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## The Asian Tapir in Jambi Lowland Forest and Commercial Landscape

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### Abstract

**This study was conducted in an oil palm plantation that borders a forest logging concession in Jambi province, Sumatra. Data were collected during 2003-2004 by using a camera trap grid combined with a tiger camera trap survey and transect sampling for animal tracks. The camera grid shows the presence or absence of tapirs in three distinct habitat types: an oil palm plantation, deforested areas (unplanted oil palm trees mixed with shrubs) and forest. Transects provide an index of abundance of the Asian tapir (# of tracks per 1 km of transect). Results from both these methods indicate that tapirs use forested and deforested habitats, but seem to avoid oil palm plantations. This result suggests a possible threat to tapir populations in Sumatra if oil palm plantations continue to spread.**

It often wanders outside forested areas (Novarino *et al.* 2004) and in many parts of its range it occurs outside protected areas (Meijaard & Van Strien 2003). Commercial landscapes, including oil palm plantations and logging concessions, may therefore be important habitats for Asian tapirs.

We used two different techniques to study Asian Tapir. The techniques used were camera trapping and transects to record the frequency of animal tracks. These techniques were used in an analysis of the temporal fluctuation in the sightings and tracks of the Asian tapir. The Camera trapping effort will enable us to determine the presence/absence and distribution of Asian Tapir within study site; the transect records enabled us to formulate an index of relative density of Asian tapirs within the commercial landscape.

### Materials & Methods

#### Study Area

### Introduction

Sumatra and Peninsular Malaysia represent the world's stronghold for the Asian tapir (Novarino *et al.* 2004). The Asian tapir is an elusive animal, primarily nocturnal; it is most commonly seen in the dry season and moves into mountainous areas with the onset of the rainy season (Holden *et al.* 2003; Colbert 2003; Novarino *et al.* 2004). In Sumatra the species is found in at least seven of eight provinces (Holden *et al.* 2003).

The study was carried out in Jambi Province, at the oil palm plantation PT Asiatic Persada (27,000 ha in size), which borders a forest logging concession (PT Asialog). The study site is approximately a two-hour drive southwest from Jambi city (Figure 1). PT Asiatic is still active, and currently PT Asialog is transferring management to PT REKI (Restorasi Ekosistem Indonesia), a consortium comprising Burung Indonesia, the Royal



**Figure 1. Location of the study site in Jambi province, Sumatra island.**

Society for the Protection of Birds (UK), and BirdLife International, created to manage and restore an area of lowland forest located across the Indonesian provinces of South Sumatra and Jambi.

The habitat of the study site is defined by deforested lowland forests, which are predominantly oil palm plantation, deforested land and commercial forest. These three habitats were therefore used to define the differing habitats within the study area. The oil palm plantation is a habitat comprised of oil palms interspersed by shrubs. The deforested habitat is located inside the oil palm plantation and comprises areas denuded of trees and not planted with oil palm trees; it is characterized by dense shrubs and self-seeded trees. The forest habitat comprises the forests inside the logging concession.

Although the oil palm plantation and logging concession forests are not ideal for wildlife, endangered and threatened species still use and live in these habitats, such as Sumatran tiger (*Panthera tigris*), Asian tapir (*Tapirus indicus*), Clouded leopard (*Neofelis nebulosa*), Dhole (*Cuon alpinus*), Pangolin (*Manis javanica*), Sambar (*Cervus unicolor*), Muntjac (*Muntiacus muntjak*), Malay civet (*Viverra zibethica*) and Banded palm civet (*Diplogale derbyanus*) (Maddox *et al.*, 2004).

### Camera Traps

Camera trapping is the most appropriate method for mammal inventory in all environmental conditions (Silveira *et al.*, 2003). We used the CamTrakker camera traps, which were placed in the three distinctive habitat types. The camera trapping method was used to ascertain the presence/absence of Asian tapirs in each habitat of the study site by using a randomly placed grid (Figure 2).

The points in the grid were located by using the waypoint number from the Global Position System (GPS). There were 16 camera traps in each grid set out in 4 rows of 4 cameras each, with cameras placed at an ideal site within 100 m of the random point to maximise the chances of photographing animals. Cameras were placed 500m apart from each other. The camera traps were positioned in the field for a month. Each was maintained weekly by checking trigger sensitivity (e.g., cleaning spider webs which would block the sensor), cleaning the window lens, checking battery power and also changing the films if they had run out.

