

# **1<sup>st</sup> Regional Malay Tapir Symposium, 2008**

**3-4 April, Krau Wildlife Reserve  
Malaysia**



**Malay Tapir Conservation Project**



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## List of abbreviations

CI	Conservation International
DWNP	Department of Wildlife and National Parks, Malaysia
FA	Forestry Administration, Ministry of Agriculture, Cambodia
FFI	Fauna & Flora International
INTAN	Institut Tadbiran Awam Negara, Malaysia
IUCN	International Conservation Union
MNS	Malaysian Nature Society
MOE	Ministry of Environment, Cambodia
MTCP	Malay tapir conservation project
NGO	Non-governmental organisation
NPW & PC	National Park, Wildlife and Plant Conservation, Thailand
PHKA	Perlindungan Hutan & Konservasi Alam, Indonesia
SSC	Species Survival Commission
TSG	Tapir Specialist Group
UKM	University Kebangsaan Malaysia
UNDAS	University of Andalas, Sumatra
UPM	University Putra Malaysia
USM	University of Science, Malaysia
UMT	University Malaysia Terengganu
ZSL	Zoological Society of London
WCS	Wildlife Conservation Society
WWF-M	World Wide Fund for Nature, Malaysia

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Carl Traeholt, June 2008  
Malay Tapir Conservation Project  
Copenhagen Zoo / Department of Wildlife and National Parks, Malaysia

## Summary

Five years have passed since the IUCN Tapir Specialist Group, in collaboration with the Department of Wildlife and National Parks (Malaysia) and Copenhagen Zoo (Denmark) undertook a PHVA-workshop in Krau Wildlife Reserve. The workshop, held in 2003, listed a number of *in-situ* and *ex-situ* activities important to tapir conservation and many activities have taken place during the 5-years period. A review of the action plan developed in 2003 was needed as well as a proper review of tapir population status is important and coordinating future conservation and research activities must take place between, primarily, researcher and wildlife authorities from the Malay tapir range countries.

Therefore, the 1<sup>st</sup> Regional Malay Tapir Symposium was held at the Institute for Biodiversity, which is located in Krau Wildlife Reserve. Copenhagen Zoo supported the Symposium financially and it attracted 58 participants from eight different countries with genuine support by the Director General of the Department of Wildlife and National Parks Mr. Abd. Rashid Samsudin. The Director General delivered an encouraging and engaging keynote at the Symposium. This was followed by 18 paper presentations covering a wide array of topics such as “status reviews”, DNA-analysis, husbandry, diseases, ecology and evolution.

One of the key objectives of the symposium was to strengthen the regional networking between resource personnel in wildlife research and conservation, particularly pertaining to Malay tapir. In this aspect, the Symposium was a resounding success and further similar symposia and workshops are likely to take place in the future.

The Symposium reviewed and updated the PHVA-workshop recommendations and action steps and produced a number of key action steps for the future. Among several dozens of action steps proposed by four different working groups 12 was shortlisted as top-priority.

Post-symposium excursions included visits to Sg. Dusun Wildlife Conservation Centre and Taman Negara.

# 1. Introduction

During the *First International Tapir Symposium* held in Costa Rica in November 2001 it became clear that one of the biggest concerns among tapir experts today is the Malay tapir conservation. Whereas, the past work of the Tapir Specialist Group was, and still is, heavily biased towards work on the three Latin American tapir species, mainly because each of these species were backed by a significant group of researchers and professional and amateur conservationists, the Malay tapir never managed to attract a similar level of attention, despite being the most conspicuous of the world's four tapir species.

Acknowledging the need to put more focus on the only Asian tapir species, the IUCN/SSC Tapir Specialist Group (TSG) decided to hold a Malay Tapir Conservation Workshop in Asia. The Malay Tapir Conservation Workshop was held 12 – 16 August 2003 at Bukit Renggit Training Center in Krau Wildlife Reserve, Malaysia, in collaboration with the Department of Wildlife and National Parks of Malaysia (DWNP) and Copenhagen Zoo, Denmark.

The outcome of the workshop concentrated on recommendations for the conservation of the species in the wild, but also with attention to captive breeding, education and extension, regional collaboration and research priorities, which primarily put focus on behavioural ecology and genetic studies.

Five years have passed since the workshop was held in 2003 and many important tapir *in-situ* and *ex-situ* conservation activities have taken place during this period. Whereas several studies indicate increased concern of the species' future conservation status, the Malay tapir remains listed as only Vulnerable on the IUCN Red List of Threatened Species. A review of its current status is important and coordinating future conservation and research activities must take place between, primarily, researcher and wildlife authorities from the Malay tapir range countries.

The venue for the 1<sup>st</sup> Regional Symposium was the Institute for Biodiversity, which is located in Krau Wildlife Reserve. The reserve was gazetted in 1923 and is one of Malaysia's oldest protected areas. It spans approximately 63.000ha over primarily lowland rainforest, but upper montane forest is found at Gunung Benom (2107m), Peninsular Malaysia's fourth highest mountain, on the northern border of the reserve.

The Department of Wildlife and National Park (DWNP) is responsible for the management of Krau Wildlife Reserve. By holding the 1<sup>st</sup> Regional Malay Tapir Symposium the DWNP and Copenhagen Zoo continues their fruitful collaboration and hope to update and pursue many of the recommended actions from the 2003 Workshop as well as promote, facilitate and strengthen the collaboration between regional scientists and wildlife managers.

## 2. Symposium objectives and outputs

- 1) A review the 2003 Workshop action step and update these where necessary
- 2) Strengthen regional and international collaboration in relation to tapir conservation (and other wildlife management)
- 3) Dissemination of information and results from the past five years of tapir research and conservation
- 4) Establishing DNA extraction protocols and map the genetic diversity of Malay tapirs in each range country
- 5) Develop and/or update tapir conservation plan
- 6) Compilation of important research findings, which will be presented to the 4<sup>th</sup> International Tapir Symposium to be held in Mexico, April 2008.
- 7) Project report (will be in downloadable format at [www.malaytapir.org](http://www.malaytapir.org))

### Participants

While one of the main objectives of the 1<sup>st</sup> Regional Malay Tapir Symposium was to gather regional resource personnel engaged in Malay tapir research, conservation activities and husbandry the symposium was open to anyone interested in Malay tapir research and conservation irrespective of which country s/he was from. However, financial support was only offered to participants from Malay tapir range countries i.e. Malaysia, Indonesia, Thailand, Myanmar and Singapore. Officers from Myanmar were invited but, unfortunately, unable to attend due to the country's prevailing political challenges. However, two officers from Cambodia attended the symposium to give a "status review" of the occurrence/absence of Malay tapir in Cambodia.

In total the 1<sup>st</sup> Regional Malay Tapir Symposium attracted 58 participants from eight countries presenting 16 interesting papers on a wide range of topics (see Abstracts). A full list of participants attending the symposium as well as a few others who had planned to attend, but were prevented to do so with short notice, can be found in table 1 below.

### **3. Status of Malay tapir in range countries**

After the opening formalities Director General Mr. Abd. Rashid Samsudin, Department of Wildlife and National Parks, Malaysia, delivered a keynote, which was a warm welcome to all participants as well as a significant encouragement to deliver a fruitful symposium.

Subsequently, each country made a “status review” of Malay tapirs in their respective countries (see Abstracts).

