

Fifth International Tapir Symposium

**Hotel Flamingo, Kuala Lumpur, Malaysia
16-21 October, 2011**

TAPIR SYMPOSIUM



SYMPOSIUM PROGRAM & BOOK OF ABSTRACTS

ORGANIZERS

IUCN/SSC Tapir Specialist Group (TSG)

Department of Wildlife and National Parks (DWNP), Malaysia

Association of Zoos & Aquariums (AZA) Tapir Taxon Advisory Group (TAG)

European Association of Zoos & Aquaria (EAZA) Tapir Taxon Advisory Group (TAG)

Copenhagen Zoo, Denmark

PLANNING COMMITTEE (TSG)

Patrícia Medici

Research Coordinator, Lowland Tapir Conservation Initiative, Brazil

IPÊ - Institute for Ecological Research

Chair, IUCN/SSC Tapir Specialist Group (TSG)

Carl Traeholt

Coordinator, Malayan Tapir Project, Malaysia

Copenhagen Zoo, Denmark

Malayan Tapir Coordinator, IUCN/SSC Tapir Specialist Group (TSG)

Bengt Holst

Director of Conservation and Science, Copenhagen Zoo, Denmark

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Member, Steering Committee, IUCN/SSC Tapir Specialist Group (TSG)

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Member, Steering Committee, IUCN/SSC Tapir Specialist Group (TSG)

Kelly Russo

Manager of Interactive Marketing, Houston Zoo Inc., United States

Coordinator, Education & Outreach Committee, IUCN/SSC Tapir Specialist Group (TSG)

PLANNING COMMITTEE (DWNP)

Hj. Mohd. Nawayai bin Yasak

Director Biodiversity Conservation Division

Mr Burhanuddin Mohd Nor

Director Consultancy Division

Mr Salman Saaban

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Mr Hazril Rafhan Abdul Halim

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Mr Muhd. Fadlli Ab Yazı

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Mrs Suzilawati Ramzan

Mr Mohammad Nasrie Mat Nasir

Mr Fauzul Azim Zainal Abidin

Ms Norfariza Mohd. Khalid

INSTITUTIONAL SUPPORT

Association of Zoos & Aquariums (AZA) Tapir Taxon Advisory Group (TAG)

Copenhagen Zoo, Denmark

Department of Wildlife and National Parks (DWNP), Malaysia

European Association of Zoos and Aquaria (EAZA) Tapir Taxon Advisory Group (TAG)

Houston Zoo Inc., United States

IPÊ - Instituto de Pesquisas Ecológicas (Institute for Ecological Research), Brazil

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IUCN/SSC Tapir Specialist Group Conservation Fund (TSGCF)

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Kansas City Zoo / USA

Linton Zoo / UK

Lionshare Farm / USA
Mesker Park / USA
Nashville Zoo at Grassmere / USA
Palm Beach Zoo / USA
Parc Zoologique d'Amnéville / France
Point Defiance Zoo / USA
Rum Creek / USA
Safari de Peaugres / France
San Antonio Zoo / USA
San Diego Zoo / USA
Sedgwick County Zoo / USA
Tierpark Hellebrunn / Germany
US Fish & Wildlife Service / USA
Virginia Zoo / USA
Wildlife World Zoo / USA
Woodland Park Zoo / USA
World Wildlife Fund / USA
WWF Russell Train Scholarship Program / USA
Zoo de la Palmyre / France
Zoo León / Mexico
ZooParc de Beauval / France

DETAILED PROGRAM

Sunday, October 16

15:00-18:00 **ARRIVAL & REGISTRATION - Hotel Flamingo**

19:00-22:00 **ICEBREAKER - Hotel Flamingo**

Monday, October 17

07:00-08:00 **BREAKFAST**

08:00-10:00 **OPENING CEREMONY - Grand Ballroom, Hotel Flamingo**

08:00 Arrival of Guest-of-Honor: The Honorable **Tan Sri Datuk Seri Panglima Joseph Kurup**
The Deputy Minister of Natural Resources and Environment, Malaysia

08:10 National Anthem

08:15 Recitation

08:20 Welcoming Address by **Y.Bhg. Dato' Abd. Rasid Samsudin**
Director General, Department of Wildlife and National Parks (DWNP), Peninsular Malaysia

08:30 Welcoming Address by **Patrícia Medici**
Chair, IUCN/SSC Tapir Specialist Group (TSG)

08:40 Official Opening Address by the Deputy Minister of Natural Resources and Environment Malaysia:
The Honorable Tan Sri Datuk Seri Panglima Joseph Kurup

08:50 **Keynote Address** by **Gathorne Cranbrook**
Large Mammals and Extinction Crisis in South-East Asia: Lessons from the Past

09:20 Presentation of Souvenir to the Deputy Minister of Natural Resources and Environment
Malaysia: **The Honorable Tan Sri Datuk Seri Panglima Joseph Kurup**

09:30 Photography Session

09:40 Press Conference / Refreshments

10:00-12:30 **PAPER SESSION 1: Malayan Tapir** (8 presentations)
Session Moderator: CARL TRAEHOLT, Copenhagen Zoo, Malaysia

10:00-10:15 **The Occurrence of Malayan Tapir (*Tapirus indicus* Desmarest, 1819) in the Malampah Nature Reserve, West Sumatra**
Desman Alfajri, Andalas University, West Sumatra, Indonesia

10:15-10:30 **Mineral Licks and Their Use by Malay Tapirs**
Boyd Simpson, Malay Tapir Conservation Project, Copenhagen Zoo, Denmark / Department of Wildlife and National Parks, Malaysia

10:30-10:45 **Estimating the Population Density of the Asian Tapir *Tapirus indicus* in a Selectively Logged Forest of Peninsular Malaysia**
Christopher Wong, WWF Malaysia

10:45-11:00 **Studying the Role of Malayan Tapirs as Dispersers of Large-Seeded Plants in Peninsular Malaysia**
Ahimsa Campos-Arceiz, University of Nottingham, Malaysia Campus & National University of Singapore, Singapore

11:00-11:15 **Can the Distribution of the Asian Tapir (*Tapirus indicus*) Predicted by Maximum Entropy Modeling be useful to Conservation Planners in Peninsular Malaysia?**
Reuben Clements, James Cook University & Universiti Malaya, Malaysia

11:15-11:30 **Displacement of Malayan Tapirs (*Tapirus indicus*) in Peninsular Malaysia from 2006 to 2010**
David Magintan, Department of Wildlife and National Parks (DWNP), Malaysia

- 11:30-11:45 **Tapirs under the Bridge: Are Highway Viaducts Beneficial or Detrimental to Asian Tapirs (*Tapirus indicus*) in the Kenyir Wildlife Corridor, Peninsular Malaysia?**
Reuben Clements, James Cook University & Universiti Malaya, Malaysia
- 11:45-12:00 **Poaching and Accidental Killing Threatens Malay Tapirs in the Taninthayi Nature Reserve, Myanmar**
Nay Myo Shwe, Forest Department of Myanmar, and Tony Lynam, Wildlife Conservation Society (WCS)
- 12:00-12:30 **QUESTIONS/DISCUSSIONS** (30 minutes)
- 12:30-14:00 **LUNCH (Hotel Flamingo)**
- 14:00-15:30 **PAPER SESSION 2: Lowland Tapir & Mountain Tapir** (4 presentations)
Session Moderator: ANDERS GONÇALVES DA SILVA, CSIRO, Australia
- 14:00-14:15 **Assessing the Viability of Lowland Tapirs in a Fragmented Landscape: Results from the Atlantic Forest Tapir Program, Brazil**
Patrícia Medici, Coordinator, Lowland Tapir Conservation Initiative, IPÊ, Brazil
- 14:15-14:30 **Pantanal Tapir Program, Brazil**
Patrícia Medici, Coordinator, Lowland Tapir Conservation Initiative, IPÊ, Brazil
- 14:30-14:45 **A New Species of the Largest Living South American Herbivore from Amazonia: Evidence of a Hidden Mammalian Diversity in the Neotropics**
Mario A. Cozzuol, ICB, Federal University of Minas Gerais, Brazil
- 14:45-15:00 **Conserving the Andean Tapir (*Tapirus pinchaque*) in the Central Andes of Ecuador**
Hugo Mogollon, Finding Species, United States / Ecuador
- 15:00-15:30 **QUESTIONS/DISCUSSIONS** (30 minutes)
- 15:30-16:00 **Coffee Break / POSTER SESSION**
- 16:00-17:45 **PAPER SESSION 3: Baird's Tapir** (5 presentations)
Session Moderators: EDUARDO NARANJO, El Colegio de la Frontera Sur (ECOSUR), Mexico & MANOLO GARCÍA, TSG Coordinator for Baird's Tapirs
- 16:00-16:15 **Conservation Status of Baird's Tapir in the Guatemalan Protected Areas System**
Manolo García, Universidad de San Carlos de Guatemala, Guatemala
- 16:15-16:30 **A Preliminary Population Viability Analysis for Baird's Tapirs in Guatemala**
Manolo García, Universidad de San Carlos de Guatemala, Guatemala
- 16:30-16:45 **An Official Monitoring Protocol for *Tapirus bairdii* in Honduras**
Nereyda Estrada, TSG Coordinator for Honduras
- 16:45-17:00 **Past and Present: The Status of the Baird's tapir (*Tapirus bairdii*) in Nicaragua and Its Implications for Conservation Planning**
Christopher A. Jordan, Michigan State University, USA
- 17:00-17:15 **Challenges for Tapir Conservation in Mexico and Central America**
Eduardo J. Naranjo, El Colegio de la Frontera Sur, Mexico
- 17:15-17:45 **QUESTIONS/DISCUSSIONS** (30 minutes)
- 20:00-22:00 **WELCOME DINNER - Hotel Flamingo**

Tuesday, October 18

- 07:00-08:00 **BREAKFAST**
- 08:00-08:30 **KEYNOTE SPEAKER: Issues Relating to Conservation of Malayan Tapirs in Peninsular Malaysia**
Y.BHG. Mislihah Binti Mohamad Basir, Deputy Director General, DWNP, Malaysia
- 08:30-09:45 **TSG REPORTS (Part 1 - 4 presentations)**
Session Moderator: PATRÍCIA MEDICI, Chair TSG, Brazil
- 08:30-08:45 Marketing & Education: **Tapir Press Kit**
Building Awareness for Tapirs: Strategies and Resources to Engage the Media
Claire Martin (Walt Disney Company, USA) and **Nathan Herschler** (International Fund for Animal Welfare, USA), Emerging Wildlife Conservation Leaders Program (EWCL)
- 08:45-09:00 Marketing & Education: **Tapirs Supporting Tapirs Brazil**
Patrícia Medici, TSG Chair, Brazil
- 09:00-09:15 Genetics
Anders Gonçalves da Silva, Australia/Brazil
- 09:15-09:30 *Tapir Conservation* Newsletter
Carl Traeholt & Anders Gonçalves da Silva, Editors *Tapir Conservation* Newsletter
- 09:30-09:45 **QUESTIONS/DISCUSSIONS**
- 09:45-10:15 **Coffee Break / POSTER SESSION**
- 10:15-12:30 **TSG REPORTS (Part 2 - 7 presentations)**
Session Moderator: PATRÍCIA MEDICI, Chair TSG, Brazil
- 10:15-10:30 Red Listing: **National Red List for Tapirs in Brazil**
Patrícia Medici, TSG Chair, Brazil
- 10:30-10:45 Action Planning: **TSG Species and National Action Plans**
Patrícia Medici, TSG Chair, Brazil
- 10:45-11:00 Action Planning: **National Action Plan for Peru**
Jessica Amanzo, TSG Coordinator for Peru
- 11:00-11:15 Action Planning: **National Action Plan for Ecuador**
Fernando Nogales, TSG Coordinator for Ecuador
- 11:15-11:30 Action Planning: **National Action Plan for Guatemala**
Manolo García, TSG Coordinator for Baird's Tapirs
- 11:30-11:45 Action Planning: **National Action Plan for Honduras**
José Trinidad Suazo, Minister of Forestry Conservation Institute - ICF, Honduras
- 11:45-12:00 Action Planning: **National Action Plan for Argentina**
Paula Gonzalez Ciccía, Fundación Temaikén, Argentina
- 12:00-12:30 **QUESTIONS/DISCUSSIONS**
- 12:30-14:00 **LUNCH (Hotel Flamingo)**
- 14:00-16:00 **WORKSHOP 1: Tapir Action Plan Implementation (Part 1)**
Facilitators: PATRÍCIA MEDICI (CBSG Brasil) & **BENGT HOLST** (CBSG Europe)
Note: Please See Workshop Outline Attached.
- 16:00-16:30 **Coffee Break / POSTER SESSION**
- 16:30-18:30 **WORKSHOP 1: Tapir Action Plan Implementation (Part 2)**
Facilitators: PATRÍCIA MEDICI (CBSG Brasil) & **BENGT HOLST** (CBSG Europe)

