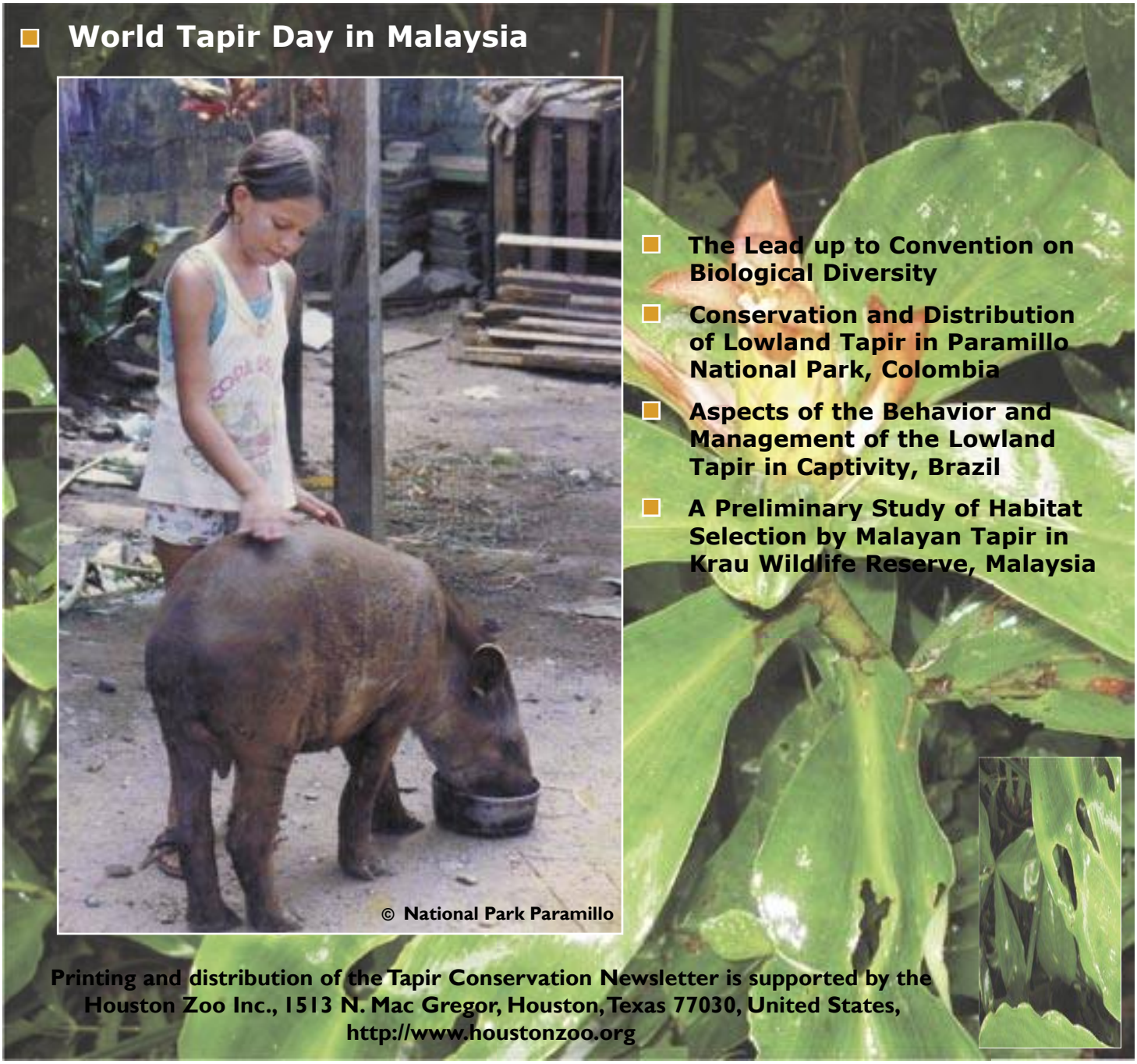
ISSN 1813-2286
Volume 19/2 ■ No. 27
December 2010