#### **Thailand**

The population of Malay tapirs in Thailand seems well managed within a protected areas network that is guarded by regular law enforcement patrols. All types of wildlife incidents are recorded i.e. poaching, road kills etc and it appears that these issues are only of minor concern in Thailand. Whilst there is very good knowledge of presence/absence of tapirs in Thailand the primary weakness is that many of the sub-populations appear to be too small to be genetically viable. One of the main future challenges will be to estimate relatively precise densities of tapirs in all areas where it occurs and, subsequently, manage it by introducing new genetic “stock” into known small populations.

#### **Myanmar**

Since there were no representatives from Myanmar attending the symposium, Dr. Anthony Lynam, WCS-Asia Programme, provided basic information of tapir work being undertaken in Myanmar. Currently, tapirs are confirmed to exist in the Taninthayi Nature Reserve, south Myanmar, which links up to the Western Forest Complex in Thailand. The Nature and Wildlife Conservation Division, Department of Forestry, will implement a management plan in throughout 2008, which includes surveys of large mammals. Currently, there are no specific information on tapir population densities in Myanmar, and further surveys are needed to establish firm knowledge of its distribution range in Myanmar.

#### **Cambodia**

There have been very few reports of Malay tapirs in Cambodia, and all of them cannot be properly verified. As such, Cambodia is not considered part of the extant Malay tapir range countries, and the possibility of discovering any Malay tapirs in Cambodia is extremely small. The review of all the past decade’s wildlife surveys does not provide any evidence of Malay tapirs. As such, it can be reasonable to consider tapirs as non-present in Cambodia. The question of when it went “extinct” remains, however, with some evidence suggesting tapir roamed the area until very recent time.

## **Malaysia**

Malaysia probably maintains the largest population of Malay tapirs. A population estimate based on ecological surveys and research in Krau Wildlife Reserve suggests that the Malaysian population may somewhere between 1500-2000 individuals. While this figure is extrapolated solely from studies undertaken in Krau WR, numbers may still turn out to be very different. At the moment, DWNP and Copenhagen Zoo is preparing for similar studies to be undertaken in Taman Negara in order to obtain better baseline data for extrapolation. The most promising prospect in Malaysia is that a major part of the current population roams largely undisturbed forest complexes, which are unlikely to be converted into agricultural land. There are, however, frequent incidents involving displaced Malay tapirs. Unfortunately, the number of displaced individuals (road kills, rescued individuals in urban areas, captured from village farms) has increased steadily during the past three years, which is believed to be a result of the increasing degree of habitat fragmentation.

The DWNP established a wildlife conservation centre at Sg. Dusun Wildlife Reserve, which operates primarily as a Malay tapir conservation and captive breeding centre. The facilities have already received too many displaced tapirs that it is forced to start reintroducing rehabilitated individuals back into nature. The main future challenge will be to assess the number of displaced animals as well as identify the reason for this growing trend.

## **Indonesia**

The population of Malay tapirs in Sumatra is not yet known. However, there is relatively solid evidence of its distribution range across Sumatra, although the population number is illusive.

Indonesia is planning to develop a tapir action plan in 2008, which will contribute significantly to the future conservation and management of tapirs in Indonesia.

## 4. Working group priorities

After excellent presentation from participants representing all Malay tapir range countries (except for Myanmar) as well as specific topical presentations, delegates convened into four (4) working groups:

Group 1: Landscape and habitat

Group 2: Population simulation and modelling

Group 3: Captive breeding

Group 4: Threats

Group 3 “captive breeding” was included as a “new” aspect of Malay tapir conservation, which was absent in the TSG Malay Tapir PHVA-workshop held in 2003. The delegates of the 1<sup>st</sup> Regional expressed strong desire to include captive breeding as an important part of contemporary conservation plans.

Each group was asked to review the action steps and priorities outlined in the 2003 PHVA-report, update it and present new action priorities. Each group was also requested to evaluate their proposed action steps and select three top priorities. In order to provide a proper framework for priority setting, each group was requested to make selection based on paired ranking.

Subsequently, each group made a 15 minutes presentation of their findings and explained the reasoning behind their suggested action steps. Finally, all four groups’ top three priorities were presented in a table as the top 12 workshop priorities. A ranking of these were conducted by “paired ranking” evaluation by each participant. The results are presented below. It is important, however, to acknowledge that *all* these priorities are considered *top* priorities and should be referred to by planners and decision makers in the region. Therefore, the complete list of priorities from each respective group is included in the following section.

As can be noted on the priority list it is set in a *regional context*. This does not mean, however, that communication and information sharing should not be pursued between institutions from the rest of Asia, Europe, Americas and the Pacific countries.

### Top 12 priorities (2008)

1. Design (or expand ongoing projects) and implement three detailed field studies (Thailand, Malaysia, Sumatra)
2. Develop and implement assessment method of the level of extraction of Malay tapirs. This should be area specific (i.e. see above assessment)

3. Expand existing DNA study to include all range stages, primarily Thailand and Sumatra and develop guidelines for DNA extractions.
4. Increased information-sharing between captive facilities between facilities in Indo, Singapore, Malaysia, Thailand and Myanmar.
5. Genetic determination of captive tapirs in regional facilities (primarily Indonesia, Singapore, Malaysia and Thailand)
6. Establish protocols and techniques of tapir management in SEA countries
7. Establish baseline information on abundance, distribution, taking into account factors affecting these with the use of standardized protocols.
8. Building capacity with a training component which includes data analysis and interpretation
9. Network information sharing and dissemination for stronger collaboration among agencies/stakeholders
10. Establish committee specifically for tapir conservation awareness programme.
11. Engage local communities directly in tapir conservation programme in parallel with economic improvement of the community.
12. To develop and ensure implementation of TOR for landscape planning including of conservation consideration

# 5. Group Sessions

## 5.1 Landscape and Habitat Group

### Top 3 priority action steps:

#### 5.1.1. Develop/build capacity of appropriate personnel in data analysis and interpretation

##### Indonesia:

- No agency specifically focusing on tapirs
- Supplementary data from other agencies (WWF, WCS, FFI, CI, ZSL)
- 10 theses were produced in the past 5 years
- Additional data from RPU census (Way Kambas, Bukit Barisan Selatan)
- Good collaboration between other agencies and government body which contribute towards building capacity of appropriate personnel

##### Thailand:

- No agency specifically focusing on tapirs
- NPW & PC conducts animal census on large mammals
- 2 theses produced (1 captive, 1 wild) in the last 5 years & one more in the future
- Large mammal records via Tigers Forever – tiger sign survey may contribute towards supplementary data on distribution of tapir

##### Cambodia:

- No records of tapirs
- Large mammal records via Tigers Forever – tiger sign survey may confirm presence/absence of tapir

##### Malaysia:

- MTCC & MTCP will establish baseline data on captive and wild tapirs
- Supplementary data from NGOs will also be collated
- Involvement of IPTA (UKM, USM, UMT, UPM)
- 2 theses on captive tapirs & 1 on radio telemetry

#### **General summary:**

No government body in any Malayan tapir range countries mentioned above is looking into building capacity in terms of data analysis & interpretation. However, NGOs and local universities contribute towards this action step.

**5.1.2. Recommend agencies to ensure each tapir research project ensures a training component for local people**

Indonesia: PHKA, NGOs, university  
 Thailand: NPW & PC  
 Malaysia: DWNP (training MTCP)  
 Cambodia: FA & MOE

**5.1.3. Develop tailor-made system to reflect national need and capacity that ensure efficient data collection and database establishment**

Indonesia: UNAND is compiling tapir database from NGOs  
             PHKA compiling general biodiversity database of which UNAND is contributing  
 Thailand: NPW & PC compiling database  
 Cambodia: FA & MoE  
 Malaysia: DWNP

**General summary:**

There is a need to explore national needs with regards to tapir conservation, and this presumably will be done by developing a national tapir action plan.