Wednesday, October 19

MID-WEEK TRIPS - Please See Attached Information

Thursday, October 20

- 07:00-08:00 **BREAKFAST**
- 08:00-09:00 **OPEN DISCUSSION: Working with Funders**
Jeffrey Flocken, TSG Steering Committee & International Fund for Animal Welfare, USA
- 09:00-10:30 **WORKSHOP 2: Ex-Situ Conservation and Management**
Moderator: MICHELE STANCER, Chair, AZA Tapir TAG, USA
- 09:00-09:15 **North American Captive Management, Breeding and Transfer Plans of Ex-situ Tapirs**
Michele Stancer, Chair AZA Tapir TAG, USA
- 09:15-09:30 **Studbook Keeping as an Efficient Tool for the Management of Tapirs in Captivity**
Sharmy Prastiti, Taman Safari, Indonesia
- 09:30-09:45 **Tuberculosis: A Major Obstacle for the European Malayan Tapir Breeding Programme**
Mark J. Hoyer, DVM, Artis Royal Zoo, Netherlands
- 09:45-10:00 **DNA Characterization and Phylogeny of the Malayan Tapir (*Tapirus indicus*) Using Complete Cytochrome b Gene Segment of the Mitochondrial DNA (mtDNA)**
Jeffrine Japning Rovie-Ryan, Department of Wildlife and National Parks (DWNP), Malaysia
- 10:00-10:30 **QUESTIONS/DISCUSSIONS**
- 10:30-11:00 **Coffee Break / POSTER SESSION**
- 11:00-11:30 **SPECIAL PRESENTATION: Assessing Age and Maturity in Tapirs Based on Dental Eruption and Cranial Suture Closure**
Matthew Colbert, TSG Evolution Consultant & Jackson School of Geosciences, University of Texas at Austin, USA
- 11:30-13:00 **WORKSHOP 3: Tapir Conservation outside Protected Areas**
Moderator: EDUARDO NARANJO, El Colegio de la Frontera Sur, Mexico
Presenters: Sivananthan Elagupillay (Malaysia); Wilson Novarino (Indonesia); Andrés Tapia (Ecuador); Eduardo Naranjo (Mexico)
- 13:00-14:00 **LUNCH (Hotel Flamingo)**
- 14:00-15:30 **WORKSHOP 4: Implementation of Conservation Strategies in Landscape Planning**
Moderator: CARL TRAEHOLT, Copenhagen Zoo, Malaysia
- 14:00-14:15 **Biodiversity Conservation: Applications for Successful Implementation at Landscape Level**
Christian Schriver, CSC Consult, Malaysia
- 14:15-14:30 **Lessons Learned: Tiger Conservation in Malaysia... Building Bridges, Safety Nets and Getting a Grade**
Melvin Gumal, WCS Malaysia
- 14:30-14:45 **Strategic Planning and the Constitution of Forest Reserves in Peninsular Malaysia**
Lim Teck Wyn, Resource Stewardship Consultants Sdn Bhd
- 14:45-15:00 **Implementation Strategy for a Tapir Conservation Plan in Honduras**
Jose Manuel Mora, Zamorano University & Jose Trinidad Suazo, Minister of Conservation and Forest Development, Protected areas and Wildlife - Honduras
- 15:00-15:30 **QUESTIONS/DISCUSSIONS**

15:30-16:00 **Coffee Break / POSTER SESSION**

16:00-19:00 **WORKSHOP 5: Assessing Structural and Functional Landscape Connectivity for Tapirs**

Moderator: MANOLO GARCÍA, TSG Coordinator for Baird's Tapirs, Guatemala & FERNANDO CASTILLO, Guatemala

Note: Please See Workshop Outline Attached.

Friday, October 21

07:00-08:00 **BREAKFAST**

08:00-13:00 **WORKSHOP 6: TSG Strategic Planning 2012/2014 (Part 1)**

Facilitators: PATRÍCIA MEDICI (CBSG Brasil) & BENGT HOLST (CBSG Europe)

Note: PLEASE SEE ATTACHED WORKSHOP OUTLINE.

10:30-11:00 **Coffee Break**

13:00-14:00 **LUNCH (Hotel Flamingo)**

14:00-18:00 **WORKSHOP 6: TSG Strategic Planning 2012/2014 (Part 2)**

Facilitators: PATRÍCIA MEDICI (CBSG Brasil) & BENGT HOLST (CBSG Europe)

16:00-16:30 **Coffee Break**

18:00-18:30 **CLOSING SESSION & FINAL REMARKS**

20:00-24:00 **CLOSING DINNER - Hotel Flamingo**

Saturday, October 22

DEPARTURES throughout the day

POSTERS (11)

LOWLAND TAPIR (3)

Integrating the Community in Tapir Conservation in the North of Argentina	Paula Gonzalez Ciccía	Argentina
Lowland Tapir Training as an Educative Tool for the Program "Feeling Nature" aimed at People with <i>Visual</i> Disability	Paula Gonzalez Ciccía	Argentina
Social Behavior in Lowland Tapir: Kinship Distribution in a Landscape	Gabriela Medeiros de Pinho	Brazil

MALAYAN TAPIR (1)

Using Camera-Trap Data to Model Habitat Use by Malayan Tapir (<i>Tapirus indicus</i>) in a Peat Swamp Forest of Berbak National Park, Sumatra, Indonesia	Dolly Priatna	Indonesia
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EX-SITU TAPIR CONSERVATION (7)

<i>Tapirus terrestris</i> Whey Proteins	Paula Gonzalez Ciccía	Argentina
Effective Drug Combinations for Collecting Samples in Lowland Tapirs (<i>Tapirus terrestris</i>)	Paula Gonzalez Ciccía	Argentina
Effects of Environmental Conditions on Tapirs' Health	Paula Gonzalez Ciccía	Argentina
Endocrine Profiles during the Estrous Cycle and Pregnancy, and Ultrasonic Characterization of Fetal Development in Captive Malayan Tapirs (<i>Tapirus indicus</i>)	Heleen van Engeldorp	Netherlands
Systematic Research and Ex-Situ Conservation Programs for Captive Malayan Tapir (<i>Tapirus indicus</i>) in Thailand	Wanlaya Tipkantha	Thailand
Butorphanol, Medetomidine and Ketamine for Anesthesia of Malayan Tapirs (<i>Tapirus indicus</i>)	Daraka Tongthainan	Thailand
Fatal Colic in 2 Captive Malayan Tapirs (<i>Tapirus indicus</i>) in Thailand	Daraka Tongthainan	Thailand

GENERAL PROGRAM

DAY	MORNING	AFTERNOON	EVENING
Oct. 16 Sunday	15:00 - 18:00. ARRIVAL & REGISTRATION Hotel Flamingo		19:00 - 22:00. ICEBREAKER Hotel Flamingo
Oct. 17 Monday	08:00 - 10:00. OPENING CEREMONY 10:00 - 12:30. PAPER SESSION 1 Malayan Tapir 12:30 - 14:00. LUNCH	14:00 - 15:30. PAPER SESSION 2 Lowland Tapir & Mountain Tapir 15:30 - 16:00. COFFEE BREAK & POSTER SESSION 16:00 - 17:45. PAPER SESSION 3 Baird's Tapir	20:00 - 22:00. WELCOME DINNER Hotel Flamingo
Oct. 18 Tuesday	08:00 - 08:30. KEYNOTE SPEAKER Y.BHG. MISLIAH BINTI MOHAMAD BASIR 08:30 - 09:45. TSG Reports (Part 1) 09:45 - 10:15. COFFEE BREAK & POSTER SESSION 10:15 - 12:30. TSG Reports (Part 2) 12:30 - 14:00. LUNCH	14:00 - 16:00. WORKSHOP 1 TSG Action Plan Implementation (Part 1) Facilitators: PATRÍCIA MEDICI & BENGT HOLST 16:00 - 16:30. COFFEE BREAK & POSTER SESSION 16:30 - 18:30. WORKSHOP 1 TSG Action Plan Implementation (Part 2) Facilitators: PATRÍCIA MEDICI & BENGT HOLST	
Oct. 19 Wednesday	MID-WEEK TRIPS Option 1 - National Elephant Conservation Centre (NECC) Kuala Gandah, Pahang Option 2 - Wildlife Conservation Centre Sungai Dusun and Kuala Selangor Nature Park Option 3 - Melaka Zoo		

<p>Oct. 20 Thursday</p>	<p>08:00 - 09:00. OPEN DISCUSSION Working with Funders JEFFREY FLOCKEN, IFAW, USA</p> <p>09:00 - 10:30. WORKSHOP 2 Ex-Situ Conservation and Management Moderator: MICHELE STANCER, Chair, AZA Tapir TAG</p> <p>10:30 - 11:00. COFFEE BREAK & POSTER SESSION</p> <p>11:00 - 11:30. SPECIAL PRESENTATION Assessing Age and Maturity in Tapirs Based on Dental Eruption and Cranial Suture Closure MATTHEW COLBERT, University of Texas at Austin, USA</p> <p>11:30 - 13:00. WORKSHOP 3 Tapir Conservation outside Protected Areas Moderators: EDUARDO NARANJO, ECOSUR, Mexico</p> <p>13:00 - 14:00. LUNCH</p>	<p>14:00 - 15:30. WORKSHOP 4 Implementation of Conservation Strategies in Landscape Planning Moderator: CARL TRAEHOLT, Copenhagen Zoo, Malaysia</p> <p>15:30 - 16:00. COFFEE BREAK & POSTER SESSION</p> <p>16:00 - 19:00. WORKSHOP 5 Assessing Structural and Functional Landscape Connectivity for Tapirs Moderator: MANOLO GARCÍA, TSG Coordinator for Baird's Tapirs, Guatemala</p>	
<p>Oct. 21 Friday</p>	<p>08:00 - 13:00. WORKSHOP 6 TSG STRATEGIC PLANNING (Part 1) Facilitators: PATRÍCIA MEDICI & BENGT HOLST</p> <p>10:30 - 11:00. COFFEE BREAK</p> <p>13:00 - 14:00. LUNCH</p>	<p>14:00 - 18:00. WORKSHOP 6 TSG STRATEGIC PLANNING (Part 2) Facilitators: PATRÍCIA MEDICI & BENGT HOLST</p> <p>16:00 - 16:30. COFFEE BREAK</p> <p>18:00 - 18:30. CLOSING SESSION & FINAL REMARKS</p>	<p>20:00 - 24:00AM. CLOSING DINNER Hotel Flamingo</p>
<p>Oct. 22 Saturday</p>	<p>Departures and Transfers to Airport</p>		

ABSTRACTS

PAPER SESSIONS (17 Papers)

PAPER SESSION 1

Malayan Tapir

The Occurrence of Malayan Tapir (*Tapirus indicus* Desmarest, 1819) in the Malampah Nature Reserve, West Sumatra

DESMAN ALFAJRI¹, Oktawira¹, Maswar² & Wilson Novarino¹

¹ Biological Department, FMIPA Andalas University, West Sumatra, Indonesia

² Nature Conservation Bureau, Forestry Department, West Sumatra, Indonesia

The study about the occurrence of Malayan tapir (*Tapirus indicus* Desmarest, 1819) in the Malampah Nature Reserve West Sumatra had been conducted from November 2009 until February 2010. Direct observation which represented by five camera traps, purposive placed on the forest trail. After 10693.533 hours of effective observation time, this study found two individual of Malayan tapir. The highest active time period recorded in the morning and evening.