Some cameras, referred to in the text as “tiger cameras,” were used to target tigers (as part of the Jambi tiger project) and were set up on tracks with known tiger activity, particularly at path junctions to maximise the chances of photographing a tiger passing (Maddox *et al.*, 2004). The tiger camera traps were set up permanently, primarily for monitoring tigers, but were triggered by and record other large animals.

Films were collected during camera trap checks. These were developed as negatives, then scanned and studied for data entry. Individual tigers and other animals (including tapirs – Novarino *et al.* 2005) can be distinguished based on fur colour patterns and other distinctive features, such as scars or cuts. The number of tapirs occasions from the camera trapping grid and tiger camera traps showed us where tapirs were most commonly found and their activities in the three habitat types.

### Transects

Transect counts were chosen as an additional method for studying the Asian tapirs at the study site by recording the frequency of footprints along transects; these counts could be used to calculate an index of relative density. Transects were set up on old logging road with varied in length from 1 km to 8 km; habitat types were also unevenly sampled. The average number of transects walked per month in the oil plantation habitat was 11.7 km (range: 0 - 21.6 km), the average for forested areas was 130.6km (range: 5.6 - 255.6 km), and for deforested areas an average of 171.6 km transects per month (range: 23 - 327 km). We sampled the oil plantations less often than the other habitat types because we soon realized tapirs were never seen there and opted to put more effort sampling the other habitat types (see results below). On average, 306.5 km of transects were walked each month. Each transect was given a unique number, and had a start and end point which were identifiable GPS waypoints. At least two people, in a team, walked each transect at a normal speed (1 km/hr); on several occasions more than one team walked a transect in a given day.

## Results

### Camera Traps

The camera traps within the grid were operated from April 2003 – April 2004. Sampling with grid camera traps resulted in few Asian tapir photos; most photos of tapirs were captured on the tiger camera traps.

There were a total of 17 camera locations, in both grid and tiger camera traps, from which photographs of Asian tapirs were obtained. At these 17 locations a total of 53 photographs were taken (Figure 3). Within the grid, a total of 12 photos of tapirs were taken in 3 separate locations. This represents 22.6 % of total photographs taken in 17.6 % of the total photograph locations. Of the photographs taken in the grid, 83.3 % were taken in forest and 16.7 % in deforested habitat. Allowing for more intensive camera trapping regime in the forests, tapir activity appears highest in this habitat type.

Within the tiger camera setup, a total of 41 tapir photographs (77.4 %) were taken at 14 (82.4 %) of total camera locations. Just looking at the 14 tiger camera trap locations and the associated photographs, 56 % of photographs were taken in deforested habitat and 44 % in forests. No photographs of tapirs were taken in oil palm plantations.

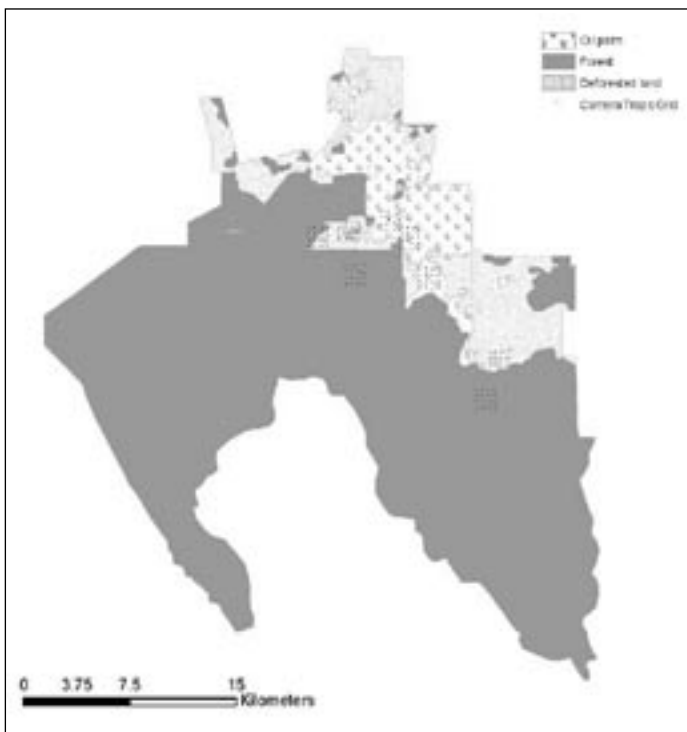
Camera traps data indicate that the Asian tapir is mostly captured during night-time (Figure 4), corroborating the nocturnal habit of the species. Accordingly, highest tapir activity occurs between 19.00-00.00 and 03.00-05.30, with a lower activity level between 00.00-03.00.