**5.1.4 Tapir-specific recommendations**

Request regional agency incorporate tapir conservation into training programmes	Suggestions to ask the following to fund several workshops to standardize protocols and provide training 1. SEAZA 2. IUCN TSG
Distribute workshop outputs to relevant agencies	To be done via Regional and National E-group
Ensure tapir research projects incorporate training for locals	Training will have to be explored under the various NGO's protocols and possibly getting together specialist groups to come for a workshop to train the trainers.
Review data collection methods	IUCN TSG
Recommend regular status reviews of significant tapir areas	A five year period for review of status was newly recommended. WCS Tigers Forever – additional data obtained on tapirs
Recommend funds are made available to create tapir central database	Each country representative can collate data from various agencies conducting field research
Develop working group &	An e-group was suggested (both regional and country)

encourage stronger collaboration & information sharing	
Establish working group to coordinate storage facilities	Each country Representative to explore how other agencies have done this

### 5.1.5 General recommendations

Recommend field expenses are prioritized within relevant agencies	Not feasible
Build capacity of personnel in data analysis/interpretation	Tapir Specialist Group to provide training via workshops?
Develop tailor-made system to ensure high quality/reliable data	Need to explore based on national needs → relate to National Tapir Action Plan
Develop working group to share information – quarterly meetings	Establish regional tapir e-group
Obtain independent review of information for public disclosure	Establish national tapir e-group
Develop standardized form & format for data collection/ monitoring	Tapir Specialist Group to provide training via workshops?
Promote open information sharing, including via internet	Via e-group
Develop MOU between relevant stakeholders	Country representative to explore with various agencies and government bodies
Develop & implement unambiguous standards for data utilization	Tapir Specialist Group to provide training via workshops?
Develop standard methods for data management practices	Tapir Specialist Group to provide training via workshops?
Recommend agencies integrate smooth staff transition practices	May not be feasible. Needs further exploration
Recommend agencies re-evaluate career structure and recruit/retain qualified personnel	May not be feasible. Needs further exploration
Develop clear standards / protocols for data publishing	Baseline and data management training to outline protocols. Hopefully sponsored by SEAZA or Tapir Specialist Group
Create national working groups to develop central & secure storage system	Country representative will have to collate data and form a database

### 5.1.6 Additional recommendations

#### Capacity

- have IUCN TSG organize a Malayan tapir workshop.
- It is hoped source funding from IUCN and TSG for additional regional workshops for training and monitoring protocols

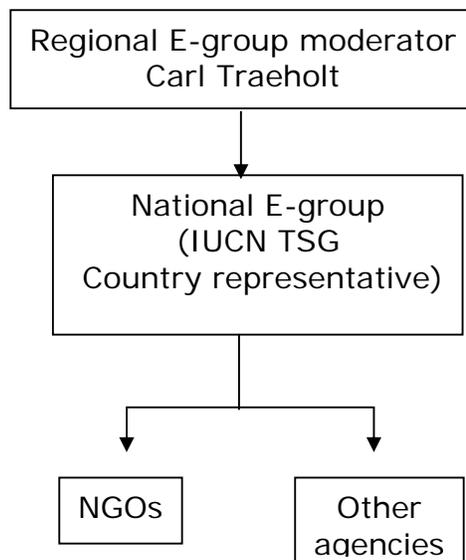
Baseline & data management

- push for standardization of data collection and publications
- determine critical factors affecting tapir distribution so that management recommendations can be made with regards to landuse and for long term solutions

Network

- establish informal groups / e-group
- identify key people from each country and establish connections

Suggested structure of e-group:



## 5.2 Population and simulation modelling Group

The group reviewed the original 2003 output “simulation” output. In order to improve the accuracy of population simulation each parameter was re-evaluated and where possible, new and more accurate information was used. However, in most cases no progress had been made in areas of concern in relation to improving the accuracy of the simulation.

1) Sumatra (started field study) Malaysia (started field study) Thailand (overall assessment)	No population estimate Population for Krau Relative densities	No tapir survival rate for any of the range countries
2) Sumatra Malaysia Thailand	<b>Hunting/bi-catch</b> No hunting/bi-catch recorded No hunting/bi-catch recorded Hunting recorded/bi-catch recorded	<b>Road kills</b> None recorded Several recorded None recorded
3) Sumatra Malaysia Thailand	Overall project and is initiated at DWNP.	
4) Improve database Sumatra Malaysia Thailand	Is in the planning process In place In place	

### Revised recommendation:

1)

Sumatra: collect and analyse all current data from ongoing survey projects (FFI in Kerinci etc). Standardize collection/monitoring methods, networking about data.

Sumatra, Malaysia, Thailand:

- Population estimates must be conducted
- Distribution pattern must be conducted

There has been no survival rate studies because of it’s relatively insignificance apart from for use in Vortex. The group felt that while survival rate is necessary for the simulation part it is somewhat irrelevant in practical management context.

2)

Extraction must be measured particularly hunting because it can impact the population size negatively over a very short period of time. Road kills and bi-catches are relatively “passive” constants.

- Develop a standard method for assessing extraction level, but made specific to each country's needs. In this case, forest fires and floods play different roles in different regions.
- Setup standard road kills monitoring system.

3)

Expand existing DNA study to include all range stages, primarily Thailand and Sumatra and develop guidelines for DNA extractions.

## 5.3 Captive Breeding Group

### 5.3.1 General Review of 2003 Malay Tapir Conservation Workshop

The goals were very broad and comprised of policies and institutions that the group felt were beyond the capacity of the tapir workshop participants. Hence it was not implemented.

There also seemed to be a lack of follow-through and review of the recommendations. Because most of the captive breeding participants was not even aware of the recommendations from the 2003 Malay Tapir Conservation Workshop before joining the 2008 Regional Malay Tapir Symposium.

### 5.3.2 Review of Species management / Captive breeding Goals from 2003

#### Tapir specific recommendation

- Conduct national-level studies on resource management and land-use sectoral development and biological diversity, policies in view of identifying sectors that support tapir habitat conservation. (Tapir habitat surveys have been done in Thailand and Malaysia.)
- Organise and conduct an ASEAN meeting focusing on large mammal conservation in the region. (A large mammal ASEAN meeting is too big of a goal for tapir workers.)
- Develop funds for tapir research in the region. (Funds for *ex-situ* programs are almost impossible, only programs on *in-situ* or more charismatic animals are successful.)
- Initiate training program for *in-situ* and *ex-situ* tapir conservation: population studies, reproduction and behaviour.
- Establish a Global Tapir Forum. (Start of an online forum)
- Organize and conduct a meeting of NGO's on regional tapir conservation. (Tapirs are of low national concern, difficulties in raising awareness)
- Develop an awareness campaign among local stakeholder communities. (hunters, local villagers etc.) (Not done, Tapirs are of low national concern, difficulties in raising awareness)

#### General recommendations:

- Develop an inventory of policies related to wildlife management. (Beyond our scope.)
- Revise and rewrite appropriate policies and propose the resulting modified policies to the Malaysian Parliament and similar institutions in other countries. (Beyond our scope)
- Conduct a detailed cost-benefit analysis of economic development vs. conservation policies. (Beyond our scope)
- Establish a regional Wildlife Research Institute with courses designed to address country-specific and cross-boundary regional issues. (Beyond our scope)