Mineral Licks and Their Use by Malay Tapirs

BOYD SIMPSON^{1,2,3}, Carl Traeholt^{1,3} & Shukor Md. Nor²

¹ Malay Tapir Conservation Project, Copenhagen Zoo, Denmark / DWNP, Malaysia

² National University of Malaysia

³ IUCN/SSC Tapir Specialist Group (TSG)

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Very little is known of the wild habits of the globally endangered Malay tapir (*Tapirus indicus*), and this is particularly the case in regard to its use of naturally occurring mineral licks (salt licks). Camera trapping and telemetry in Krau Wildlife Reserve and Taman Negara National Park in Malaysia has shown that tapirs make frequent use of naturally occurring mineral licks throughout the year. Results indicate that tapirs visit a number of different licks and can travel up to 11 km between lick sites. Preliminary work with camera and video traps suggests that Malay tapirs may only be drinking the water from such licks, rather than engaging in geophagy, although this requires verification, as mineral licks can be extensive, covering several thousand square meters. Camera trapping rates show that although tapirs visit licks throughout the year, the frequency of visitation changes over the course of 12 months. Significantly higher visitation rates were obtained in the Aug-Jan period compared with the February-July period. Such a trend may be correlated to rainfall which is highest in November-January and lower in the Apr-Jun period. As is typical of the nocturnal Malay tapir, the vast majority of mineral lick visits were conducted at night, between 7pm and 7am, with the highest rates seen during the early morning hours of approximately 1-5am. As a comparison, captive tapirs held under semi-wild conditions in a 30 ha natural forest enclosure also showed defined nocturnal visitation rates when visiting an artificial mineral block in their enclosure. Visitation did occur at low rates during the day, but with a peak use at night between the hours of 8-10pm. This peak use was seen both on the as number of visits per hour and also the total time spent at the lick block. The exact role of mineral licks and their targeted use has not been established, although such licks possibly fulfill a number of vital functions including supplying essential elements lacking in the diet. Analysis (using inductively coupled plasma mass spectrometry) of soil and water samples from mineral licks in Taman Negara National Park and elsewhere, reveal that such licks can be enriched in a number of elements, including Na, K, Mg, P, Ca, Cu, Fe or Mo, when compared to non-lick sites. The elemental composition of licks (even those in close proximity) need not necessarily be similar, and specific licks may be enriched with specific elements. The concentrations of the various elements can also change during the wet and dry seasons, and thus mineral licks should be seen as a dynamic resource. Our preliminary work on mineral licks has lead to far more questions than answers, and we will continue to carry out work on these potentially vital resources.

Estimating the Population Density of the Asian Tapir *Tapirus indicus* in a Selectively Logged Forest of Peninsular Malaysia

D. Mark Rayan^{1,2}, **WONG CHAI THIAM CHRISTOPHER**¹, Shariif Wan Mohamad¹, Gopalasamy Reuben Clements^{3,4}, Sheema Abdul Aziz¹, Leejiah Dorward⁵, David Magintan⁶ & Carl Traeholt⁷

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² Durrell Institute of Conservation and Ecology (DICE), University of Kent, UK

³ School of Marine and Tropical Biology, James Cook University, Cairns, Australia

⁴ Center for Malaysian Indigenous Studies, Universiti Malaya, 50603 Kuala Lumpur, Malaysia

⁵ School of Environmental Science, University of East Anglia, Norwich, UK

⁶ Department of Wildlife and National Parks, KM. 10, Jalan Cheras, 56100 Kuala Lumpur, Malaysia

⁷ Copenhagen Zoo, Denmark

The endangered Asian Tapir (*Tapirus indicus*) is threatened by large-scale habitat loss, fragmentation and increasing hunting pressure. However, conservation planning for this species is hampered by a severe paucity of information on its ecology and population status. We present the first Asian Tapir population density estimate using a maximum likelihood-based spatially explicit capture recapture framework (SECR) from a tiger camera-trapping study conducted in a selectively logged forest within Peninsular Malaysia. With a trap effort of 2,496 nights, 17 individuals were identified and a density (D(SE)) estimate of 9.49 (2.55) adult tapirs/100 km² (95% CI of 5.66-15.94 adult tapirs/100 km²); g0 (0.014), sigma (1.56 km) was obtained. Though camera-trapping studies in Peninsular Malaysia appear to have focused on tiger population monitoring, our findings accentuate the potential of extracting vital population information for other species such as the Asian Tapir. Although our results include several caveats, we believe that our density estimate still serves as an important baseline to facilitate the monitoring of tapir population trends in Peninsular Malaysia and guide future monitoring and conservation efforts for this endangered species.

Studying the Role of Malayan Tapirs as Dispersers of Large-Seeded Plants in Peninsular Malaysia

AHIMSA CAMPOS-ARCEIZ^{1,2}, Carl Traeholt³, Razak Jaffar⁴, Luis Santamaria⁵ & Richard T. Corlett²

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The elimination of the largest herbivores (elephants and rhinoceroses) from many forests in tropical East Asia may have severe consequences for plant species that depend on them for seed dispersal. We assessed the capacity of Malayan tapirs *Tapirus indicus* — the next largest non-ruminant herbivore in the region — as a substitute for the lost mega fauna in this role by studying their ability to disperse the seeds of nine fleshy-fruited plants with seeds 5–97 mm in length. We combined information from feeding trials, germination tests, and field telemetry to assess the effect of tapir consumption on seed viability and to estimate how far the seeds would be dispersed. The tapirs (N = 8) ingested few seeds. Seed survival through gut passage was moderately high for small-seeded plants (e.g., 36.9% for *Dillenia indica*) but very low for medium- (e.g., 7.6% for *Tamarindus indica*) and large-seeded (e.g., 2.8% for *Artocarpus integer*) plants. Mean seed gut passage times were long (63–236 h) and only the smallest seeds germinated afterwards. Using movement data from four wild tapirs in Peninsular Malaysia we estimated mean dispersal distances of 917–1287 m (range = 22–3289 m) for small-seeded plants. Malayan tapirs effectively dispersed small-seeded plants but acted as seed predators for the large-seeded plants included in our study, suggesting that they cannot replace larger herbivores in seed dispersal. With the absence of elephants and rhinos many mega faunal-syndrome plants in tropical East Asia are expected to face severe dispersal limitation problems.

Can the Distribution of the Asian Tapir (*Tapirus indicus*) Predicted by Maximum Entropy Modeling be useful to Conservation Planners in Peninsular Malaysia?

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Coarse distribution maps for the Asian Tapir (*Tapirus indicus*) in Peninsular Malaysia exist based on presence data and approximate locations. In an attempt to predict its distribution at finer scales across Peninsular Malaysia, we used Maximum Entropy (MaxEnt) modeling, a species distribution modeling method with a predictive power that has been consistently competitive with the highest performing methods. After employing data reduction techniques on an initial number of 1,068 tapir presence-only points and 20 environmental covariates, as well as accounting for the effect of sample selection bias, the reduced dataset produced a MaxEnt tapir distribution model with an average area under the receiver operating characteristic curve [AUC] value of 0.65, which indicated modest predictive power. The environmental variable with the largest contribution to the MaxEnt model was temperature annual range, explained 29% of variation in the prediction of tapir habitat suitability. Here, we will discuss: 1) several caveats (e.g., imperfect detections not accounted for, heterogeneous sampling) associated with the analysis; 2) whether MaxEnt should be used to predict the distribution of wide-ranging species such as the Asian tapir; 3) whether more meaningful covariates in lieu of traditional ones (e.g., BIOCLIM environmental variables) can be used to provide more accurate tapir distribution maps; and 4) whether a finer resolution tapir distribution map has value to conservation planners in Peninsular Malaysia.

Displacement of Malayan Tapirs (*Tapirus indicus*) in Peninsular Malaysia from 2006 to 2010

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A study on Malay tapir, *Tapirus indicus*, displaced from their habitats in Peninsular Malaysia was conducted by the Department of Wildlife and National Parks, Malaysia, from 2006 to 2010. A total of 142 cases of displaced Malay tapirs were recorded during the study period. Habitat disturbance and fragmentation appear to be the main factors forcing the tapir out of its habitat to seek food near forest fringes and agricultural area. Occasionally Malay tapirs can also be seen wandering into human settlements. Some displaced animals damaged crops, which led to human-tapir conflicts in some areas. State of Pahang recorded the highest number of displaced tapirs (46), followed by Johor (31), Negeri Sembilan (21), Selangor (18) and Terengganu (15) respectively. Other states such as Kelantan, Kedah, Perak, Kuala Lumpur and Melaka recorded less than 10 cases.

Tapirs under the Bridge: Are Highway Viaducts Beneficial or Detrimental to Asian Tapirs (*Tapirus indicus*) in the Kenyir Wildlife Corridor, Peninsular Malaysia?

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Roads and highways can have an array of deleterious effects on tropical forests, and often facilitate forest colonization, hunting and deforestation. Along a highway bisecting an important ecological linkage known as the Kenyir Wildlife Corridor in the State of Terengganu, Peninsular Malaysia, 10 viaducts have been built by government authorities, some of which considered 'eco-viaducts' meant to facilitate the movement of large mammals across highways. However, no one has elucidated whether these viaducts are beneficial or detrimental to endangered mammals such as the Asian Tapir (*Tapirus indicus*). Here, we present preliminary results from direct (camera trapping) and indirect sign (track encounter surveys) surveys to show whether these viaducts function as effective wildlife corridors for tapirs. We also present encroachment data gathered around viaduct access routes to determine whether they provide greater access to encroachers than other access routes such as old logging roads. If viaducts are not effective wildlife crossing structures or serve as poaching hotspots, government authorities in Malaysia should refrain from constructing viaducts in wildlife corridors important for endangered mammals.

Poaching and Accidental Killing Threatens Malay Tapirs in the Taninthayi Nature Reserve, Myanmar

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Myanmar is one of four range states for the Malay tapir (*Tapirus indicus*) but little is known about their status, distribution and current threats. Only one protected area in southern Myanmar, the 1700 km² Taninthayi Nature Reserve (TNR) conserves tropical rainforests and affords protection for tapirs, tigers, Asian elephant and other biodiversity. During March to June 2011 surveys were conducted using camera-traps, tracks and sign and interview methods. Over 60 km of trails were walked with an encounter rate of tracks and sign of 0.05 per km. Over 630 trap nights recorded 2774 pictures of tapirs, and 18 other species of mammals. At least 3 individual tapirs were recorded by camera-traps in 2 mineral licks in the core zone of the reserve. A total of 119 persons from 21 villages and 2 military camps were interviewed. A third of interviewees reported having eaten tapir meat in the last 14 years. At least 26 tapirs were killed by local hunters and elephant capturers within last 2 decades, similar to the estimated number of tapirs in Huai Kha Khaeng Wildlife Sanctuary, Thailand and over half the estimated tapir population of Krau Wildlife Reserve, Malaysia. Tapirs were accidentally killed in pit fall traps (1981 to 1996) and during commercial logging operations prior to the reserve being gazetted (1989 – 1996). Hunting and habitat loss and degradation are major threats to tapirs in and around the TNR. The short-term priority for tapirs is to reduce poaching and accidental killings of tapirs. In response to the threat, a ranger training program has been established to raise capacity for patrolling and law enforcement. Medium-term priorities for tapirs include occupancy surveys to determine the distribution inside the TNR, and creating a tapir conservation awareness program for local people. In the long-term a National Tapir Action Plan is recommended to guide effective conservation of Myanmar's dwindling tapir population.