TAPIR SPECIALIST GROUP

Tapir Conservation

The Newsletter of the IUCN/SSC Tapir Specialist Group

www.tapirs.org



- **World Tapir Day in Malaysia**
- **The Lead up to Convention on Biological Diversity**
- **Conservation and Distribution of Lowland Tapir in Paramillo National Park, Colombia**
- **Aspects of the Behavior and Management of the Lowland Tapir in Captivity, Brazil**
- **A Preliminary Study of Habitat Selection by Malayan Tapir in Krau Wildlife Reserve, Malaysia**

© National Park Paramillo

Printing and distribution of the Tapir Conservation Newsletter is supported by the Houston Zoo Inc., 1513 N. Mac Gregor, Houston, Texas 77030, United States, http://www.houstonzoo.org

CONTENTS

Volume 19/2 ■ No. 27 ■ December 2010

TAPIR CONSERVATION

Abbreviation **Tapir Cons.**

ISSN **1813-2286**

Website **www.tapirs.org**

Contributions Editor **Carl Traeholt (Denmark/Malaysia)**
E-mail: ctraeholt@pd.jaring.my

Layout & Distribution Editors **Stefan Seitz (Germany)**
E-mail: tapirseitz@web.de

Kelly J. Russo (United States)
E-mail: krusso@houstonzoo.org

Production & Distribution This issue is kindly sponsored by Houston Zoo Inc., Kelly Russo, 1513 North Mac Gregor, Houston, Texas 77030, USA.

FROM THE CHAIR

Letter from the Chair

Patrícia Medici

Over the past six months, the Tapir Specialist Group has made considerable progress on developing **National Action Plans for Tapir Research and Conservation**. Argentina and Ecuador have recently finished and published their plans! As you all know, after holding Population and Habitat Viability Assessments (PHVAs) and developing new action plans for each species of tapir, the TSG has shifted its focus to developing National Action Plans for each tapir range country. So far, Argentina, Colombia, Ecuador and Mexico have finished their plans. French Guiana, Guatemala, Indonesia, Peru and Venezuela are well on their way. In Brazil, the TSG is working with the Federal Environmental Agency (ICMBio) on the revision of the Brazilian Red List – which includes lowland tapirs – and the results of this work will be used for the development of a National Action Plan for lowland tapirs in Brazil. A workshop to evaluate the status of lowland tapirs in all Brazilian biomes where the species occurs will be held in November 2010. All tapir action plans can be downloaded in all appropriate languages from the TSG website (www.tapirs.org). I would like to express our gratitude to all TSG Country Coordinators who have been working really hard on developing and publishing the National Action Plans! In addition, I would like to thank all organizations that have provided institutional and financial support for our action planning activities in each country.

As I mentioned before, the **Fifth International Tapir Symposium** will be held in Kuala Lumpur, Malaysia, in 2011. This is the first time the TSG will bring the conference to a Malayan tapir range country and we are very excited about it! Originally we planned to hold the conference in March 2011. However, due to personal reasons on my part we had to postpone the symposium to the second half of 2011. The new dates are from **17-21st of October, 2011**. An organizing committee consisting of members from the Malaysia Department of Wildlife and National Parks (DWNP) and our TSG members Carl Traeholt and Boyd Simpson are working together on the local organization of the conference. A scientific committee has been formed and we will soon post a call for abstracts. A fundraising committee formed by members of the TSG as well as members of the AZA and EAZA Tapir

Patrícia Medici and José Aragão (Pantanal Tapir Program) profiled on Revista Brasileiros in Brazil.

and stayed with us for an entire week! We captured and radio-collared two tapirs during her stay! Liana has worked as a professional journalist since 1977 and specialized on Science and Environmental Reporting back in 1983. She is a huge tapir fan and major supporter of tapir conservation in Brazil. In 2002, she won the Biodiversity Reporting Award with a feature story on lowland tapirs based on my tapir project in the Atlantic Forest. Since then, Liana has published several media articles on tapirs. For years I had been inviting her to join my team in the field, and we finally managed to make it happen! As a result of her visit to my project in the Pantanal she wrote and published an incredible article in a national magazine called "**Revista Brasileiros**" (July Edition 36)! The article profiles tapirs, tapir conservation issues, my long-term tapir work in Brazil and talks about the Tapir Specialist Group. It is by far the most beautiful, complete article ever written about our tapir conservation efforts here in Brazil. The article is available online at: **http://www.revistabrasileiros.com.br/edicoes/36/textos/1081/**.