- Develop a Rural Participatory Workshop. (Will be done when nearing the reintroduction of tapirs)
- Create opportunities for conservation and tourism related jobs such as nature guides, rangers, boatmen, etc. (Possible conversion of Sungai Dusun for ecotourism)

### **5.3.3 Action steps for 2008 Tapir Captive Breeding Group**

#### **1. Info Sharing**

1. Studbook (Amy)
2. Website (Karn)
3. Tapir behaviour/mating record form (Gabriel)
4. 2010 workshop

#### **2. Genetic**

1. Confirm readiness of Malaysian lab for faeces DNA extraction (Jeffrine)
2. Send samples to Malaysia, assess genetic profile of captive tapirs (Jeffrine)

#### **3. Establish technique/protocol**

1. Semen collection (Abraham)
2. Husbandry and hand-rearing protocol (Singapore Zoo)

#### **4. Research**

1. Disease/health profile of captive/displaced/wild tapirs (Malaysia, Indonesia)
2. Artificial insemination (Dr Mark)

#### **5. Exchange programme**

1. Exchange in country
2. Exchange between country

#### **6. Reintroduction**

1. Malaysia to publish explanations of reintroduction plans, which will form a guideline for other countries. (DWNP)
2. Reintroduction of tapirs at one site in each country in 5 years

### 5.3.4 Captive Breeding Working Group Participants

<b>NAME</b>	<b>COUNTRY</b>	<b>INSTITUTE</b>
Ishak Bakar	Malaysia	Zoo Negara
Ahmad Nizam Zainuddin	Malaysia	Zoo Negara
Mazwin Marjan	Malaysia	Zoo Taiping
Zakaria Razali	Malaysia	Zoo Johor
Abraham Gabriel Nadarajah	Malaysia	Department of Wildlife and National Parks
Abraham Mathew	Malaysia	Department of Wildlife and National Parks
Koo Li Lia	Malaysia	Universiti Putra Malaysia
Anthony Ganesh	Singapore	Singapore Zoological Gardens
Nanda Kumaren S. R.	Singapore	Singapore Zoo and Night Safari
Mark Hoyer	Netherlands	Artis Zoo, Amsterdam
Karn Lekagul	Thailand	Dusit Zoo
Sharmy Prastiti	Indonesia	Taman Safari Indonesia

## 5.4 Threats Group

### 5.4.1 General Review of 2003 Malay Tapir Conservation Workshop

#### Awareness

1. Awareness programmes were carried out but was not tapir specific.
2. However, it is possible that awareness programme of other “important” species will “spill over” into tapir as habitat of these animals overlaps in the wild.
3. Need more tapir specific awareness programme for ex-situ projects to create the sense of importance and to draw in funding.

#### Networking

1. Networking between range countries exist, however are not active imparting relevant information readily.
2. Data and information collected on wild population are not being standardize and not easily accessible to all relevant parties.
3. No centre of databases was establish to compile and coordinate information on tapir conservation programme and research result.

#### Enforcement and Landscape Planning

1. Wildlife Act 1972 is being revised to heighten the penalties imposed on violators of the laws as current penalties are almost negligible to deter these offences. No information of revision of laws in wildlife protection in other range countries.
2. Enforcement in all range countries are still lagging due to constraint of man power, vast land area of the countries and corruptions.
3. Tapirs are not intentionally targeted as “popular” poached species, however incidental capture in traps may end up in illegal trade or as food source.

#### Research and Conservation

1. Research had been done on tapir both in-situ and ex-situ. However, data is still limited and sample sizes are generally small.
2. National survey for tapir is ongoing in Malaysia. Thailand and Indonesia have information on their wild tapir population. No information is available from Myanmar.
3. Impact of forest fire on tapir habitat has not been carried out.

#### Community development

1. Programmes to incorporate local community directly conservation programme are not directly specifically towards tapir.
2. Economy status of local community should be improved in parallel to conservation programme to gain the community’s support.

3. Incentives for informant on poachers, illegal logging and other activities that may cause habitat loss may not be substantial to be effective as the wrong doers may offer higher incentives.

#### **5.4.2 Top Three priority action steps**

1. To establish a committee to work specifically on Tapir conservation including awareness campaign about the importance of buffer zones in all range countries (directed towards the communities around the Protected Areas, managers and relevant authorities).
2. To engage local community directly in tapir conservation programme in relative with forest use that is located within area of tapir home range.
3. To develop and ensure implementation of Terms of Reference for landscape planning with inclusion of conservation considerations.

#### **5.4.3 Tapir specific recommendations**

1. To organize seminar on tapir conservation for NGO and GO stakeholders, zoos and universities
2. To produce and distribute leaflets about tapir conservation to public (schools, zoos, visitor centres, etc.)
3. To promote as “Adopt a Tapir” programme in relevant zoos to assist in conservation programme.
4. To approach public sector for funding for tapir research, survey implementation and database construction.
5. To establish a stakeholder network with the purpose of exchanging information about tapir conservation measures both nationally and internationally.
6. Nationally establish a co-ordinating body with members from relevant governmental departments to agree upon the enforcement of rules and regulations relating to tapirs.
7. To utilize research result on Tapir ecology, surveys on tapir distribution and relate data distribution in tapir awareness programme.
8. To conduct an overall registration of tapir presence in close co-operation with NGOs and local people.
9. To develop standard format for data collection of tapir data in all range country.
10. To establish central databases in each range country and at TSG for tapir registration and export.
11. To define and identify tapir core areas in all range countries that needs further protection.
12. To develop Term of Reference for landscape planning with inclusion of tapir conservation considerations.

13. To make reference Terms of Reference for all new developments obligatory.
14. To encourage authorities to revise penalties for illegal capture of wildlife and snare hunting.
15. To encourage development and implementation action plans for Protected Areas relevant for tapir conservations
16. To revise action plans for Protected Areas every 5 years.
17. Conduct workshops in all range countries to define “carrying capacity” for all Protected Areas relevant for tapir conservation with regards to number of visitors/activities.
18. To encourage relevant authorities to address ecotourism in all action plans for Protected Areas relevant to tapir conservation.
19. To encourage relevant authorities to use zoning in action plans for Protected Areas relevant to tapir conservation.
20. To incorporate local community in projects that would bring economy improvement in parallel to tapir conservation programme.
21. To target awareness programme on the younger generation,.
22. To legalise ownership of forest land to the local community to instill a sense of responsibility to protect the land from habitat destruction, poaching, etc.
23. To create a mascot to represent a mascot representing the tapir conservation programme to promote interest in public and corporate for support.

### **Group members**

Choong Siew Shean, DWNP, Melaka Zoo, Malaysia.

Siti Aisyah A Talib, DWNP, Malaysia

Muhammad Danial Felix, Zoo Negara, Malaysia.

Navy Nop, Cambodia.

June Rubis, Malaysian Nature Society.

Muhammad Silmi, Indonesia

Mohd Firdaus Hasbullah, MTCC, DWNP, Malaysia

Mohd Khairuddin Johari, DWNP, Malaysia.