PAPER SESSION 2

Lowland Tapir & Mountain Tapir

Assessing the Viability of Lowland Tapirs in a Fragmented Landscape: Results from the Atlantic Forest Tapir Program, Brazil

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This presentation will focus on the assessment of ecological factors that determine the long-term persistence and viability of animal populations across severely fragmented landscapes. The lowland tapir, *Tapirus terrestris*, and the fragmented Atlantic Forests of the Interior of the Pontal do Paranapanema Region, São Paulo State, Brazil, were used as a model to illustrate this assessment. Both empirical and modeling approaches were used. The empirical approach focused on aspects of tapir spatial ecology, intra-specific interactions, spatial and temporal interactions between tapirs and the landscape, as well as estimates of tapir abundance in Morro do Diabo State Park (370 km²) and seven smaller forest fragments (4-18 km²) where tapirs were present. The modeling approach consisted of a Population Viability Analysis (PVA) using the software VORTEX. Spatial ecology, intra-specific interactions, and interactions between tapirs and the landscape were estimated by radio-telemetry. Population sizes were derived from tapir densities obtained by radio-telemetry, nocturnal line-transect sampling, and Footprint Identification Technique (FIT). Lowland tapirs in Morro do Diabo had very large home ranges (4.7 km²) when compared to other sites, particularly contiguous habitats. Tapir home ranges had very complex internal structures, including multiple core areas of use, which comprised a very small proportion of the home range (50% core area, 17% of the home range; 25% core area, 6% of the home range). Little seasonal variation in size and location of home ranges and core areas of use were observed. Tapirs exhibited extensive home range overlap (30%), as well as overlap of core areas of use (20%). No evidence of spatial territoriality was noted. Tapirs incorporated portions of all available habitat types within their home ranges and core areas of use, but significantly selected riparian habitats, where they performed most of their main activities, particularly foraging. Tapirs avoided areas of agricultural and pastoral land, as well as secondary growth forests. It was estimated that Morro do Diabo hosts a population of 130 tapirs and, altogether, the seven forest fragments host 22 additional individuals. Results from the PVA model projected that the tapir population in Morro do Diabo has zero probability of extinction and is likely to persist over the next 100 years. However, the population is not large enough to maintain 95% of genetic diversity over the long-term. A Minimum Viable Population of 200 tapirs would be required to ensure long-term viability. The model showed that, without dispersal of tapirs from Morro do Diabo, tapirs in the small fragments will go extinct over the next 100 years. However, this study showed that tapirs in the Pontal do Paranapanema Region moved fairly easily through areas of non-natural habitat in between patches of forest, indicating a certain level of landscape functional connectivity. This provided evidence of a tapir metapopulation scenario, which proved to be a determinant factor for the persistence and viability of lowland tapirs in the Atlantic Forest of the Interior. Overall, the long-term persistence and viability of animal populations across severely fragmented landscapes appears to be dependent on the maintenance and full protection of complex landscape networks. These networks must include some large patches of habitat that can host larger animal populations and function as source areas for dispersal of individuals to smaller populations in sink habitats. Patches of forest comprising these networks must incorporate required habitat types where animals can find the resources they need in order to survive and persist. Most essentially, there must be an appropriate level of landscape connectivity, either structurally or functionally, in order to facilitate biological fluxes between patches and promote the maintenance of a demographically and genetically healthy metapopulation.

Pantanal Tapir Program

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Since 1996, Patrícia Medici has been leading a long-term lowland tapir research and action planning program in the fragmented Atlantic Forests of the Pontal do Paranapanema, São Paulo, Brazil. The use of long-term multidisciplinary species research, action planning, and the application of landscape-based approaches provides the foundation for the development of scientifically-sound strategies that will engage all stakeholders and influence decision- and policy-making to safeguard a targeted biome. In 2008, Patrícia launched a nationwide Lowland Tapir Conservation Initiative (LTCI) aiming at establishing tapir programs in other biomes of Brazil. The first of these was the Pantanal, where no tapir research has ever been conducted. The Pantanal is the largest continuous freshwater wetland on the planet and this biome is increasingly threatened by deforestation and intensification of cattle ranching practices. The Pantanal Tapir Program has been collecting data to assess the status and viability of tapirs in the Pantanal. Results will substantiate the development of a specific set of recommendations that will benefit tapirs, other wildlife and the Pantanal itself. In addition, the program has been using tapirs as ambassadors for conservation, catalyzing habitat conservation, environmental education and outreach, training and capacity-building, and scientific tourism initiatives. The establishment of the LTCI through tapir programs in the Pantanal and, in the future, in the Amazon and Cerrado, will provide some of the necessary tools for the conservation of several Brazilian biomes.

A New Species of the Largest Living South American Herbivore from Amazonia: Evidence of a Hidden Mammalian Diversity in the Neotropics

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Until now, all known living tapirs are allopatric, with one species in southeastern Asia and three in Central and South America, where they are the largest native mammals. All are vulnerable or endangered. We describe here a new living species of *Tapirus* from Neotropics, Amazon Region, the first properly described since *T. bairdii* Gill, 1865, and the first *Perissodactyla* in more than 100 years. The new species is based on morphological analysis (morphometric multivariate statistics and parsimony based morphological cladistics, using all living and selected fossil species) and molecular analysis of mitochondrial DNA (parsimony, maximum likelihood and Bayesian inference of CytB). We calculate estimates of divergence times for all known living species which indicates that the new species emerges during the late Pleistocene. Both morphological and molecular analysis places it as a well-supported clade, basal to the pair *T. terrestris*-*T. pinchaque*. The new species is found in western Amazonia, where it is documented by captive animals, collected specimens, tissue samples, camera-trap photos, footprints and faecal samples. It is likely present in eastern Amazonia, from which we have photos local people information. It is partially sympatric with *T. terrestris*, but it seems to be more frequent in mosaic environments, where open areas and forest are close. It seems to be rarer or even absent when only forest or savannas are present. This report highlights the richness and not fully covered biodiversity in Western Amazonia, yet facing still growing threats. Also, local people recognized for long this species ignored by the scientists, showing key roles of traditional knowledge for biodiversity description.

Conserving the Andean Tapir (*Tapirus pinchaque*) in the Central Andes of Ecuador

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Less than 2,500 Andean tapirs (*Tapirus pinchaque*) are thought to remain in the wild, and the International Union for the Conservation of Nature (IUCN) estimates that the total population is decreasing. Hunting, habitat fragmentation and loss, and ranching are the major threats to the survival of this species, which makes its home in the cloud forests and high elevation páramos of Colombia, Ecuador, and northern Peru. Ecologically, the Andean tapir plays an important role as a seed disperser, helping to maintain high plant species diversity throughout its habitat. Within the Tungurahua Province in the eastern slopes of the central Andes of Ecuador, there are two large national parks, Llanganates and Sangay, conforming the Sangay and Llanganates Ecological Corridor (CELLS); this zone, recognized as one of the most diverse in the whole country, represents the Ecuador's largest remaining area of habitat for the Andean tapir. Because of the high quality of tapir habitat in this area, Sangay and Llanganates have become the focal area for conservation efforts. The Andean Tapir Conservation Project in the Central Andes of Ecuador (PCTA) has three components: field research, community education, and on the ground conservation. Regarding research, we study the ecology and behavior of the species and the status of mountain tapir populations within the project area. Prior to this project, little was known about local tapir distribution, habitat, and areas of greatest local threat. Information collected during our research –including a list of more than 300 plant species consumed by tapirs- has informed Ecuador's National Strategy for the Conservation of Tapirs (TSG, 2011) and Field Manual for Mountain Tapir Monitoring (PCTA, 2009). The project has taken stunning images of tapirs and their habitat as an important educational tool for community outreach. Through compelling visual materials and storytelling, the PCTA created an education campaign aimed at increasing knowledge and pride in the mountain tapir among school students, covering 450 students in sixteen different schools associated with park buffer zone communities; complementary seminars were held for parents, reaching 220 adults in these same communities. In addition, the PCTA implemented two yearly workshops for park rangers, community leaders and authorities on how to monitor the species and how to protect it. The PCTA has reached more than 1,300 local people in sixteen communities and one city in the Parks' buffer area, through its conservation campaigns targeting park staff and managers at Sangay and Llanganates National Parks, local government authorities, and communities, including its schools, high schools and local assemblies. As a result, rangers in both parks have learned monitoring tapir populations for the first time; reports of tapir poaching in the area have decreased significantly, communities are adopting tapir-friendly land use practices and local authorities are evaluating implement tapir-protection policies for the parks' buffer zones. Consequently, the project is contributing to improve the protection of the mountain tapir, through the implementation and adequacy of special protection legislation and policies to ensure long-term conservation of the Andean tapir and its habitat in the region.

PAPER SESSION 3

Baird's Tapir

Conservation Status of Baird's Tapir in the Guatemalan Protected Areas System

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The range of Baird's Tapir in Guatemala is mainly included in the northeast of the country; where it is still possible to find different types of habitat that allow its presence, such as tropical forests, cloud forests, swamps and mangroves. However, due to the various threats that exist on the species and its habitat, such as change in land use, hunting, among others, tapirs have been forced to remain within protected areas where they can still find the conditions that favor their existence. In order to know Baird's tapir current state of conservation in Guatemalan Protected Areas System (SIGAP), we made a classification of the species status for each of the 34 areas within its range, based on information about the presence of the species, the existence of a protection scheme of the area (management category), its territorial extension, connectivity with other areas, and the availability of habitat within each of the areas evaluated. From this information a general classification was established showing the importance of each of the priority areas in terms of research, conservation, establishment of corridors, and as genetic reservoirs. From the above we identified that only 4 areas have the minimum extension to maintain viable populations in the medium term, as long as they keep their habitat and connectivity with other areas. Most of the areas (17) do not have the minimum extension, which makes their populations vulnerable in the medium term. In a few areas the presence of the species is unlikely (6) or uncertain (7) due to low connectivity and degraded habitat. The Mayan Biosphere Reserve is one of special importance due to its ecological integrity and high connectivity among areas that comprise it; altogether represent the best option for conservation of the species in the long term. For that reason management actions should be taken by thinking of it as a whole and not as separate areas. The Biosphere Reserve of Sierra de las Minas has high habitat availability, however, isolation from the other areas is a threat to its populations. This classification allows us to assess the role of the SIGAP in the conservation of the species, as well as to establish strategies that strengthen it, by ensuring the viability of tapir, and other species, populations in the long term.

A Preliminary Population Viability Analysis for Baird's Tapirs in Guatemala

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It has been estimated, that in Northern Mesoamerica exists about the 50% of the current global wild population of Baird's tapir. Researches in Guatemala have reported that the species is extinct in the southern lowlands and the Volcanic slopes, remaining only in northern lowlands, Sierras de las Minas and the Caribbean mountains and lowlands. The Maya Biosphere Reserve (RBM), which is part of the Great Selva Maya shared with Mexico and Belize, has been identified as the most important habitat remnant including about the 70% of the total population in the country. Sierra de las Minas Biosphere Reserve (RBSM) and Sierra Lacandón National Park (SLNP) are important habitat areas too, with extensions larger than 1,000 km², both are becoming isolated from other remnants. The other areas are, most of them, smaller than 400 km², and located in fragmented habitats. A preliminary population viability analysis was conducted for the remnants where the species presence was recorded in previous researches, using the software Vortex. A forest cover map for the region was created combining the Forest cover and land use map of Guatemala for the year 2006 and the

Global cover map 2004-2005 provided by the European Spatial Agency. The largest remnants were identified by removing 1Km of forest border and calculating the remaining forest areas. Thirteen remnants were selected to be modeled, and were grouped in 4 categories classified by estimated tapir population: I) less than 20 individuals, II) from 40 to 50 individuals, III) from 80-100 individuals and IV) larger than 1,000 individuals. A model for each category was generated. Habitat loss and hunting was also modeled for each category. Because only the RBM was included in category IV, specific rates of deforestation were used, for other categories, national rates were used. For the species description to be included in the model, we used the parameters generated by the IUCN/SSC Tapir Specialist Group (TSG), improved by Medici (2010). For category I, there were 9 remnants, all of them with a low probability of survival even without threats and an estimated period of approximately 50 years for extinction if hunting and habitat loss continue. The remnant associated with the Montañas Mayas – Chiquibul Biosphere Reserve was the only one included in category II, with a low probability of survival when hunting and habitat loss are included in the model. The RBSM and SLNP were included in category III, which has about the 50% probability of survival with hunting and habitat loss, with genetic diversity loss. As expected, the population in the RBM (category IV) has the highest probability to survive and maintain genetic diversity in long-term in the country. Seize hunting and habitat loss is urgent, especially for remnants included in category I and II; as well as increasing and maintaining habitat connectivity. Although the RBM may include a long-term viable population, is important to strengthen the efforts to preserve populations with low-probability of survival which are samples of the species genetic diversity in the country.