The mean number occasions of Asian Tapir passed through camera traps placement show was highest in July 2003 and May 2004 which were in deforested and forest habitat types. The data is the combined results from the tiger camera and grid camera traps data. The dry season starts from May to September, and the wet season between November to March, which means that tapir sightings are highest in the dry season for both habitat types which also shows that tapirs activities in these habitat types seem doesn't affect with seasonal change.

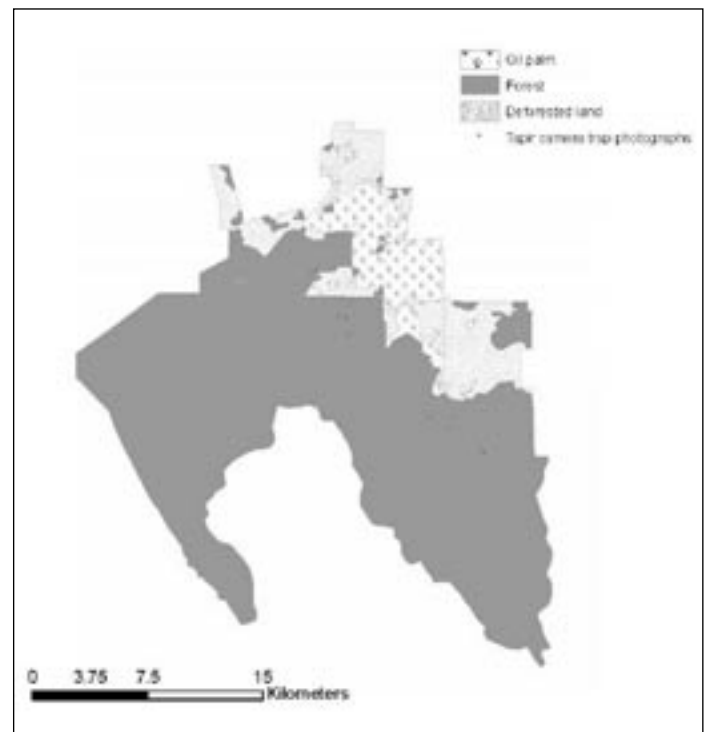
### Transects

The total distance of transects walked was 6933.4 km. Within these transects, there were 478 tapir tracks recorded. On average, the number of tapir tracks seen was 0.07 per km walked.

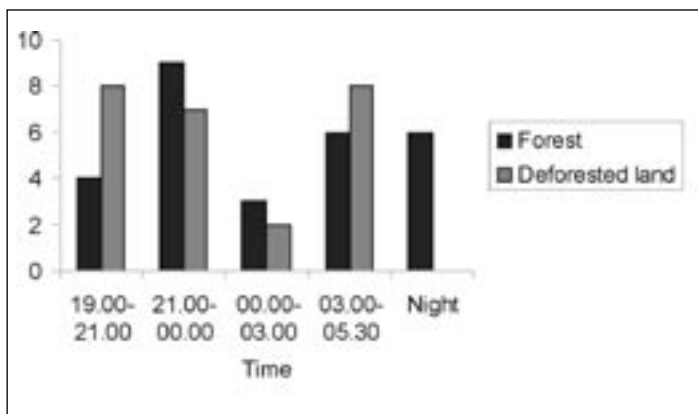
Figure 5 also shows that the mean number of Asian tapir tracks found in transect walks is about the same between the rainy and the dry season. We found no