## 6. Programme

<b>Day 1:</b>	<b>3<sup>rd</sup> April</b>
09:00 – 09:20	<i>Welcome note &amp; Opening speech</i> (Malay Tapir Conservation Project – Carl Traeholt)
09:20 – 09:50	<b>Keynote speech: En. Abd. Rashid Samsudin, Director General, Department of Wildlife and National Parks, Malaysia</b>
09:50 – 10:10	<i>Status, distribution and abundance of Malay tapir in Thailand</i> by Somying Thunhikorn, director of Phluang Wildlife Research Station
10:10 – 10:30	<i>Status, distribution and abundance of Malay tapir in Indonesia</i> by Herry Djoko Susilo, Forest Protection and Nature Conservation, Ministry of Forestry, Indonesia
10:30 – 10:50	Tea break
10:50 – 11:10	<i>Status, distribution and abundance of Malay tapir in Cambodia</i> by Nop Navy, Ministry of Environment, Cambodia
11:10 – 11:30	<i>Displacement of Malay tapir in Malaysia</i> by Dr. Zainal Zahari Zainuddin, Department of Wildlife and National Parks, Malaysia
11:30 – 11:50	<i>Activity patterns and relative abundance of the Malayan Tapir in Gunung Basor Forest Reserve, Kelantan</i> by Mark Rayan Darmaraj, WWF-Malaysia
11:50 – 12:10	<i>Preliminary studies on micro-habitat usage of Malay tapirs</i> by Nor Zalipah Mohamed, University Malaysia Terengganu
12:10 – 13:40	Lunch break
13:40 – 14:00	<i>Population estimates of Malay tapir by camera trapping in Krau Wildlife Reserve</i> by Carl Traeholt, Copenhagen Zoo, Denmark
14:00 – 14:20	<i>Frequency of salt lick visited by Malay tapir</i> by Wilson Navarino, Universitas Andalas, Sumatra, Indonesia
14:20 – 14:40	<i>Seasonality of occurrence Malay tapir in Taratak</i> by Muhammad Silmi, Universitas Andalas, Sumatra, Indonesia
14:40 - 15:00	<i>An archaeozoological and historical review of the Malay tapir, Tapirus indicus, in Borneo</i> by Philip Piper, University of York, United Kingdom
15:00 – 15:10	Tea break
15:10 – 15:30	<i>Captive behaviour of Malayan tapir (Tapirus indicus) at Sungai Dusun Wildlife Conservation Center, Peninsular Malaysia</i> by Shukor Mohd. Nor, Faculty of Science and Technology, Universiti Kebangsaan Malaysia.
15:30 – 15:50	<i>DNA Characterisation and Phylogeny of the Malayan Tapir</i> by Jeffrine J. Rovie-Ryan, Department of Wildlife and National Parks, Malaysia
15:50 – 16:10	<i>DNA extraction using fecal samples</i> by Ahmad Mashur, Department of Wildlife and National Parks, Malaysia
16:10 - 16:30	<i>Tranquilizing Malayan tapir using Butorphenol and Xylazine Hcl</i> by Abraham Mathew, Department of Wildlife and National Parks, Malaysia
16:30 – 16:50	Tea break
16:50 – 17:10	<i>Rearing a TB negative calf from two TB positive parents</i> by Mark Hoyer, ARTIS Zoo, Holland
17:10 – 17:30	<i>Malay tapirs in Singapore Zoo</i> by Anthony Ganesh, Registrar, Singapore Zoo
17:30 – 17:50	<i>Breeding of Malay tapir at the Singapore Night Safari</i> by Nanda Kumar, Deputy Head Keeper, Singapore Night Safari
17:50 – 18:10	<i>Spatial use by Malayan tapir (Tapirus indicus) in Krau Wildlife Reserve, Malaysia</i> by Siti Khadijah Abd. Ghani, School of Biological Sciences, Science University of Malaysia, Penang.
18:10 - 18:20	<i>Wrap up of day's activities</i> (Carl Traeholt)
<b>19:00</b>	<b>Dinner</b>

<b>Day 2:</b>	<b>4<sup>th</sup> April</b>
<b>07:00 – 08:30</b>	<b>Breakfast</b>
09:00 - 09:20	Presentation of Malay Tapir Action Plan, 2003
09:20 - 10:30	Discussion groups (review Action Plan)
<b>10:30 – 10:50</b>	<b>Tea break</b>
10:50 – 12:10	Discussion groups (continued)
<b>12:10 – 14:00</b>	<b>Lunch break</b>
14:00 – 15:00	Group presentations
15:00 - 16:00	Formulation of new action plan (plenary)
16:00 – 16:20	Tea break
16:20 – 17:00	Wrapping up
<b>19:00</b>	<b>Dinner</b>

<b>Day 3:</b>	

<b>07:00 – 08:30</b>	<b>Breakfast</b>
<b>09:00</b>	
<b>11:00</b>	<b>Depart for Kuala Lumpur</b>

## **Abstracts**

# STATUS, DISTRIBUTION AND ABUNDANCE OF MALAYAN TAPIR IN THAILAND

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<sup>3</sup>Hala Bala Wildlife Research Station, Narathiwat, Thailand

## Abstract

Declining forest areas in Thailand have raised the awareness in the wildlife conservation. Therefore, tapir has been categorized as a protected species by the Wildlife Preservation and Protection Act B.E. 2535. Furthermore, it was listed as an endangered species in the Thailand Red Data book. Nevertheless, past deforestation have lead to fragmentation of tapir's habitat leaving small remnant population isolated from each other. That may be one of the reasons for an apparent decrease in population size. The study on distribution and abundance of tapir was initiated during the Large Mammals Survey in 2004 to 2007. One hundred and forty nine national parks and wildlife sanctuaries were surveyed along the forest trails. Tapirs' tracks and dung were recorded and location mapped. The location of tapirs outside protected areas was recorded during the study too. Threats to wildlife have also been reported. The results showed that tapirs' are almost only found within the protected areas. Only a few incidents were recorded outside a protected area, but near the boundary of Bang Lan National Park and Budo Suhai Padee National Park in the south of Thailand. Tapirs appeared to range from the west part of Thailand towards the boarder with Myanmar and to the south towards Malaysia covering approximately 37,821km<sup>2</sup> spanning over protected areas in seven forest complexes. Those are the Western forest complex, Krang Kra Chan forest complex, Chumporn forest complex, Khlong Saeng-Khao Sok forest complex, Khao Lung forest complex, Khao Ban Thad forest complex and Hala Bala forest complex. Frequency of recorded tapirs' signs in these forest complexes indicated that tapirs were more common in the south than in the west. Their relative population in Khlong Saeng-Khao Sok forest complex is believed to be the largest (16.38%) while their population in Chumporn forest complex in the upper southern part was the smallest (2.9%). Their status in all protected areas were analyzed and categorized. Additionally, habitat utilization of tapir in each forest type was studied and the frequency of tapirs' signs showed that tapir utilized evergreen forest more than others species (9.7%), although tapir signs were frequently recorded in secondary forest too (2.2%). The study also revealed that tapirs were recorded in various altitudes from 100 m to 2100 m. although they were most frequently recorded in areas between 200 m to 1300 m. Some ecological information have been summarized and presented. Threat to wildlife in tapirs' distribution range was reported and major threats in their range were identified. Finally, recommended conservation measures for tapirs have been proposed.