An Official Monitoring Protocol for *Tapirus bairdii* in Honduras

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The Central American tapir (*Tapirus bairdii*) is frequently hunted by indigenous people and poachers. Additionally its habitat is being strongly fragmented and reduced everywhere. In Honduras the species is restricted to protected areas and remaining forest of the northern and eastern (Moskitia region) parts of the country. The Moskitia contains one of the largest continuous forests of all Mesoamerica. Biological monitoring activities in Honduras are guided by the Wildlife Office (WO) of the Parks and Wildlife Department of the Forestry Conservation Institute (ICF). The WO develops its monitoring activities under the government philosophy of Ecological Integrity (EI) of Honduras protected areas. This office in collaboration with the Proyecto Ecosistemas (a project funded by the Global Environment Facility) and Honduras representatives of the Tapir Specialists Group (TSG) have been looking for monitoring tools that fit the EI purposes. Tapir monitoring activities should help to generate reliable information on the ecological status of protected areas. Central American tapir is an ideal subject as a monitoring model and a monitoring protocol for Honduras has been elaborated based on EI philosophy. However, it also will be useful to evaluate the tapir conservation status, and provide basic information for decision making on other topics besides protected area effectiveness. The EI methodology as well the protocol can also be applied to productive landscapes considering these as conservation units at higher scale. The protocol preparation began with a literature review including protocols, field guides, mammal sampling methodology, scientific papers, reports and basically all Central American tapir publications. Tapir experienced researchers were contacted for information and protocol review. Then a consultation workshop was conducted with experts and government officials to discuss a draft protocol. The tapir monitoring protocol (TMP) is designed to measure tapir distribution, occurrence frequency, relative abundance indices, habitat use, threat analysis, and additional information on tapirs, such as diet, poaching, and trafficking. The protocol also includes basic information about tapir status in Honduras, species natural history and appendices on telemetry and camera trap methodologies. The TMP is divided in four main sections: background, justification, elaboration process and monitoring protocol which constitutes the main body of the document. This last section includes objectives, what should be measured, monitoring areas, and

monitoring design, including monitoring units. It also includes sections on data collection such as track observations, interviews and photographic captures, data storage and analysis, report preparation and personnel. The protocol was finished in May 2011 and it is being validated at some specific areas (Sierra de Rio Tinto and Cusuco national park). Further tests are planned at Texiguat wildlife refuge and Pico Bonito national park in the near future. The TMP will be published in August 2011. Thanks to the Honduras TSG team efforts the government has recognized the tapir as a priority species. The species has been included in the Honduras national monitoring program throughout the country where it has been detected. All tapir research projects in Honduras at the moment are following the new protocol which is now an official tool of the ICF.

Past and Present: The Status of the Baird's tapir (*Tapirus Bairdii*) in Nicaragua and Its Implications for Conservation Planning

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The IUCN describes the Baird's tapir as extinct in the majority of Nicaragua's autonomous regions, which are located along the Caribbean coast of country. In contrast they are described as a resident in the remainder of the country. However, throughout the past decade biologists and anthropologists have reported on Baird's tapir detection and hunting accounts throughout much of the autonomous zone, while effectively no information has come from the Pacific regions of the country. This presentation first briefly contrasts the forest cover and development in the Caribbean region with that of the Pacific region of Nicaragua. It then summarizes the historical literature and more recent publications describing Baird's tapir presence in the country. Subsequently it combines recent anecdotal evidence, indigenous hunting records, and presence/absence data from a sampling protocol combining camera traps and track and scat surveys to review the current status of Baird's tapirs along the Caribbean coast region. These various sources of data collectively constitute strong evidence that a viable tapir population exists throughout the autonomous Caribbean region. This agrees with other literature describing the Caribbean coast, in particular the Southern Atlantic Autonomous Region (RAAS) and the Northern Atlantic Autonomous Region (RAAN), as integral to maintaining connectivity of the Mesoamerican Biological corridor throughout the Central American isthmus. In light of this, Baird's tapir conservation initiatives in the RAAS and RAAN should be considered a high priority, perhaps more so than channeling conservation efforts to the Western regions of the country. Nonetheless, wildlife monitoring and research is inadequate in Nicaragua and this project focused almost entirely on the Caribbean coast region. Thus, more research is needed before reaching a definitive conclusion. Furthermore, hunting records suggest that educational initiatives in the entirety of Nicaragua would benefit tapir conservation greatly, as migrants from the Pacific coast to the Caribbean coast are some of the most frequent tapir hunters.

Challenges for Tapir Conservation in Mexico and Central America

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Human numbers and needs are rapidly increasing in most developing countries worldwide. This trend constitutes a formidable challenge for survival of wild mammals requiring extensive areas with low human disturbance. Baird's tapir populations (*Tapirus bairdii*) are suffering the effects of this phenomenon in southern Mexico and Central America, where the expansion of cattle ranching and commercial agriculture is continuously shrinking tapir habitat across tropical and montane forests. Recent estimates suggest that around 6,000 Baird's tapirs subsist in the wild. Most populations are within large forested areas, usually protected or with low human disturbance and greater than 10,000 hectares in southeastern Mexico, northern Guatemala,

Belize, northern Honduras, eastern Nicaragua, Costa Rica, Panama, and northwestern Colombia. Assuming that extant protected areas currently representing over 50% of available habitat remain without major disturbance in the near future, the perspectives for tapir conservation outside those areas are very uncertain because of habitat loss and overhunting. Progressive geographical and reproductive isolation of populations represent an additional major challenge for long-term tapir survival among both protected and unprotected areas. Under current isolation conditions, it is likely that only four areas may contain viable Baird's tapir populations: 1) The Greater Maya Forest shared by Belize, Guatemala, and Mexico; 2) The rainforests of northern Nicaragua and neighboring eastern Honduras; 3) The wet forests of western Panama and eastern Costa Rica; and 4) the Darien Forest of Panama. A considerable number of actions to mitigate threats for tapir populations and their habitat have been proposed in the national conservation action plans developed in Colombia and Mexico. These actions include improvements in habitat protection, hunting control, environmental education and communication, training, research, and law enforcement, among many others. However, such actions require huge synergistic efforts seeking common goals by government agencies, academic institutions, non-governmental organizations, and especially, organized groups of residents in tapir distribution areas. It is certain that scientists and conservationists will not be able to implement these actions by themselves, but the impact of their work can be strengthened by collaborating in multidisciplinary groups supporting appropriate policies to avoid tapir extinction throughout its range.

POSTERS (11)

Integrating the Community in Tapir Conservation in the North of Argentina

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The Tapir (*Tapirus terrestris*), is an emblematic representative of the Argentinean wildlife. It is endangered and has been extinct in many provinces of the country. As part of the Tapir's Conservation project, since 2008, Fundación Temaikén has developed and implemented different awareness and education strategies in the provinces of Chaco and Salta. These places have been cited as conservation priorities in the national action plan. The main goal of these activities is to integrate communities in conservation efforts for the species and lessen the effect of human activities. Between the strategies implemented is the Integration with the Community workshop, Teacher Training Courses, and integrated activities in schools with students and participants of the Science Club. All activities performed were declared provincial and municipal interests, and teacher training courses were sponsored and supported by the Ministry of Education. In the development and establishment of the actions were involved the "Complejo Ecológico Roque Saenz Peña", Chaco Wildlife Department and the Ministry of Environment of the province of Salta. Activities involved in Chaco 56 teachers, who work in 24 schools and reach an average of 960 students. In the city of Salta was attended by 48 teachers, who formed 10 working groups involving 564 students in the plans developed. The results showed that there is a huge interest from teachers in working towards the conservation of species and especially in the appreciation and conservation of natural resources. Large number of people suggested that tapir hunting is common and that is necessary to work against this problem. It is essential to be with the community to achieve a substantial and representative attitudinal change. Teachers and children, as multipliers of the message, are key actors in achieving conservation of biodiversity. In 2011 is being developed a different strategy that involve diverse community key actors in order to diagnose the knowledge, perception and attitude that people have of the species. At the same time, we are working to characterize the threats such as hunting, livestock, etc, which affect the species and based on this information, we will plan and implement actions to increase the valuation of the species by local people and lessen the effect of threats.

Lowland Tapir Training as an Educative Tool for the Program “Feeling Nature” aimed at People with *Visual* Disability

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Fulfilling its mission of spreading knowledge in all areas and levels of education, TEMAIKÉN Foundation has developed several proposals to offer persons with disabilities an approach to living things and their environment. Special Education Programs are born with the aim of providing persons with disabilities the tools and appropriate resources to participate in educational activities, being active participants in the Biopark activities, fostering attitudes of respect and care for the environment. During the Program "Feeling Nature" visually impaired visitors receive a tour behind the scenes, giving them the opportunity to make contact with some animals, sharing experiences with their keepers. Thanks to this specific contact, persons with visual disabilities are able to know the general characteristics of these animals. The tour agenda, the selection of the animals and the activities during the visit are specifically chosen depending on the characteristics of each visitor group to encourage their participation. In this context we decided to include the tapir (*Tapirus terrestris*) in this Program by being a native species, which is in serious danger of extinction in Argentina and is known for its ecological and cultural importance. The tapir is a species that can be easily managed through positive reinforcement training in order to achieve the proper care in captivity. This feature helps persons with visual disabilities to interact with individuals, allowing them to reach a comprehensive understanding of the species (size, weight, shape, texture, body, sounds, food, habitat and conservation status). The animals selected for the Program are chosen based on their temper and are conditioned to accept the presence of the public in various situations unforeseen. The training of the animals is only under protected contact and as in all faunal collection is used operant conditioning with positive reinforcement to train animals. Throughout the activity, participants are accompanied by trained guides in charge of the group and keepers trained to handle animals. The contact is always protected by a containment bar according to the species and visitors can only touch body areas that do not involve risk, excluding the head and legs. The activity with the tapir takes 15 minutes (duration of the training session) and are mainly used secondary reinforcements (petting and brushing) and primary reinforcements (food) is only given to the animals at the end of the session to minimize their anxiety in order to improve security for the activity. All the time, two keepers are present and working with the animal, noting that the work is done with wild animals trained but not domesticated animals. Through this activity persons with visual disabilities are able, through contact with the tapir, to build attitudes of respect for life, care and preservation of the environment, and particularly of the flagship species that needs to be known.

Social Behavior in Lowland Tapir: Kinship Distribution in a Landscape

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The lowland tapir's (*Tapirus terrestris*) mean home range is 3 Km² (1,9 to 4,0 Km²) with a high degree of overlap between individuals, a spacing behavior characteristic of a non-territorial species. In contrast to this observation, there is evidence that individuals will regularly walk along the borders of their ranges suggesting some form of territoriality. Furthermore, at least in one reintroduction of *Tapirus bairdii*, resident tapirs were recorded attacking the reintroduced individuals, again suggesting some form of territoriality. In order to

explore this apparent contradiction and gain further insight into what drives tapir spacing behavior, we hypothesized that tapirs will tolerate individuals from adjacent and overlapping home ranges if they are closely related. To test this hypothesis we compared the distribution of geographic distances of unrelated individuals to related individuals across the islands of Balbina reservoir landscape, in Central Amazon, Brazil. In total, we sampled 63 fecal samples, of which 24 were successfully genotyped at five microsatellite loci (from 14 tested). The five loci were suitably informative in terms of individual identification: the probability of identity and the power of exclusion were 6.32^{-6} and 0.98, respectively. At the population scale, both AMOVA and STRUCTURE suggest that the samples were taken from a single panmictic population. At the individual level, four genotypes were each observed twice across different samples, indicating the possibility of “re-capture” events. Analysis using COLONY across 22 unique genotypes identified two full-sib pairs and 36 half-sib pairs, but no parent-offspring pairs, and suggests that the most likely mating system for tapirs is one in which both sexes are polygamous – as indicated by the high proportion of half-sibs. The distribution of distances between half-sibs ranged from 0.22km to 19.3km and was normally distributed (mean \pm sd; 10.6 \pm 5.14km). The distribution of geographic distances between half-sibs was not statistically different from the distribution of geographic distances between unrelated individuals (Mann-Whitney, $U=1$; $p > 0.05$). Thus, we did not find support for our hypothesis, suggesting that individuals up to a level of kinship of half-sibs were similarly distributed in the landscape as unrelated individuals. However, because we did not have any parent-offspring pairs in our sample, it is not possible to exclude this hypothesis completely, as territorial overlap may only occur among individuals with this level of kinship. Furthermore, as we were unable to sex the individual samples it was not possible to explore whether sex is also an important parameter determining spacing behavior in tapirs.