Environmental Journalist Liana John, Major tapir conservation supporter in Brazil.

Veterinarian Paulo Mangini (Pantanal Tapir Program) being interviewed by Repórter ECO.

The article is in Portuguese, so apologies to the English speakers! Another outcome of Liana´s visit to the Pantanal was our decision to work together on a **tapir coffee table book** to be published in both English and Portuguese! The main focus of the book will be on the lowland tapir… including biological and cultural information about the species. We are currently raising funds for the initiative and we are aiming at having the book published before the next Tapir Symposium in Malaysia. We know it is a tight schedule, but we want to give it a try!

In August, we hosted a TV crew from "TV Cultura", an extremely well-known, well-respected Brazilian TV channel. They have a show called "Repórter ECO" that focuses on nature, wildlife and environmental issues in general, and it is aired every Sunday afternoon to the entire country. The Repórter ECO crew came to the Pantanal with us and obtained footage for an entire **show dedicated to lowland tapirs and the Pantanal Tapir Program**! The show was aired last September and made available online on the TV Cultura website (**www.tvcultura.com.br**). I would like to take this opportunity to thank TV Cultura for this opportunity to profile tapirs on national television in Brazil, the exposure was priceless!

In the meantime, our tapir presence on **Facebook** (**www.facebook.com**), the most popular social media tool these days, has been growing by the day! The TSG Facebook profile created in 2009 has attracted **718** friends so far. The TSG Group page, also created in 2009, has recruited **370** members. I created a Cause Page for my Lowland Tapir Conservation Initiative here in Brazil and we have managed to recruit **1,335** members in less than six months! The page dedicated to World Tapir Day has recruited over **3,000** fans! The Colombian Group page called Red Danta recruited **106** members in a few months. All these people who have become members, friends or fans of these tapir Facebook pages are now receiving regular information about tapirs and tapir conservation issues and needs and that is extremely powerful!

We will continue to work hard to maintain tapirs high on the list of conservation priorities worldwide!

Patrícia Medici
M.Sc. in Wildlife Ecology, Conservation and Management
Ph.D. in Biodiversity Management
Coordinator, Lowland Tapir Conservation Initiative
IPÊ - Instituto de Pesquisas Ecológicas
Chair, IUCN/SSC Tapir Specialist Group (TSG)
Facilitator, IUCN/SSC Conservation Breeding Specialist Group (CBSG) - Brasil Network
Rua Taiobá, 672, Cidade Jardim, 79040-640, Campo Grande, Mato Grosso do Sul, BRAZIL
Phone & FAX: +55-67-3341-8732
E-mail: epmedici@uol.com.br; medici@ipe.org.br
Web: www.ipe.org.br, www.tapirconservation.org.br, www.tapirs.org

SPOTLIGHT

The Tapir Research Spotlight

Anders Gonçalves da Silva, Mathias Tobler

The research spotlight this issue chose two papers related to ongoing conservation dilemmas: how many individuals do we have to conserve for species to survive, and once we achieve our conservation goals can we be safe in thinking that the species is out of the woods. These remit to broad discussions within conservation for which no unifying answers exist. We took the liberty of expanding a little on some of our own opinions on the subjects in the hopes of stimulating some discussion (which do not reflect in anyway TSG's position). We also chose a third paper that was fruit of some great collaborative effort from TSG members, and gives a first peak at lowland tapir evolutionary history. This paper has been rated as "highly accessed", meaning it has had a unusually high access rate over the two weeks following its publication. We hope you enjoy them.

