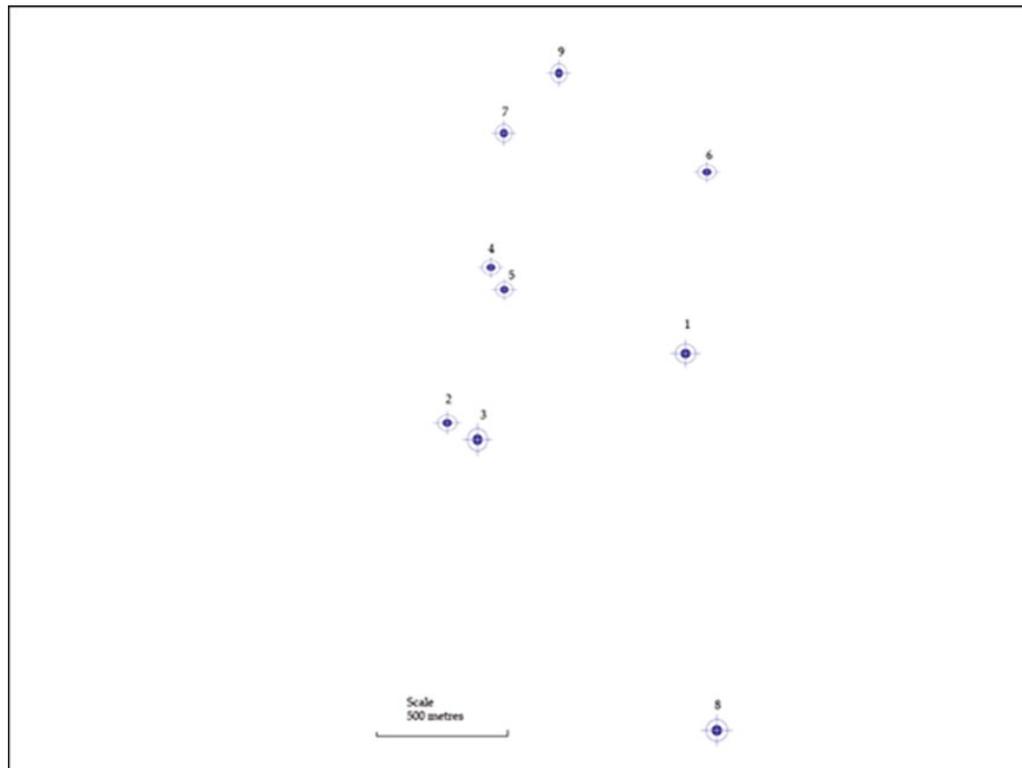


Figure 3. The planimetric locations of Sunda pangolins recorded during the six months surveys.

population still exists in most parts of Gaya Island. According to one of the Sabah Park staff stationed at Gaya Island, a decade ago Sunda Pangolins were commonly seen walking around at night within the staff quarters compound (Victor Siam pers. comm. 17 October 2016). Nowadays, they can no longer be sighted that way, indicating a reduced population of Sunda Pangolin. Although its encounter rate (OI-value) was higher than that of the Formosan Pangolin (*M. pentadactyla pentadactyla*) in Taiwan, 0.147 versus 0.016-0.078 in Alishan area (Pei & Weng 2017), it was similar to the low density site of 0.179 in northern Coastal Mountain Range (Kurtis Jai-Chyi Pei unpub. data). The IO-value for high density area (12.8/100ha) in Eastern Taiwan was 0.38 (Pei 2010). The body weight of the Sunda Pangolin (up to 10kg) is larger than that of the Formosan Pangolin (up to 6kg), therefore more resources are required. The number of pangolins in Gaya Island park area might be present in a small population if there is 300-350 ha pangolin habitat on the island. A requirement for proper conservation action is indicated.

The Gaya Island Sunda Pangolins were strictly nocturnal, with most activity concentrated in the first two-thirds of the evening/night. This observation is consistent with Payne et al. (1985); Phillipps & Phillipps

Table 1. Sunda Pangolin data from camera trap survey.

Camera No.	Date of pangolin image that was recorded	Time capture (hrs)	Trapping days	Days to the pangolin image taken
1	6 October, 2016	08.21	35	11
2	9 November, 2016	23.15	109	9
3	1 March, 2017	00.48	29	11
4	19 March, 2017	08.30	24	1
5	19 March, 2017	08.26	24	1
6	29 May, 2017	01.10	31	11
7	25 May, 2017	00.09	30	7
8	18 June, 2017	02.22	30	30
9	24 May, 2017	22.28	30	7

(2016). However, Lim & Ng (2008) reported that a female Sunda Pangolin that they studied in Singapore had peak activity between 03.00h and 06.00h.

All of the Sunda Pangolin images taken during this survey were of animals near large trees. Their survival is closely associated with large trees that have hole/burrow at their root, which provide refuges (Bhandari & Chalise 2014; Wu et al. 2004). Decomposing trees are also important sources of food in the form of ants and

termites that make up the pangolins entire diet, making them important regulators of insect populations in forest ecosystems (Li et al. 2011; Mohapatra & Panda 2014).

Sabah Parks do not have a comprehensive data on the presence of Sunda Pangolins on all of the islands in Sabah. To date, Gaya Island is the only island in the west coast of Sabah known to have Sunda Pangolin, although pangolins have also been reported on the Banggi Island. However, the villagers in Banggi Island have also reported that Sunda Pangolin sightings have become uncommon due to poaching.

The terrestrial treasure that resides in Gaya Island is less emphasized as it is overshadowed by marine tourism. As such, there is an imminent danger that the island will be converted into a terrestrial ecosystem of built environment that solely focuses reaping the revenues from marine tourism at the expense of the island's terrestrial natural ecosystem. The terrestrial ecosystem of the island is also an important transit location for winter migratory bird, as reported by Sompud et al. (2016). There is an urgent need for a detailed study of the Sunda Pangolin to gather comprehensive scientific information; such as number of individuals left, their sex ratio, age-group ratio, reproduction, habitat use and preferences, to support further effective conservation actions.

CONCLUSIONS

The Sunda Pangolin occurs in low numbers on Gaya Island, and long-term studies and monitoring are required for its conservation. The Island has a potential to become a Sunda Pangolin rescue and conservation centre.

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