**Keywords:** Malayan tapir, *Tapirus indicus*, distribution range, Thailand

# VISIT FREQUENCY TO SALT LICKS BY MALAYAN TAPIR

Novarino, W. and M. Silmi

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## Abstract

The importance of salt licks to the Malayan tapir was studied in 2004 and 2007. The visitations of Malayan tapir to salt licks were observed by using camera trap. Three salt licks were observed in 2004 and two salt lick observed in 2007. Mineral content of the salt lick water and soil were analyzed in laboratory of Andalas University. In 2004, all of the salt licks were visited by Malayan tapir, however in the longer time periods in 2007, only one salt lick was visited. Results of the study revealed that the visitation frequency of Malayan tapir to salt licks was not affected by distance from village and the number of human entering the area. Chemical analyses of water from salt licks show a significant difference from place to place. This study suggests that Malayan tapir are highly dependent of mineral contents in salt licks. In the future the composition of mineral should be adopted by ex situ conservation management handling Malayan tapir.

**Keywords** : Malayan tapir, *Tapirus indicus* , salt lick

## SEASONALITY OF MALAYAN TAPIR IN TARATAK

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### Abstract

The activity of Malayan tapir (*Tapirus indicus*) in the protected forest area in Taratak Village, West Sumatra, was monitored by camera trapping. Eight camera traps were set up in several types of habitat. They are 1) forest edge (mixed with cultivated trees) where there is salt lick, 2) mature secondary and, 3) primary forest. The monitoring was conducted for the entire year of 2007. Observation was totalled 52,399 trapping hours, or approximately 2183 trapping hours. The results showed that the highest activity range occurred in June and October (23% of total photos). Furthermore, tapirs were found active from 6pm late afternoon until 6am in the morning. 74% of photographed were taken in secondary mature forest habitat at an altitude of 740-930m asl. The remaining 26% of the photos were taken in salt lick area, around edge of fragmented forest after gambier cultivation.

**Keywords:** Malayan tapir, *Tapirus indicus*, Seasonality, camera trapping

## DNA CHARACTERISATION AND PHYLOGENY OF THE MALAYAN TAPIR (TAPIRUS INDICUS) USING PARTIAL SEQUENCES OF THE CYTOCHROME B SEGMENT OF THE MITOCHONDRIAL DNA (MTDNA)

Jeffrine Japning Rovie-Ryan<sup>1,2</sup>, Carl Traeholt<sup>4</sup>, Marilyn Jaoui-Edward<sup>1,2</sup>, Zainal Zahari Zainuddin<sup>1</sup>, Abraham Mathew<sup>1</sup>, Khairiah Mohd Shariff<sup>1</sup> & Sivananthan Elagupillay<sup>3</sup>, Mohd. Farouk M. Y.<sup>5</sup>, Aniq Akhtar Abdullah<sup>5</sup>, Cornelia C. S.<sup>5</sup>

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### Abstract

DNA characterisation on the Malayan tapirs were done using the partial cytochrome *b* gene segment of the mitochondrial DNA. DNA characterisation revealed a low variation in their genetic content. Two haplotypes were identified, which presumably represents the two recognised subspecies of *Tapirus indicus*: (1) *Tapirus indicus indicus* and (2) *Tapirus indicus sumatranus*. 40 species-specific sites for the *Tapirus indicus* were identified when compared to the sequence of *Tapirus terrestris*, which are important to distinctly distinguish *Tapirus indicus* from the other species of tapir. DNA sequences were later subjected to phylogenetic analyses using distance (neighbour-joining), maximum parsimony and maximum likelihood analysis. All three methods produced a similar topology, which supported the monophyletic status of the Malayan tapir.

*Keywords:* *Tapirus indicus*, partial cytochrome *b*, sequence characterisation, species-specific sites, phylogenetic analysis

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## POPULATION ESTIMATES OF MALAY TAPIR, *TAPIRUS INDICUS*, BY CAMERA TRAPPING IN KRAU WILDLIFE RESERVE, MALAYSIA

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### Abstract

The Malay tapir (*Tapirus indicus*) is the only Old World tapir species. Its distribution ranges from Southern Thailand and Myanmar, Peninsular Malaysia and Sumatra. Due to habitat destruction it is believed that the population density has decreased during the past two decades. There have been no specific population density studies of Malay tapir in the past. This study proposes a new method for identifying tapir individuals and estimating the population density of Malay tapir from photographs. The study took place in Krau Wildlife Reserve, Malaysia, consisting of 63.000ha undisturbed tropical forest. Two camera traps were deployed at 13 different salt-licks where tapirs had been recorded. All animal species photographed were recorded and all photographs containing tapirs were analysed and individuals were identified. The results reveal that using necklines is a reliable method for identifying and distinguishing between individual tapirs. The results also suggest that tapirs frequent salt licks relatively often when compared to other species, and that any individual frequently visit salt licks more than 15km apart. The study estimated approximately 45-50 tapirs in Krau Wildlife Reserve.

**Key words:** *Malayan tapir, Tapirus indicus, population density, camera trapping*

# MANAGEMENT OF A TB-POSITIVE MALAYAN TAPIR (*TAPIRUS INDICUS*) BREEDING COUPLE IN ARTIS ZOO, AMSTERDAM.

## 1. TREATMENT BASED ON PHARMACOLOGICAL EVIDENCE, 2. REARING A TB-NEGATIVE CALF

HOYER MJ<sup>1</sup>, SEMRAU A<sup>1,2</sup> AND FRANSEN EJF<sup>3</sup>

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3. Dept. of Pharmacy and Clinical Pharmacology. OLVG Hospital Amsterdam, the Netherlands

### Abstract

Tuberculosis remains of great concern to the zoo community and veterinary authorities. Reports of case of tuberculosis in zoo animals are numerous and recently some European zoos had to cull rare or endangered species because of tuberculosis. Tapirs seem particularly vulnerable to mycobacterial infections and very commonly react positively to TB testing. Many of these results may however be false positive. Unfortunately, this can only be ruled out by post mortem examination. This means that rare and often endangered animals may be culled unnecessarily and only for diagnostic reasons. During routine TB testing of the Artis' Malayan tapir (*Tapirus indicus*) breeding couple, the animals responded positive to the skin test to avium and bovine ppds (protein purified derivatives) and serologically (ELISA) against *M. avium* / paratuberculosis, *M. bovis* and MPB70. They never showed clinical signs consistent with active TB. Due to the vulnerable status of the Malayan tapir and the female's ongoing pregnancy, it was decided not to euthanize the animals, but to try to avoid culling as required by the Dutch Veterinary Authorities. The following protocol was designed:

1. The tapirs were put into isolation and strict quarantine measures were taken.
2. Sire, dam and offspring were tested regularly by the inguinal skin test and serological tests (ELISA) [CDI- the Netherlands], Rapid Test (RT) and Multi Antigen Print Immuno Assay (MAPIA, Chembio, Diagnostic Systems, Inc. USA, courtesy K. Lyashchenko). Faeces, milk, placenta, uterine discharge and bronchial lavage were tested by bacteriological culture and PCR
3. Once the calf was born, the dam (Aya) was treated for eight months with three different regimes of anti-mycobacterial drugs; (a) Isoniazide + Rifampicine (two different doses) and (b) Isoniazide + Ethambutol. Initially doses were extrapolated from literature (Fowler and Miller, 1993; Dowling, 2006; [www.aphis.usda.gov/ac/Elephants/](http://www.aphis.usda.gov/ac/Elephants/)), Scott, 1968) and later adapted based on pharmacological evidence. To study the pharmacokinetics, blood drug levels were assessed by sequential blood sampling and processed by High Performance Liquid Chromatography.