Being Clear About the Goals

Traill, L. W., Brook, B. W., Frankham, R. R., & Bradshaw, C. J. A. (2010). Pragmatic population viability targets in a rapidly changing world. *Biol Conserv*, *143*(1), 28-34. doi:10.1016/j.biocon.2009.09.001

"*The first rule of fight club is: you do not talk about fight club*." This iconic quote from *Fight Club* can be easily transposed to most activities in life. For instance, one could easily say "The first rule of PVA is: you DO talk about the goals". A PVA, or a *population viability analysis*, is, according to the authors, one of the most common ways of determining the MVP, or *minimum viable population* size – a central measure used to determine conservation action. One of the main issues with MVP is that it only makes sense given the conservation goals used to parameterize the PVA. The MVP of a population will change if your goal is to have a 50% chance of survival over the next 10 years or a 90% chance of survival over the next 100 years (a common goal in many PVAs). The difference in this case is likely to be between a population size of a few hundred adult individuals to one of several thousand (which, as pointed out by the authors, maybe the difference between having or not having support from policy makers). An additional layer that must be considered is what does population size mean. Conservationists will generally distinguish between two types: census and effective population sizes. A census population size is the number of individuals in a population, thus easy to measure, and most importantly, easy to manage. Effective population size is a somewhat more abstract concept, and is defined as the idealized population size (i.e., with equal sex ratio, equal reproductive success, predictable family size, etc.) that is loosing or gaining genetic variation at the same rate as observed in the census population. Because in most populations we observe unequal sex ratios, unequal reproductive success, and variable family sizes, effective population size is generally smaller than census population size, usually about one tenth of the size ($N_e = 0.1N_c$). Thus, effective population size is hard to measure, and even harder to manage. On the other hand, effective population size is much more meaningful in terms of conservation than census population size. The reason is that the MVP, in terms of effective population size, is the size at which the loss of genetic variation due to demographic stochasticity is equal to the gain due to mutation – so the net change in genetic variation is zero. If the population is below that number, then it is loosing genetic variation faster than it can produce it, and therefore, it is loosing its ability to adapt and evolve. Irrespective of how you define your population size and species, what Traill and colleagues argue is that in both cases PVAs tend to come up with the same number, roughly 5,000 adults. In other words, for a population to have a 90% chance of survival over the next 100 years, and assuming all else remains equal, 5,000 reproductive adults are needed today. This number is way above the population size of most species listed as Critically Endangered in the IUCN Red List, and below what has been set as acceptable targets in many action plans. This observation has led the authors to state that "… *Many existing conservation programs might therefore be managing inadvertently or implicitly for extinction – a clearly illogical and counter-intuitive aspiration.*" The authors have many detractors, and most would argue that PVA predictions are highly dependent on assumptions and data, and result in predictions that have little applicability to real conservation scenarios – mostly because of high variance associated with these predictions. The rate at which species are going extinct, though, dictates that we do not have time for collecting data on every species. Furthermore, biases due to lack of high quality data are expected to underestimate extinction risk, not overestimate it, and finally

in spite of individual species variability in PVA outcomes, meta-analysis across a couple hundred vertebrate species PVA results suggest that roughly 5,000 adults is the minimum necessary for long-term survival. The authors thus advocate using 5,000 adults as a *pragmatic* rule of thumb population size to guide conservation action. A position that carries the advantage of simplicity, and that is unambiguously expressed to policy-makers. However, it is a goal that is certainly unrealistic for many populations, including many tapir populations. How do we decide then which populations should be prioritized, and which ones should be left aside? One potential scheme proposed by the authors involves ranking populations by how far they are from the goal of 5,000: "*... So for example, a small population of 50 individuals will score 0.01 (percent of 5000), ...*". However you feel about it, I doubt that this is the last word on the subject, but in an increasingly changing world, with decision-makers more and more constrained for time, a rule of thumb for conservation sounds appealing. Perhaps more importantly than a specific goal, I think, the authors bring to the forefront the discussion about communicating clearly about the "conservation goals" that underlie our conservation action, and what are their consequences. I think that without that, we might re-live an iconic *Fight Club* scene. We will watch hopelessly as species "implode" under the low weight of their numbers caused by our inadequate goals while the *Pixies* ask over and over again "*Where is my mind?*"...