Using Camera-Trap Data to Model Habitat Use by Malayan Tapir (*Tapirus indicus*) in a Peat Swamp Forest of Berbak National Park, Sumatra, Indonesia

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Tapirus indicus is the only tapir species found in Asia, while three other species of tapir occurs in the forests of Central and South America. Malayan Tapir (*Tapirus indicus*) distributed in southern and central parts of Sumatra (Indonesia), and on the Asian mainland in Peninsular Malaysia, Thailand (along the western border and on the Peninsula south to the Malaysian border, and in Huai Kha Khaeng Wildlife Sanctuary in the north), and Myanmar. They are categorized as endangered species on IUCN red list and on Appendix I of CITES. The ecology of Malayan Tapir is poorly known and yet knowledge of the factors determining their distribution and abundance is important to the conservation of this increasingly threatened species. Camera-trapping was used to investigate Malayan Tapir ecology in the peat swamp forest of Berbak National Park, Sumatra, Indonesia. The relationship between camera-trapping rates and land covers (and other habitat variables) was investigated using generalized linear modeling. More than 50 photographs of Malayan tapir were obtained. The relation between camera-trap rate of Malayan Tapir and the type of land covers as well as its relation to the ground surface will be examined. The relation between camera-trap rate of Malayan Tapir and to distance to the nearest village will also be determined. Results of this study will illustrate the potential of camera-trapping for modeling habitat requirements and providing guidelines for the conservation management of threatened Malayan tapir populations in peat swamp forest habitats in Sumatra.

Tapirus terrestris Whey Proteins

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Mammals inhabit and have adapted to multiple ecological niches that require differential expression of milk proteins that are linked to defense mechanisms, nutrition of breeding and homeostasis of milk. In this

presentation we refer to changes occurring in tapir whey proteins during the prenatal period and the first month of lactation. It implies the exclusion of proteins that are part of the casein micelles. The studies were carried out on samples of colostrums and mature milk of two *Tapirus terrestris* females belonging to Temaikén Zoo (Buenos Aires, Argentina), one of them was sampled every 5 days from one week before birth up to 30 days of lactation. Samples were analyzed by electrophoresis (PAGE), HPLC, western-blotting, and turbid metric method for lysozyme determinations. Results showed: a) great difference between colostrum period and full breastfeeding due to the high immunoglobulin concentration especially at first stage., b) most of the decrease in whey protein content is isochronous but slower than in other species; c) anisochronic variation in some proteins with medium molecular mass ,d) lesser variability in peptides of molecular mass <10 kDa in mature milk than in colostrum; e) rapid decline of lysozyme during colostrum period) constant presence, with little variation of α -lactalbumin, β -lacto globulin, serum albumin, and other six proteins of different molecular mass; g) presence of osteopontin in whey; h) existence of a single molecular form of β -lacto globulin, unlike occurring in other Perissodactyla. Results show aspects that are common to those known for most mammals, and others that have not been described previously. Our observation about prenatal whey proteins peptides seems to be the first made in this field. The degree of differences between tapir milk characteristics and other ungulates is pending of further information about counterpart phylogenetically related species.

Effects of Environmental Conditions on Tapirs` Health

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Animal behavior is the result of natural selection and adaptation to specific environmental condition where the behavior is developed. The AZA Welfare Committee defines the animal welfare as a combination of physical health and psychological welfare. Captive animals are housed in different environmental condition from wildlife, thus, the animals could develop clinical pathologies related with stress, diet or the enclosure environment. Symptoms often become complex to diagnose and establish the cause of the disease. In the summer of 2010, was diagnosed that one juvenile lowland tapir (*Tapirus terrestris*) housed in the CRET (Species Reproduction Center of Temaikén) suffered corneal ulcer in both eyes. Given the situation, different studies were planned to determine which factors could be related to the pathology and to elaborate strategies to avoid the advance of process. Firstly, were documented observations during the day to determine the time and impact of light in the exhibit and at the same time, keepers made training sessions for medical treatment. The observations determined that Tapirs` exhibit received sunlight t throughout the day; animals stayed under the roof made to offer shade; the trees present in the exhibit were still young specimens and were not enough to provide shade and moisture; tapirs consumed the plants and for that reason it was necessary to renew them periodically. In conclusion, these environmental conditions were inappropriate for this species because the tapirs in the wild inhabit in environments that provide protection for the eyes and skin. In this context, was realized an appropriate designing of the exhibits which consisted on the plantation of native trees and the placement of a roof of cloth to generate shade until the growth of plants. Furthermore, was placed a spray irrigation system at 2 meters height for water and moisten the environment. Finally, was prepared a supplementary exhibit with the same enriched environment, in order to rotate the animals and to allow regeneration of vegetation. Importantly emphasize that when the pathology was closely related to the inadequate environment for this species, the environmental enrichment is a fundamental tool for resolving the case. The environment of the exhibit and the stimulation and development of specie-specific behaviors are essential to improve the animal welfare.

Endocrine Profiles during the Estrous cycle and Pregnancy, and Ultrasonic Characterization of Fetal Development in Captive Malayan Tapirs (*Tapirus indicus*)

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The current knowledge of the reproductive physiology and biology in Malayan tapirs (*Tapirus indicus*) is at best fragmentary. Therefore, the aim of this study was to address this lack of knowledge by undertaking a long-term study to obtain data regarding the estrous cycle and pregnancy, including serum/plasma hormone levels (progesterone, estradiol-17 β , equine Chorionic Gonadotropin (eCG) and prolactin) and measurements of fetal structures by ultrasound. Two female Malayan tapirs were studied for a period of 1.9 to 4.8 years. In response to brushing the body surface the females were trained to lie down in a lateral position, allowing blood collection and ultrasound examinations without anesthesia. Blood was collected once or twice per week, dependent on the reproductive status of the female. If pregnancy was suspected, blood was collected weekly and approximately two months before predicted parturition sampling frequency increased to 3-5 times weekly. In both females the cyclic estrous pattern was characterized by two different cycle lengths ($n=12$; based on plasma progesterone profiles); Type I cycle of approximately 1 month with a mean length of 35.7 ± 4.7 days (mean \pm S.D; $n = 3$) and Type II cycle of approximately 2 months with a mean length of 62.8 ± 5.8 days ($n = 9$). The Type II cycles are characterized by an extended luteal phase. Three pregnancies (i.e. 3 fetuses) were monitored in one female tapir. The average gestation length was 399 ± 3.0 days. Gestation was characterized by a general increase of plasma/serum progesterone and serum estradiol-17 β concentrations throughout gestation, with a marked increase during the last weeks of pregnancy, followed by a sharp decline 1-2 days prior to parturition. Weekly transabdominal ultrasound examination was carried out from 79 ± 8 days to 281 ± 48 days (mean \pm S.D) post mating. To assess fetal growth and development, attempts were made to obtain measurements of ten fetal parameters (i.e. head, thoracic, abdominal and limb parameters). This long-term study of serial blood sampling and transabdominal ultrasound, without the use of anesthesia, provided a unique opportunity to evaluate and monitor the estrous cycle and pregnancy by steroid analysis and to evaluate fetal development by ultrasound in captive Malayan tapirs. Even though this study comprises results of estrous cycles of only two females and monitors only three pregnancies in one female, this study is believed to comprehend an exceptional data set. The results of this study can serve as a basis for further research and might provide a valuable tool for the improvement of the reproductive management of (captive) Malayan tapirs and thereby survival of this unique and endangered species.

Systematic Research and *ex situ* Conservation Programs for Captive Malayan Tapir (*Tapirus indicus*) in Thailand

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The Malayan Tapir (*Tapirus indicus*) is one of the endangered large mammals in Thailand and Southeast Asia. Data on the status of the wild population and its ecology is limited. At present, there are 41 captive animals housed in 2 institutions in Thailand; Zoological Park Organization (ZPO) ($n=27$), and Safari World ($n=14$). These captive populations are valuable for breeding stocks, research and conservation purposes. The successful captive breeding management is an important key for sustaining and expanding *ex situ* conservation programs. The ZPO population of 27 tapirs (? 12 males and 15 females) is divided between 5 separate zoos across Thailand. Natural breeding has been successful in several zoos; nevertheless, this small population is a major challenge for the long-term species maintenance and will require exchanging animals and/or genetic materials between the different populations to maintain the required genetic diversity. Therefore, the ZPO has established management, medical and reproductive research in captive Malayan tapir to aid in their long-term management. Basic information on general management of all individuals including husbandry, behavior and

nutrition has been recorded but is reviewed as required. Health assessment of the population and individuals were performed. In general, blood samples were collected from tamed animals by physical restraint techniques. Information on anesthesia protocols for this species is limited. Because general anesthesia is required for specific purposes such as, radiography, surgery, complete physical examinations and sample collection for targeted diagnostics (e.g. tracheal wash for tuberculosis culture) the ZPO veterinarians have developed a safe anesthesia protocol for this species using the combination of Butorphanol tartarate (0.12–0.18 mg/kg), Medetomidine HCl (0.012 - 0.018 mg/kg) and Ketamine HCl (0.5-0.7 mg/kg) given IM this protocol also includes supplementation using IV glycerol guaiacolate as required. Morphometric measurement, physical examination, sample collections were conducted with the animal under surgical plane of anesthesia for biomedical survey and disease surveillance. Furthermore, biological samples such as hair, feces and blood were collected and stored for genetic diversity analysis in this population. In breeding adults, documenting reproductive physiology has been considered critical information in both sexes to assess fertility and enhance breeding potential. Non-invasive endocrine studies measuring fecal hormone metabolites have been ongoing since 2009. Semen collection, using electro-ejaculation, has been performed on adult males (n=8) with limited success. These ongoing comprehensive research and conservation programs will provide useful information for rational management of Thailand captive Malayan tapir populations plus provide useful information and guidance for other captive populations.

Effective Drug Combinations for Collecting Samples in Lowland Tapirs (*Tapirus terrestris*)

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As part of the work done through the ex situ tapir Group to contribute to the conservation of the species, Argentinean zoos and other institutions that hold tapirs in captivity, led by Fundación TEMAIKÉN and according to a letter agreement to work, was proposed : the identification of specimens, serological survey, genetic studies, etc. of the tapir captive population. To achieve it was necessary conducting a clinical examination of animals and collection of different samples (skin, hair, blood, fecal material). To do so was required to achieve deep sedation of tapirs to perform the procedures for what was necessary achieve a combination of drugs developed based on different literature sources and allowing the completion of the procedure to completely reverse the body of the animal. It was also necessary to analyze the characteristics of the enclosures where the specimens inhabit as most of these animals were in semi-captivity. The procedure was performed in 40 animals (24 males and 16 females) from 5 institutions of which 38 were adults and 2 juveniles. In 93% of the animals, it was necessary to estimate the weight due to the inability to weigh them before the administration of drugs. It was made a chart to estimate weight considering inducing drug, antagonist drugs, which proved a major success. The drug combination was done with Xylazine 0,8mg/kg IM + Butorphanol 0,4 mg/kg IM provided via dart and reversal with Yohimbine 0,36 mg/kg IV (for the Xylazine) and Naltrexone 0,4 mg/kg IV (for the Butorphanol). In the case that was necessary to deepen the anesthetic plane for some reason (a surgical procedure or transfer) was carried out with Ketamine IV (1mg/kg) or inhaled Isoflurane. The time between the dart and the level of sedation took about 12 minutes. The procedures took between 10 and 45 minutes with an average of 28 minutes in general. In all cases once the animal was in lateral decubitus with deep sedation plane proceeded to characterize the cephalic or saphenous vein. The procedure was successful in 93% of the cases, except for 3 animals that were not achieving the desired sedation level after applying the estimated weight-based dosing. The work resulted in identification of tapirs with microchip, the characterization the health status of animals, providing the samples to generate genetic reliable information on the captive population, and especially to achieve, through the establishment of an interagency partnership, to perform these actions that would not have been possible without the collaboration because of many institutions do not have the resources to carry them out.