At the age of eight months the calf (Tumpat II) was weaned off and separated from its mother. The ELISA antibody titers which were high four weeks after birth had dropped to low or non-detectable levels, indicating the presence of maternal antibodies. To date (one year after its birth) the calf is still negative and fit for transfer to another zoo. The ELISA antibodies in both male and female were high initially but rose to very high levels after tuberculation. This phenomena is apparently often seen in positive animals (Bakker, pers. Comm.; Larsen and Salman, 2001). The breeding couple is still thriving and preliminary progesterone levels predict that the female is pregnant again. The skin tests in both dam and sire stayed positive for both avium and bovine ppd throughout the study. The

mycobacterium involved could never be cultured, and PCR for mycobacteria was negative. The calf never responded.

In all three pharmacokinetic studies significant graphs were obtained for isoniazide, suggesting drug exposure and clinical efficacy as seen by various authors. Neither rifampicine nor ethambutol could be detected during respectively 6 and 24 hour measurement. Drug absorption, drug metabolism and drug protein binding can be quite different amongst different species. Therefore, one has to be careful to assume efficacy from drugs and their dosages extrapolated from literature used in other species, including human.

This report may be a precedent for future cases of TB in captive rare or endangered species.

Keywords Malayan tapir, *Tapirus indicus*, tuberculosis, pharmacokinetics, treatment,

#### **Acknowledgements**

This study would not have been possible without the help of the tapir keepers at Artis Zoo and Piet Meisner in particular, colleagues Frank Verstappen and Marno Wolters, veterinary nurse Daphne Valk and the personnel of the Dept of Pharmacy and Clinical Pharmacology. OLVG Hospital.

## PRELIMINARY STUDIES ON THE MICRO-HABITAT USAGE OF *TAPIRUS INDICUS* AT KRAU WILDLIFE RESERVE, PAHANG, MALAYSIA

<sup>1</sup>Nor Zalipah Mohamed, <sup>2</sup>Mohd Sanusi, M. and <sup>2</sup>C. Traeholt,

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<sup>2</sup>Malay Tapir Conservation Project, Department Of Wildlife and National Parks/Copenhagen Zoo, Krau Wildlife Reserve, Malaysia

### Abstract

The study of micro-habitat usage of *Tapirus indicus* was conducted at Krau Wildlife Reserve, Pahang Malaysia. Habitat characteristics were recorded for two sub-adult tapirs named Merdeka (female) and Ramadhan (male). Both individuals were caught, radio-collared and followed since August and October 2004 respectively. The GPS-locations for both individuals were used as micro-habitat usage and 30 study points each were selected randomly. Samplings of habitat evaluation were conducted from October 2006 to June 2007. A total of 27 habitat variables were recorded at each point of 3m radius and trees with a DBH<5cm at the sampling area were identified. From the total variables, only 23 were available at each point. Only climbers showed significant different between individuals ( $t=2.05$ ,  $P=0.045$ ,  $df=58$ ). From PCA calculated, Merdeka shows the highest value of Principal Component 1 (PC1) for climber (0.437) while Ramadhan shows the the highest value for ginger (-0.399). A total of 391 trees of DBH<5cm recorded for Merdeka consist of 166sp from 47 families. 13 of the species were listed as species consumed by tapir from previous study with a preference for two species. For Ramadhan, 385 trees of DBH<5cm recorded consist of 165 species from 47 families. The species consumed were only 10 with a preference for four species. This study recorded a total of 15 species that were consumed by tapir with five species in the "most preferred" category. To get the clear picture of micro-habitat usage of tapir, more intensive studies on habitat characteristic of tapir habitats are needed.

**Key words:** Malayan tapir, *Tapirus indicus*, micro-habitat, habitat utilisation

# DISPLACEMENT OF MALAYAN TAPIR IN PENINSULAR MALAYSIA

Zainal Zahari, Z, Choong Siew Shean, Abraham, M and Siti Aisyah, A.T

Department of Wildlife and National Parks, Malaysia

## Abstract

Over the past two decades, the displacement of large mammals was apparent in various parts of Peninsular Malaysia. More prominent are the Asian elephants (*Elephas maximus*) and Sumatran rhinoceros (*Dicerorhinus sumatrensis*). The displacement trend presumed by these species was similar; increasing to a peak within the first 15 years and then declining. The first and last Sumatran rhinoceros displaced was in 1975 and 1994 respectively. The displacement of Malayan tapir was first reported in 1991. During the periods 1991 – 1999, a total of 28 individuals were displaced. Of this, six were displaced in the first five years, followed by 22 in the subsequent five years. The rate of displacement averaged 2.8 individuals per year (Zainal Zahari, et al., 2001). However, in 2007, the rate increased sharply to 16 per year. In 2008, until April, five individuals were already displaced, two died and three survived and being cared for in the Malayan Tapir Conservation Centre, Department of Wildlife and National Parks, Malaysia.

In general large ungulates that are displaced are easily captured as compared to those within their habitat. The same scenarios were observed in Sumatran rhinoceros and the Malayan tapir. Once a Malayan tapir is displaced, the animal wanders around its new “habitat” trying to reestablish a home range. It has to connect the food, water, shelter and other niches within the new “habitat” via a common trail. Prior to expanding its home range, it would remain close to areas of food abundance, raiding the orchards and villages for several days or weeks. During this stage of confusion the animal is very vulnerable to poachers, depredation by large carnivores and capture or rescue. In addition, in the unfamiliar “habitat”, the animal succumbs to various problems; falling into drains and wells, trapped in backyards and being hit by automobiles.

As in most conservation issues, habitat loss is the primary cause of Malayan tapir displacements. Since 1974, a total of 10,028km<sup>2</sup> of native forest cover were converted to oil palm plantation, rubber estates, urban areas and mixed horticulture farms (DOA, 1995). Although, Peninsular Malaysia still has 47.4% of land under forest, the rate of land conversion must be controlled to counteract more displacement of large mammals. Fragmentation of indigenous forest also resulted in loss of many species, particularly those that are solitary, including the Sumatran rhinoceros and Malayan tapir.

**Keywords:** Malayan tapir, *Tapirus indicus*, displacement, tapir conservation

# ACTIVITY PATTERNS AND RELATIVE ABUNDANCE OF THE THE MALAYAN TAPIR IN GUNUNG BASOR FOREST RESERVE, KELANTAN

Darmaraj, M.R. and S. Mohamad

WWF-MALAYSIA

## Abstract

Camera trapping appears to provide reliable data on activity and ranging patterns of tapirs. However, there is no published literature on camera-trapping surveys for tapirs in Malaysia thus far. Here, we present activity patterns and relative abundance index of tapirs from a camera-trapping survey, which was targeted for density estimation of tigers. A nine-month (October 2004 - July 2005) camera-trapping survey was conducted in Gunung Basor Forest Reserve, a logged dipterocarp forest in Jeli, Kelantan. Sixteen camera-trap locations varied in terms of elevation (194 - 851 m) and floristic zones (lowland to hill/upper dipterocarp). A trap effort of 2,664 trap-nights yielded 80 independent tapir photos, representing 9.1% of the total number of wildlife photos. Individual recognition was subject to discrepancies; hence the number of individuals detected was not quantified. Tapirs in the study area seem to have two main peaks of activity during the night occurring around 0430-0530 and 2030-2130 hours. Though tapirs were found at various elevations in the study area, the highest relative abundance index according to camera-trapping sites was attained at an elevation of 292 meters above sea level with 9.52 photos/100 trap nights. Although qualitative, such data may be indicative of the habitat preference of tapirs for lowland forest. In light of the increasing changing land use patterns in Malaysia, more camera-trapping and telemetry studies on tapirs are urgently needed to gain a better understanding of its distribution and habitat preference. The results from these future studies are crucial for the development of management recommendations to reduce negative impacts affecting the tapir's natural habitat.