Anders Gonçalves da Silva

Parenthood Dilemma

Scott, J. M., Goble, D. D., Haines, A. M., Wiens, J. A., & Neel, M. C. (2010). Conservation-reliant species and the future of conservation. *Conserv Lett*, *3*(2), 91-97. doi:10.1111/j.1755-263X.2010.00096.x

A very divisive topic among most humans is whether or not you are "pro-choice" or "pro-life" (i.e., whether you support women and parent's choice to carry out a pregnancy to term or whether you think that every pregnancy should be carried to term no matter what the circumstances). In many cases, soon to-be parents have to make a choice because the fetus has tested positive for Down syndrome or some other life crippling disease or handicap. At the end of the day, I believe that the child's future is all that matters, and if there is some certainty that if something happened to me, that my child would not be able to live on his/her own, would not be self-sustaining, then I would be pro-terminating the pregnancy (others may think differently, and I do not dispute their right to do so). Scott and colleagues introduce us to a new concept in conservation: "conservation-reliant species", which points to a similar sentiment expressed above. According to the authors, these are species for which we can identify the main threats to their continued survival but "*... If these threats cannot be eliminated, continued management will be required and this management will require 'existing regulatory mechanisms' to ensure that it continues for the foreseeable future.*" In other words, these are species that cannot survive on their own, mostly because of human action. According to their data, 84% (N = 1,136 species across animals – vertebrates and invertebrates, and plants) of all species listed under the United States Endangered Species Act (USESA) can be considered "conservation-reliant species". The actual long-term management required by these species differs according to threats, which can vary from controlling an invasive species that is a predator or competitor of the endangered species, to controlling pollution and artificially augmenting numbers. A curious, but illustrative example cited by the authors is the case of the buffalo running clover (*Trifolium stoloniferum*), which is believed to depend on the disturbance caused by buffalo during their migration through the central prairies of North America for their survival. To recreate this disturbance, options such as mowing and livestock grazing are being considered. The example is descriptive of the threats that cannot be eliminated (i.e., buffalos won't be roaming the prairies ever again), of the time scale of future management (i.e., indefinite) and the uniqueness of the management required (e.g., mowing). The problem, the authors tell us, becomes even more dramatic if we consider that there is an estimated 14 to 35 thousand species in the United States alone that may warrant some form of conservation action, and thus are potentially conservation-reliant. Moreover, the problem is likely to only get worse, as the Intergovernmental Panel on Climate Change (IPCC) estimates that 20-30% of these species and those listed under the IUCN Red List are expected to have increased extinction risk because of projected rises in global temperature. When it comes to solutions, the authors round up the usual suspects: increased funding for conservation, better legislation to protect species and the environment, more community, government and private sector involvement, and finally, the recognition that not all species will receive equal or adequate conservation action, and thus we need forms of prioritizing so that we can get the "biggest bang for our buck." It would seem that prioritizing by "self-reliance" as some would do for other situations would be extremely restrictive, and exclude from conservation efforts 84% of the species listed under USESA. Traill

and colleagues in the previous paper examined in this *Spotlight* propose to prioritize by how distant the current population size is from the ideal population size of 5,000. Others propose we focus on function: a bee providing pollination services is more valuable than a panda. The issue is divisive, and there is no clear winner. The authors themselves admit that no answer is immediately forthcoming. To me we need unity in well thought out conservation goals with identified consequences. Attempting a uniform prioritization of species of conservation concern, on the other hand, seems foolish. All life is important, but every conservationist has his or her baby (we have the tapirs), and as good parents we will do our best and worst to defend its right to a future. Many may say that such a fragmented approach will undermine our ability to bring about political change. I don't necessarily agree, I think we are unified in our agreement that life is precious, but the fact that we are willing to fight harder for some rather than others, works to biodiversity's advantage – each fighting for their own babies, as a collective fight for all species. However, we have to remain somewhat objective about it. We need to keep in mind what kind of future we are writing for our species or population of interest, and know when to "pull the plug".