Butorphanol - Medetomidine and Ketamine for Anesthesia of Malayan Tapirs (*Tapirus indicus*)

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Ten (five male and five female) 1-17 years old captive Malayan tapirs (*Tapirus indicus*) with an average weight of 244 ±50 kg were anesthetized for reproductive evaluations and physical examinations following a fasting period of 12 hours. A combination of Butorphanol (0.12±0.07 mg/kg.), Medetomidine (0.012±0.007 mg/kg.) and Ketamine (0.46±0.23mg/kg.) via intramuscular injections provided a safe and effective anesthesia. Guaifenesine (GG) 5,000 – 15,000 mg/animal was given to all tapirs intravenously to prolong and/or deepen the anesthesia. Inductions were smooth and rapid (2-4 min) with good muscle relaxation. Each tapir was intubated using a tracheal tube exchanger as a guide and respiration was supported with positive pressure ventilation using oxygen. Heart rates averaged (45± 15 beats/min.) with average respiratory rates of (19± 10 /min.) 10 minute post injection. Hemoglobin oxygen saturation (SO₂, measured with a pulse oxymeter, was maintained greater than 95% throughout the procedures. Naltrexone (0.28±0.15 mg/kg) was given intramuscular to reverse Butorphanol and Atipemazole (0.06±0.03 mg/kg) was given intramuscular to reverse Medetomidine. Recovery was smooth and rapid with tapirs standing in 5-10 min.

Fatal Colic in 2 Captive Malayan Tapirs (*Tapirus indicus*) in Thailand

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Tapirs are listed as Vulnerable in the IUCN Red List, as are reserved species under Thai Wildlife Preservation and Protection Act (1992). The two captive tapirs in this report were maintained in a same zoo. A 2 yr old male tapir died in June, 2009 and a 7 yr old female died 18 months later. Both tapirs presented with the similar clinical signs of severe abdominal pain with distention, tachycardia and open mouth breathing. Despite treatment with intravenous fluids and analgesics the animals died within 2hr. Gross necropsy findings were similar in both tapirs with gaseous distention of the gastrointestinal tract. The male's stomach and small intestines contained large amounts of undigested fiber with a large fibrous mass in the duodenum associated with a perforation. Both tapirs had bloody fluid throughout the small intestines, cecal-colitis and accumulation of fiber and sand in their cecum. A complete torsion of cecum was observed in a female. The gross finding suggested the cause of death of the 2 tapirs was associated to colic due to sand accumulated plus the presence of fibrous masses which predisposed to terminal events such as the perforation in the male's duodenum and torsion of the cecum in the female. In captive tapirs, colic is a common health problem (Janssen, 2003). Impacted coarse food, bacterial enterocolitis and sand impaction can result in acute inflammation and necrosis of mucosa (Griner, 1983). The use of mineral/salt blocks may help prevent animals from licking dirt and thus ingesting sand. Also food should be place on feeding pads and/or off the ground to prevent ingestion of sand. A high intake of roughage is recommended for prevention of cecal torsion but creeping plant not recommended. In severe colic non-surgical treatment consists of anti shock therapy including pain relief plus aggressive intravenous fluid therapy.

TSG REPORTS

Building Awareness for Tapirs: Strategies and Resources to Engage the Media

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One of the key tapir conservation challenges that has been identified by the IUCN/SSC Tapir Specialist Group (TSG) has been a lack of public awareness of the species and limited conservation engagement in the communities living in or adjacent to tapir habitat. To address these concerns, the authors, part of the Emerging Wildlife Conservation Leaders (EWCL) program, embarked on a project to develop press materials that could be used by TSG members to generate excitement and discussion in the media and broaden public consciousness around worldwide tapir conservation efforts. This new Tapir Press Kit, available in both Spanish and English, can be a resource for TSG members to engage the media and quickly provide necessary background information to those that can help you tell your story. A press kit is just a starting resource for working with the media. Successful media strategies come first from the knowledge of what is considered newsworthy and a better understanding of the associated audience. There are also simple methods that can help you to develop and assess possible media opportunities, determining which may be the best fit for what you want to accomplish. Once an opportunity arises, there are general tools that can help you to create and deliver memorable messages and simple steps you can take to present yourself in a way that builds credibility and trust. With good preparation and a few response strategies you can also be equipped to answer tough interview questions and avoid the traps that can lead to negative coverage. This holistic approach to media relations can help you to raise awareness for your work and engage multiple audiences and stakeholders in your effort to conserve tapirs and the important ecosystems on which they depend.

Tapir Conservation National Action Plan and Advances in Ecuador

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The process to make succeed the National Action Plan for Tapir Conservation in Ecuador began since our participation in the Mountain Tapir Population and Habitat Viability Assessment, held in Pereira, Colombia in 2004. A result of the Lowland Tapir PHVA and the Third and Fourth International Tapir Symposiums, we matured this idea and began to make it happens. Since that, many working meetings and national workshops have been held in Ecuador, making us to succeed with our national action plan structuring. We concretized the production of the action plan in 2005 with a research performed by Natalia Torres and Ana Correa, two of our TSG members and students of the Universidad Técnica Particular de Loja (UTPL). They were designed surveys directed towards researchers, park rangers, decision makers, environmental authorities, zoos and breeding and rescue centers and other actors involved in tapir conservation in Ecuador. With this procedure, it was compiled updated information regarding the status of tapirs that summarized the current knowledge of all people involved in conservation of the three tapir species in Ecuador. At the end of this period by 2007, it was produced a first draft of the national strategy. Simultaneously, we maintained several working meetings with environmental authorities of MAE, IUCN representatives and members of the TSG in order to plain the next steps, consolidate the process and engage more institutions, potential donors and sponsors, and decision

makers. Finally, the draft was sent to national and international researchers and tapir specialists in order to get criticisms and contributions, formulating by this way a consensus and participative strategy. As a consequence of the above mentioned process it was held in Baños de Agua Santa, Tungurahua-Ecuador, the National Workshop for the Validation of the Tapir Conservation National Strategy, which took place during 8th to 9th May, 2009. This meeting gathered for the first time 45 participants including researchers, local people, TSG members, veterinarians, zoos and rescue centers representatives, environmental authorities, park rangers and others. The main task during the workshop was to review each one of the five strategic guidelines, discuss about threat categories of tapir species established by IUCN and strengthen inter-institutional partnerships between all actors involved in tapir conservation in the country. Because of this event, the participants decided to celebrate the May 9th as the National Day of Tapir in Ecuador. The strategy was sent again for revision and after that we have acquired a document that reflects all the process developed so far. It is important to remark that the action plan is supported by the Environmental Ministry of Ecuador and will be thus recognized in the Official Register of the National Constitution of the Republic of Ecuador. This will allow all tapir conservationists to have a legal conservation tool guiding tapir conservation in the country. Nowadays, Ecuador is developing several important projects for the National Action Plan for Tapir Conservation in Ecuador which are categorized as a priority in the proposed strategies in our action plan

The Conservation Strategy for Baird's Tapir Habitat in Guatemala

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Environmental public policies are important for managing natural resources and fostering sustainable development. In Guatemala the main institution dealing with species conservation and protected areas is the National Council for Protected Areas (CONAP). This institution makes different policies and implements strategies to provide tools for environmental managing of protected areas both private and public. Since our institution is part of its board of directors, it has the ability to promote such policies and strategies. The Conservation Strategy of Baird's Tapir Habitat was developed by researchers at CECON in 2009. This important task was done because of the major importance of conserving habitats, since Baird's tapir habitat shares more than 75% of all terrestrial vertebrate species in the country and 265 are classified as endangered in Red List and National List of endangered species. *Proposal:* A first draft was made after 4 workshops held in northern Guatemala and Guatemala City with 57 participants of 17 different government institutions, managers, private organizations and academic institutions. This draft was revised and improved by the results of the workshops. *Revision:* During field work, the draft was discussed locally with members of different institutions related to nature conservation and resource management. This was done in order to identify different problems, in the areas that have Baird's tapir habitat. The draft was also sent to tapir specialists outside Guatemala who have made same strategies in their countries. *Validation:* The first draft strategy validation was done in five workshops made in the departments of Alta Verapaz, Izabal, El Petén and Guatemala City with 49 participants of 11 institutions. The main purpose of the strategy is to develop guidelines for conserving Baird's tapir habitat in Guatemala having four objectives: to promote research and monitoring of Baird's tapir habitat, strengthening the management practices of institutions related to the habitat, diminishing human impact in the habitat in order to allow the survival of the species and raising awareness of the importance of the species habitat for other species and for the services it provides to people. The strategy consists of four major issues: Research and Monitoring (RM), Landscape Management (LM), Legislation & Institution Strengthening (LIS) and Environmental Education (EE). In the workshops the Main problems, Strategies to solve, Actions to take and Responsible to do were identified for every major issue: 8 problems for RM, 6 for LM, 6 for LIS and 4 for EE. This strategy will give valuable inputs for the future development of the National Action Plan for Baird's tapir in order to have a major impact in the environmental public policies and in the conservation of the species.

National Action Plan for Baird's Tapir Conservation in Honduras

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Honduras is located in the middle of the biological corridor formed by the remaining forest fragments in Central America, accounting for the only dispersal bridge between Mexico to the north and Colombia to the south. The Wildlife Office at the Forestry Conservation Institute (ICF), with the support from the UN-GEF Project ECOSISTEMAS have identified tapirs as indicators of healthy ecosystems within protected areas, as well as for productive landscapes. With the support of the TSG volunteers we have elaborated the Honduran National Conservation Plan and the National monitoring protocol for this species. Both documents aimed to achieve a more efficient and better organized investment for tapir conservation in the country as well as to improve our scientific knowledge about this species. We applied interviews to researchers and government officials in charge of wildlife management; we also carry on an extensive bibliographical revision of all data available about tapirs in Honduras. All information taken from scientific papers, official documents and other material was used to create the first comprehensive summary about the biology, distribution, used by people and other relevant topics about tapirs in Honduras. Additionally, official government documents related to biodiversity laws and policies were revised. This allowed us to construct a National Action Plans for Baird's Tapir Conservation that was in context with the nation's objectives and interests. A large workshop was organized to validate the documents by all stakeholders before the final version was produced.

Peruvian Tapirs Conservation Strategy Process

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Peru has two species of tapirs, the Amazonian tapir or sachavaca (*Tapirus terrestris*) and the Andean tapir or pinchaque (*Tapirus pinchaque*). Very threatened throughout its range, is estimated between 350 and 375 mountain tapir individuals in Peru considered as Critically Endangered by Peruvian law and IUCN criteria. The Amazonian tapir, more widely distributed, is categorized as Vulnerable by Peruvian law and IUCN. Both species are threatened mainly by loss and deterioration of habitat as a result of extensive cattle ranching, agriculture and infrastructure projects that cause population decline and isolation, as well as hunting for meat consumption and parts trade. Conservation units, national, regional and private, have greater representation of Amazonian tapir habitat, and is required greater protection of the mountain tapir habitat. The development of conservation and management national plans was included within medium term targets of the TSG Action Plan. So far, four countries have developed national strategies (Costa Rica, Colombia, Ecuador and Argentina). The National Strategy for Peruvian Tapirs Conservation is working with the analysis of the current scenarios and available information on the species, to prioritize goals, objectives, actions and recommendations designed to the identified stakeholders. The Peruvian Strategy process began in mid 2010. With the potential participants identified, 63 invitations were sent, having then the reply of 41 positive answers and 22 surveys completed prior to the workshop. The first workshop was held between March 1st and 4th of 2011 at Huachipa Zoological Park (Lima) with participation of 43 persons from government and academic institutions, zoos and breeding centers, NGOs involved in conservation and independent researchers; all the workshop was led by the TSG Peruvian team with the support of other members from Brasil, Colombia and Argentina. Strategy selected work areas were three: In situ conservation, Ex situ conservation and Legislation. Each one was worked out separately for each species, resulting in preliminary documents developed in a participatory manner. It is planned to develop two additional workshops in two locations within species distribution range for include also the participation of local stakeholders such as hunters, wildlife managers and educators, which

had have little representation in the first workshop. As a workshops result we developed a compilation document which have overview of the necessary actions to be implemented for the conservation of tapir species in Peru. Strategies are used worldwide as a guideline for researchers, academic institutions, NGOs aimed at conserving biodiversity and entities. The General Directorate of Forestry and Wildlife of the Ministry of Agriculture and the National Natural Protected Areas of the Ministry of Environment are taking an important presence in the strategy, therefore is being creating a platform for collaboration with these agencies of the Peruvian State to implement the strategy in the country. Finally, as a part of the workshop, an a training in management of captive and wild tapir was included in terms of providing valuable information to those invited to the process and involved with the management and research of the species.