**Keywords:** *Tapirus indicus*, logged forest, activity pattern, relative abundance index

# REVIEW OF THE OCCURRENCE OF LARGE MAMMALS IN CAMBODIA

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<sup>1</sup>Royal University of Phnom Penh / Ministry of Environment

<sup>2</sup>Conservation International Cambodia Programme

## Abstract

The surveys on large mammals in Cambodia have begun in mid-1990s. The aerial survey for Kouprey in 1994 was important in its observations of large mammals in eastern Cambodia and was followed by further foot-based surveys in subsequent years nationwide; 1996, 1998, 1999, 2000, 2001, 2003 and 2005. Other surveys are still ongoing. The Malayan tapir populations are extremely fragmented in its northern distribution range, which is considered Southern Thailand and Myanmar. Southern Vietnam and Cambodia have also been listed as range countries although the three (3) records from these two countries are difficult to verify. Comparing the habitat type of South-western Cambodia with other range countries such as Thailand, Malaysia and Indonesia it is reasonable to suggest that tapirs may occur in Cambodia too. The species overlap between Southwest Cambodia and Peninsular Malaysia is significant, for example, large mammals such as tiger (*Panthera tigris corbetti*), sambar deer (*Cervus unicolour*), Asian Elephant (*Elephas maximus*), Bear (*Helarctos malayanus*), gaur (*Bos gaurus*), red muntjak (*Muntiacus muntjak*), leopard (*Panthera pardus*) and clouded leopard are just some of the species found in common. Based on 13 surveys countrywide on large mammals, none of those surveys give evidences of tapir to be present in Cambodia including the wildlife survey of Bokor National Park where a picture of tapir tracks was alleged to have been taken in 2001. No local communities have been able to recognize tapirs on pictures and it is, therefore, reasonable, to conclude that tapirs are not part of the Cambodia mammalian fauna.

**Keywords:** Malayan tapir, *Tapirus indicus*, mammal survey, Cambodia

# CAPTIVE BEHAVIOUR OF MALAYAN TAPIR (*Tapirus indicus*) AT SUNGAI DUSUN WILDLIFE CONSERVATION CENTER, PENINSULAR MALAYSIA.

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## Abstract

Tapir is one of endangered mammal species in the world. The rapid destruction of tapir's natural habitat is one of the main factors that could further force this species to the brink of extinction in Peninsular Malaysia. Many efforts have been made by the Department of Wildlife and National Parks to conserve this species which include captive breeding at Sungai Dusun Wildlife Conservation Centre (SDWCC). The objectives of the study were three folds; i) to investigate general captive behaviours, ii) to understand the daily time spent on each prescribed captive behaviour and iii) to investigate the captive activity pattern within 24 hours cycle. The method used in this study was continuous focal sampling. Five individual subjects were selected in this study; two adult males and three adult females. Observation was divided in two sessions where each session consists of a complete 24-hour observation cycle. Data from observations identified 6 major Tapir behaviours or activities in captivity. The daily time spent on each of these activities were significantly higher ( $H = 25.434$ ,  $df = 5$   $P < 0.05$ ) on resting (69.18%), followed by feeding (17.94%), moving (11.07%), urinating or defecating (1.28%), grooming (0.31%) and playing (0.19%). All of these activities were not significantly different between sexes and among individual subjects. Almost the same pattern was shown by the daily frequency of each of these activities repeated by each individual except that feeding (37.5%) became the most frequently repeated activity followed by resting (30%), urinating or defecating (24.5%), grooming (5.5%), moving (1.3%) and playing (1.1%). The results also indicated that tapir individuals in SDWCC tend to more active at night (nocturnal) with two daily active peaks – first, between 4am and 9am and second between 7pm and 12am. This pattern is almost similar with the pattern reported in the wild.

**Keywords:** Malayan tapir, *Tapirus indicus*, captive behaviour, Sg. Dusun, Malaysia

## SPATIAL USE BY MALAYAN TAPIR (*TAPIRUS INDICUS*) IN KRAU WILDLIFE RESERVE, MALAYSIA

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### Abstract

A radio telemetry project was conducted in Krau Wildlife Reserve Malaysia between October 2002 to May 2007. Five individuals were fitted during the study consisting two adult males (78 & 1113 point locations hereafter referred as pl), a female (21pl), a subadult male (1275pl) and a subadult female (777pl). Wildlife Inc. transmitter is used to detect the individuals. The bearing test for transmitter shows the average of error was  $2.64 \pm 0.67^\circ$  (n=15) 50-250m,  $4.38 \pm 0.62^\circ$  (n=15) 250-500m, and the error was  $7.26 \pm 0.84^\circ$  (n=15) 500-800m. The signal from distance more than 800 meters was not clear and sometimes not detected. The most suitable distance to collect data was less than 800 meter. As for minimum number of points, only three individuals reached asymptote. Home range and core area estimates were analysed using Minimum Convex Polygon (MCP95%), Harmonic Mean (HM50%) and Fixed Kernel (K50%, K75% & K95%) for overall, daily and monthly comparison among individuals. There are significant different daily MCP95% within same age group of sub adults, daily HM50% within adults and sub adults, daily K50% within males and female, and within daily K95% same age group of adult males. There is significant difference of monthly MCP95% within individuals, within adult and sub adults, and within same age group of sub adults. As for the monthly HM50%, there is significant difference within individuals, within adults and sub adults, within same age group of sub adults, and within adult males. There is significant difference of monthly K50%, K75% and K95% within individuals, within males and female, within adult and sub adult, and within same age group of sub adults. Two individuals were monitored within the same timeframe and there are significant differences within daily overlap HM50%, monthly overlap of MCP95%, HM50%, K50%, K75% and K95%. Correlation between rainfall and area utilized is also discussed and spatial analysis is used to explain Malayan tapirs' habitat utilization in relation to altitude, forest type, saltlicks and human settlement.

**Keywords:** Malayan tapir, *Tapirus indicus*, spatial use, tapir conservation, Krau Wildlife Reserve

# AN ARCHAEOZOOLOGICAL AND HISTORICAL REVIEW OF THE MALAY TAPIR *TAPIRUS INDICUS* IN BORNEO: A POTENTIAL LOCATION FOR RE- INTRODUCTION

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## Abstract

The critically endangered Malay tapir *Tapirus indicus* currently has a patchy and disjunctive biogeographic range, extending from southern Myanmar and Thailand south of latitude 18°N through Peninsular Malaysia, to the island of Sumatra. The palaeontological record however shows that the past range of *Tapirus indicus* included China, and also the two other large islands of the Sunda region: Java and Borneo. Archaeozoological records combined with historical accounts indicate that the Malay tapir was present on Borneo from at least the Late Pleistocene (~45,000 years ago), possibly until the early 20<sup>th</sup> Century. It also demonstrates that the Malay tapir is a remarkable, resilient creature that has adapted to numerous climatic and ecological regimes throughout its long history. In recent centuries, when not hunted, they have even managed to tolerate close contact with, and disturbance from people. As the remaining natural habitats of the Malay tapir come increasingly under threat, there appears to be no ecological reason why *Tapirus indicus* could not be re-introduced to Borneo, where it is known to have existed into the recent past.

**Keywords:** Malayan tapir, *Tapirus indicus*, palaeontology, Borneo, historical distribution.

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