Anders Gonçalves da Silva

Large-scale Questions Require Large-scale Collaborations

de Thoisy, B., Gonçalves da Silva, A., Ruiz-Garcia, M., Tapia, A., Ramirez, O., Arana, M., Quse, V., Paz-y-Mino, C., Tobler, M., Pedraza, C., Lavergne, A., 2010. Population history, phylogeography, and conservation genetics of the last Neotropical mega-herbivore, the lowland tapir (*Tapirus terrestris*). *BMC Evol Biol* 10, 278. doi:10.1186/1471-2148-10-278

At the Third International Tapir Symposium in Buenos Aires the members of the newly formed TSG Genetics Committee together with several field researchers met to discuss the idea of performing a range wide analysis of the genetic history, diversity and population structure of the lowland tapir (*Tapirus terrestris*). This was a truly international question that could only be answered by an international research team. Over the next few years samples were collected, DNA was extracted and sequences were cleaned in order to create a large database spanning eight range countries (Argentina, Brazil, Bolivia, Colombia, Ecuador, French Guiana, Peru and Venezuela). The first results of this collaboration have just been published in *BMC Evolutionary Biology (de Thoisy et al. 2010)*. Based on fossil records, tapirs migrated into South America between 3.1 and 2.7 million years before present (My BP) during the Great American Biotic Interchange. Over time there were multiple species of tapirs inhabiting South America, most of which are now extinct. Today, there are three remaining known species of tapirs in the Americas; Baird's tapir (*Tapirs bairdii*) occurring throughout Central America and into Colombia and northern Ecuador east of the Andes, the Mountain tapir (*Tapirus pinchaque*) inhabiting Andean mountain cloud forests in Colombia, Ecuador and Peru and the lowland tapir occurring throughout large parts of lowland South America, and inhabiting a wider range of habitats such as tropical moist and swamp forests, tropical dry forests, cerrado and wet savannas. The questions of when in history these current species emerged, how they colonized South America, and how current populations are structured remain unanswered and were addressed by de Thoisy and his colleagues. Based on their results, the lowland tapir first appeared between 0.19 and 0.57 My BP somewhere in the western Amazon. The mountain tapir is a sister species of the lowland tapir and might have evolved as tapirs started moving up the steep slopes of the Andes into colder climates and different vegetations. From the western Amazon, lowland tapirs started colonizing South America through two independent dispersal events, a first one into regions north of the Amazon such as northern Brazil, Venezuela and the Guianas, and a second one into the southern Amazon, and into the dryer areas of the Cerrado and northern Argentina. The Amazon River seems to be an effective barrier preventing gene flow between these two groups. Overall, there was low level of genetic structuring of tapir populations at the continental scale and there was no evidence that lowland tapirs have genetically adapted to different climates and vegetation types. It rather seems that they occupy a broad ecological niche, allowing them to adapt to local conditions. The highest genetic diversity was found in the western Amazon, supporting the idea that this is where the species originated and making this region a high priority for conservation efforts, and corroborating other studies that have pinpointed the region as an important biodiversity "generator". The study by de Thoisy and colleagues is only a first examination into tapir history and evolution with many interesting questions still to be answered, nevertheless it is an excellent example of what can be achieved when we put our heads together and join our efforts to reach a common goal. Collaborative effort is one of the foundations of the Tapir Specialist Group, and here we have an example to be proud of.