**Figure 2.** Location of the nine randomly placed camera trap grids. Each grid is made of 16 camera traps (4 x 4).

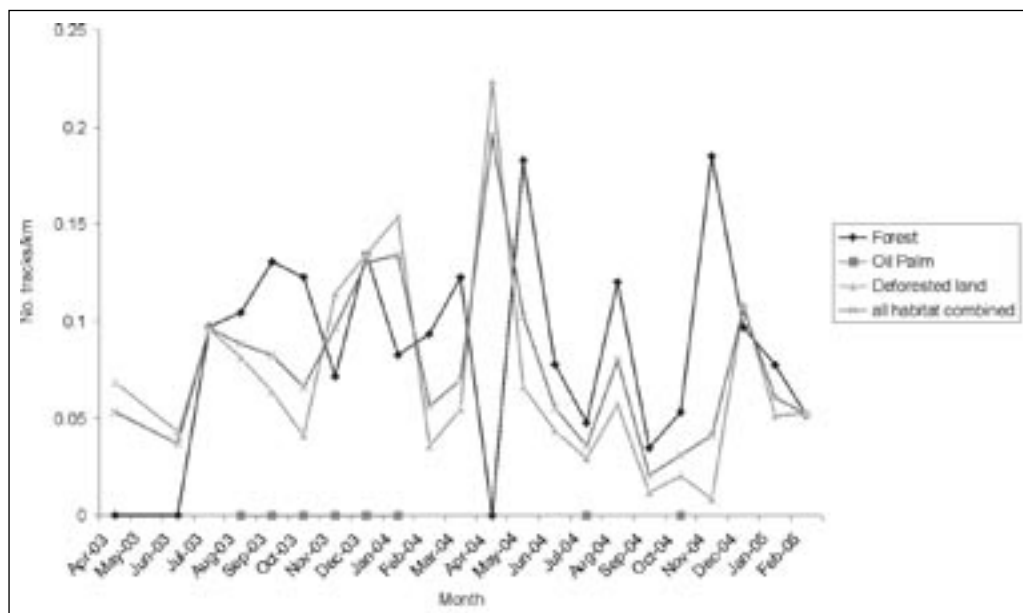


**Figure 3.** Location of tapir photographs in camera traps.



**Figure 4. Tapir photographs during night time in each habitat type. The “night” bar reflects records without time but known to have happened at night.**

evidence of tapirs occurring in the oil palm plantation. All tracks were found in the deforested and forest habitats. It is possible that the frequency of tracks seen in the field relates to the seasonal weather change in Sumatra. In the forest habitat tapir abundance was highest (0.18 tracks/km) in May '04 and November '04. No tracks were seen in June 03 and April 04. In the deforested habitat the highest frequency values occurred in January '04 and April '04 (0.15 and 0.2 tracks/km respectively). The lowest index value occurs in September '04 and November '04, (0.011 and 0.008 tracks/km, respectively).



**Figure 5. Number of Asian tapir tracks per km seen each month in transect walks for each habitat type.**

## Discussion & Conclusions

There were no photos or tracks of tapirs found in the oil palm habitat (Figures 3 & 5). This could be mean that tapir does not use the oil palm habitat and prefers to use the forest and deforested habitats. There are no reports from local workers that tapirs damage the oil palm saplings or trees, indicating that the species might avoid this habitat type. If the numbers of oil palm plantations increases, it will lead to habitat loss and probably to further decline of the Asian tapir populations (Kinnaird et al. 2003).

Photographic trapping is a very successful method for gathering evidence on the biology of the Asian tapir, an animal that is difficult to study (Holden *et al.*, 2003). The Asian tapir is a very elusive species - during the patrol transect none of the survey teams saw the tapirs. The only one seen was an opportunistic sighting on one evening when one team saw a tapir whilst returning from radio tracking tapirs in the field. It's potential a good idea to use the camera trapping methods combined foot prints transect method to collect the evident of Asian Tapir as an elusive animal.

The 17 camera locations, with total 53 photographs of tapir, show that 52.8% of the tapirs were recorded in the forest habitat and 47.16% in the deforested habitat. From these results is can be concluded that tapirs used both of the habitats (forest logging concession and deforested areas in plantations) (Figure 3). Our highest track indices throughout the year alternated between these habitats. This shows that tapir live and used these two habitats, which mean that they are important for tapir distribution and conservation.

The index of abundance (tapir tracks/km – Figure 5) of the Asian tapir was highest in April 2004 where an overall density of 0.19 tapir tracks per km walked was recorded, despite walking only 32 km of transects that month. This result could be because the tapir tracks are seen more easily in the deforested areas than in forests or oil palm habitats; we did not sample in oil palm habitats, and only walked 9 km in the forests, that month.

The data were collected during the 2003 and 2004, and so it is still difficult to conclude if these results are representative of tapir activity and abundance in the commercial landscape.

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