The Argentinean Tapir Group as a Tapir Conservation Tool

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In 2005, zoos and other institutions holding tapirs in Argentina came together to help improve the conservation status of species through interdisciplinary work and unified conservation guidelines. Over the years they have added to this group of government agencies and academic research institutes and NGOs. There were seven meetings in which actions were planned and developed: tapirs were identified with a microchip, were developed and agreed management and husbandry protocols, were made genetic and health studies and were developed different researches and educative activities. In this context, was made the proposal to form an integrated national group. The methodological basis of the conceptualization of this group was based on Open Standards for Conservation. This group was created at the seventh “ex situ” meeting held in Formosa in may 2009. Moreover, is based on the Action 23 of the fifth strategy of the National Plan. The group was officially founded in November as part of the National Meeting for an Integrated Strategy for Tapir Conservation. The Argentine Tapir Group is a set of governmental and non government, public and private institutions and independent professionals work in interdisciplinary and coordinated way towards tapir conservation in Argentina based on collaboration. The objectives are: Advancing the National Action Plan for the Conservation of the species and participate in periodic reviews; working in an integrated and coordinated; identify and carry out research priorities, management, education, dissemination, monitoring and control. The scope of action consists of the historical range of *Tapirus terrestris* in Argentina and all zoos and institutions that have tapirs. The actions of the group are based on the strategies and actions of the National Action Plan for Tapir Conservation in Argentina. The group structure is composed of a general coordination (two representatives) and six working committees: Education and outreach, administration and legislation, research, ex situ management, habitat management, and fundraising. In the first meeting the plan's actions were grouped by each committee, institutions then joined the working committees. In the end, participants set priorities and identified the steps to achieve some of these actions. Each institution made a commitment to the realization of integrated activities with the group and an institutional commitment to contribute their shares to the implementation of national action plan. Among the achievements of 2011 the ex situ management committee has conducted the workshop “Management and ex situ conservation of the species”; through the commission of administration and legislation is being prepared the presentation and request for the Group proposal endorsement to the Environmental Federal Council, and is being developed the proposed declaration of a natural monument of the species in the province of Formosa. Institutions that are part of this initiative believe that the Argentine Group Tapir is the tool that will allow us to continue working various institutions, strengthening our capabilities and combining efforts for the conservation of the tapir in Argentina.

WORKSHOPS

EX-SITU CONSERVATION

North American Captive Management, Breeding and Transfer Plans of Ex-situ Tapirs

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The Association of Zoos and Aquariums (AZA) sponsors two cooperative breeding programs for captive tapirs in North America – the Malaysian Tapir and the Baird's Tapir Species Survival Plans (SSPs). The goal of each Tapir SSP is to maintain a viable, captive population of tapirs through both demographic and genetic management. Management recommendations are developed on a regular basis by each SSP's Program Coordinator and Population Management Advisor, and communicated to tapir holding institutions through Breeding and Transfer Plans. Although recommendations are designed to provide the best management possible for each species as a whole, institutional input is also solicited to foster cooperation and ensure that the needs of tapir holders are being met. The foundation of both SSPs is a studbook, which is used to track life history data and each tapir population's pedigree. When management recommendations are developed, life history data (mortality rates, reproductive age, longevity, etc.) are first used to address the demographic management of each species. Given average mortality rates and the current age structure of the population, the approximate number of births needed over a specified time period (e.g., 3 years) to maintain each species' target population size is determined. Then, given a target number of births, genetic analyses are used to recommend a corresponding number of breeding pairs that will retain high levels of gene diversity while producing offspring with low inbreeding coefficients. In general, this is accomplished by breeding animals with low, well-matched mean kinships. An individual's mean kinship is a measure of its genetic value in the context of the current population – tapirs with high mean kinships have many living relatives and, thus, their genes are well-represented, while tapirs with low mean kinships are poorly represented because they have few living relatives. Preferentially breeding individuals with low mean kinships retains gene diversity that has the highest probability of being lost from a population.

Studbook Keeping as an Efficient Tool for the Management of Tapirs in Captivity

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International Malayan Tapir Studbook Keeper

Malay tapir (*Tapirus indicus malayanus*) known as mammals where found in all state of Malay Peninsula in South east Asia region such as Indonesia, Malaysia, Burma, Thailand and Cambodia. Today, population of tapir are extremely fragmented, occurring in southern Vietnam, southern Cambodia, parts of southern Myanmar (Burma), Tak Province in Thailand and through the Malay Peninsula to Sumatra south of the Toba highland (Van Strien in litt, Khan M in litt. 2003). Tapir make attractive exhibit in zoos, many zoos around the world have tapirs in their exhibit. The Malayan tapir has been categorized as vulnerable (VU: A1c+2c, B2cd+3a,C1+2b) given according to the 1996 IUCN red list of threatened animals (IUCN 1996). The tapir is listed on CITES Appendix I (Burton and Pearson 1987). Malayan tapir has been given total protection since 1955 under the Wild Animals and Bird Ordinance No. 2 of 1955. In Indonesia, tapir listed on government regulation no 7, 1999 about plantation and animal preservation. On January 7, 2008 the Committee on Interregional Conservation Coordinator (CIRCC) of WAZA considered that author has been elected as an International studbook keeper of tapir (*Tapirus indicus*). Until August 2010, there are 213 institution in captivity around the world has been registered internationally into tapir studbook keeper and there are 952 number of tapir individually has been recorded since 1927. From the 952 tapir recorded individually there are 919 tapir alive that divided into 420 males, 482 females and 16 unknown sex. The information of data tapir has been compiled by the author internationally and it is one of the key roles from our Indonesian native wild animal. Perhaps part of this information will give an effort to conserved wild animal both in situ and ex-situ worldwide.

Tuberculosis: A Major Obstacle for the European Malayan Tapir Breeding Programme

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The Malayan tapir (*Tapirus indicus*) population in the wild is listed as endangered (appendix 1 of CITES). Therefore, maintaining a viable and healthy population in zoological gardens is essential for the preservation of the species. Consequently, the European Endangered Species Programme (EEP) was established in 1992. A free movement of animals within this programme benefits the exchange of genetic material. Tuberculosis (TB) is one of the major drawbacks within this scenario. After recent outbreaks of TB by *Mycobacterium pinnipedii* in captive populations of Malayan tapir in two European zoo's, parks keeping this species were encouraged to test their animals. Of 53 animals held in 21 zoological parks (2010), 65.4% were tested. 11.3% tested positive, 47.2% negative and 11.3% dubious. Based on the available tuberculosis tests in Europe a strategy was designed to tackle this problem. Zoo's not wanting to cooperate are excluded from the breeding programme. Test engaged are: Interdermal Tuberculin Test, the STAT PAK Elephant Rapid Test (Chembio Inc., USA) and ELISA (Lelystad, NI). Direct examinations like Ziehl Neelsen (ZN) staining, culture, PCR and spoligotyping are deployed to isolate and type the causative agent if animals react positively to screening tests. Major drawbacks of the tests in general are their limited performance in zoo animals. The varying quality of the tuberculin used, the lack of validation, the low sensitivity and specificity for the species, can partly be overcome by combined and repetitive testing. Although tapirs can be trained to lie down and have minor non-invasive procedures performed, this is a long-term process and many animals will require repeated anesthesia. (Latent) infections with NTM leading to false positive test results and the fact that clinical signs of TB are rarely seen before death in zoo animals further complicate matters. A practical working protocol will be presented.

DNA Characterization and Phylogeny of the Malayan Tapir (*Tapirus indicus*) Using Complete Cytochrome b Gene Segment of the Mitochondrial DNA (mtDNA)

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DNA characterization of the *Tapirus indicus* using 1140bp of the Cytochrome *b* gene revealed a low variation in their genetic content. Phylogenetics analyses using distance (neighbor-joining), maximum parsimony and maximum likelihood analysis produced a similar topology, which supported the monophyletic status of the *Tapirus indicus*. 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 tapirs. Overall, DNA characterization and phylogenetic construction of the Malayan tapirs using the complete Cytochrome *b* gene proved to be important and useful for species identification, conservation and management purposes.

LANDSCAPE CONNECTIVITY FOR TAPIRS

Landscape Connectivity Assessment for Tapir Conservation and Habitat Management

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Changes in the land use on tapir's habitats have caused that natural patterns of ecosystems are modified into new patterns with human influence. These changes are associated with processes such as habitat loss and fragmentation, which causes alterations on the connectivity, or capacity of the species to move through the landscape, interrupting or disturbing natural flows. Connectivity is species specific because it depends on the behavior of each species and its interaction with the surrounding habitat. It can be assessed by the spatial structure of the landscape, for example the existence of corridors, core areas, branches, islets, and other elements (structural connectivity) or by recording the movements of individuals through the landscape (functional connectivity). Functional connectivity assessments provide more accurate information, but are expensive in comparison to structural connectivity. There have been developed landscape connectivity assessment tools that enable the user to approach functional connectivity based on habitat structure spatial data, animal movements recorded in the field by other researchers and graph theory approach (know as potential functional connectivity). This workshop aims to introduce tapir specialists and researchers to landscape connectivity assessment for tapirs based on habitat spatial data, present free software for connectivity assessments and to promote the exchange of data and experiences in order to generate tools that can be employed in the future by researches and managers for tapir conservation all over the four species distribution ranges.

KEYNOTE SPEAKERS

Large Mammals and Extinction Crisis in South-East Asia: Lessons from the Past

GATHORNE CRANBROOK

The Malay Tapir *Tapirus indicus* is a survivor of the Pleistocene mega fauna of South-east Asia. Since the 1950s, continuing paleontological/zoo archaeological investigation has extended knowledge of the former occurrence and distribution of this species and other large mammals of the Sunda sub region, with some exciting discoveries beyond the outer limits of their previously known ranges. At the same time, there has been increased understanding of prevailing environmental conditions to which these large mammals were adapted, particularly during the Last Glacial Period and the early Holocene. The changing climate of this period had varying effects in different parts of the region, impacting in contrasting fashions on large mammal populations. Archaeological evidence suggests that, in some places, hunting pressure has intensified the effects of deteriorating environmental conditions, leading ultimately to local disappearance. In the 21st century, widespread conversion of natural habitats, coupled with the use of modern weapons, threatens the final extinction of isolated residual populations of many large mammals of the region. Steps need to be taken to protect surviving remnants in their natural habitats, but consideration can also be given to planned re-introduction to suitable sites of past occurrence, where the process can be managed (and funded) alongside commercial land-usage.

SPECIAL PRESENTATION

Assessing Age and Maturity in Tapirs Based on Dental Eruption and Cranial Suture Closure

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Patterns of suture closure and tooth eruption can be used to indicate maturity in mammals. The use of these indicators is complicated by the fact that sequences of tooth eruption and suture closure are often variable (or polymorphic) both within and between species. Assessing actual age based on these sequences is further complicated by the observation that maturity may not be strongly correlated to absolute age. Here we use Ontogenetic Sequence Analysis to determine sequences of tooth eruption and suture closure based on skeletal collections of *Tapirus terrestris*, *T. pinchaque*, *T. bairdii*, and *T. indicus*. We also investigate the correlation between maturity and age using dental casts taken from a wild population of Baird's tapir from the Corcovado National Park in Costa Rica. These casts comprise 24 individual tapirs, and include not only the date of capture, but also the actual age of ten of these individuals, collected over a period of seven years. Fourteen of the individuals are represented by multiple casts that record recaptures, and thus serve to document changes as these individuals aged. Results point toward considerable polymorphism within each species, and also underscore the relationship between sample size and sequence resolution. Not surprisingly, poorly sampled species are less likely to have resolved sequences for all dental eruption and suture closure events. The sequences show some phylogenetic signal with the more closely related species having more similar sequences – suggesting an evolutionary component to the sequence order. The dental cast data demonstrate only a moderate correlation between age and dental maturity, which sets limits on their utility for actual age estimation. The dental cast data further show that previous estimates of age based on cementum annuli on the teeth likely drastically underestimate an individual's age. This suggests that the annuli may not accurately record every yearly increment. Although the results call for caution when assessing age based on dental and sutural sequences, they do provide a standard by which to assess individual maturity, and thus can be used to establish demographic patterns.