Mathias Tobler

CONSERVATION

The Lead up to Convention on Biological Diversity (CBD) COP10

Dena Cator, IUCN

Introduction

This article is a follow-up to the one published in April 2010 and will give a brief background on the Convention on Biological Diversity (CBD), describe the outcome of the CBD SBSTTA14, WGRI3 and UN General Assembly meetings that took place earlier in 2010, explain what will take place at the upcoming CBD COP10 meeting that will take place in Nagoya, Japan in October and how IUCN is preparing for the that meeting. See the end of the article for an easy reference glossary of all acronyms / terms in this article.

Background to CBD

The Convention on Biological Diversity, which has been in force since 1993, works to enable three main objectives: 1) the conservation of biological diversity, 2) the sustainable use of its components, and 3) the fair and equitable sharing of benefits from using genetic resources. In 2002, the Parties to CBD adopted a Strategic Plan which included as its mission the target of achieving by 2010 "a significant reduction of the current rate of biodiversity loss at global, regional and national levels as a contribution to poverty alleviation and to the benefit of all life on Earth" – known as the 2010 biodiversity target. This year, the International Year of Biodiversity, countries have been responsible for reporting their progress towards meeting the 2010 biodiversity target but it is generally agreed that the target has not been met. The third edition of the Global Biodiversity Outlook (GBO3) (see: http://gbo3.cbd.int/resources.aspx), a CITES Secretariat and UNEP-WCMC publication, concluded that we are continuing to lose biodiversity at a rate never before seen in history and that efforts to address the loss must be substantially strengthened. Three meetings this year (SBSTTA14, WGRI3 and COP10) will provide a venue for CBD Parties to update decisions relating to the Convention and renew their commitment to conserving biodiversity beyond 2010.

SBSTTA14

The 14th meeting of the scientific advisory body to CBD, known as the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), was held May 10-21 in Nairobi. The purpose of SBSTTA meetings is for country delegations to review the scientific and technical basis for suggested changes to components of the Convention and make recommendations to the Conference of the Parties (COP) in this regard. The meeting covered a number of issues of particular relevance to IUCN including the launching of the third edition of the GBO3, the revision of the Strategic Plan of the Convention and its 20 targets for 2020, protected areas, marine and coastal issues, among others. SBSTTA14 adopted 18 recommendations that will be taken to COP 10. Many discussions in Nairobi were permeated by questions about the relationship between climate change and biodiversity and, more specifically, between the CBD and UNFCCC. The emphasis at SBSTTA14 was not only how to mainstream climate change into CBD and the importance of mitigation and adaptation within the Convention, but also how to integrate biodiversity into non-biodiversity processes, in particular the UNFCCC.

At SBSTTA14, the proposed CBD Strategic Plan for 2011-2020 was revised based on discussions that took place between Parties that attended the meeting as well as observers such as IUCN. The changes to the CBD Strategic Plan were collated into a decision document that will be considered by governments at the upcoming CBD COP10 meeting in October (see below under CBD COP10). IUCN made a number of interventions on key issues at SBSTTA14, including on invasive species, the Global Strategy for Plant Conservation (GSPC) and the post-2010 CBD Strategic Plan, for the latter drawing attention to Parties' agreement to use the findings of the GBO3 to guide scientific and technical discussions relating to updating the Strategic Plan. IUCN's position statement on the proposed updated GSPC, considered one of the most effective thematic programmes of the Convention, was largely reflected by Parties that made interventions at SBSTTA14, demonstrating the reach of IUCN's position papers and pre-meeting influencing strategy. For more information on SBSTTA14, see the CBD final report here: http://www.cbd.int/doc/?meeting=SBSTTA-14 or the IISD Earth Negotiations Bulletin coverage here: http://www.iisd.ca/biodiv/sbstta14/.

WGRI3

The 3rd Working Group on the Review of Implementation (WGRI) meeting followed SBSTTA14 from May 24-28. The purpose of WGRI meetings is to make recommendations on concrete approaches for implementation of CBD decisions. In this regard, the meeting focused on discussions around the proposed Strategic Plan, targets for the post-2010 period and resources and incentive measures needed to implement them and the CBD itself. Brazil called for a decision on the necessary funding to "halt" biodiversity loss before adopting an ambitious Strategic Plan that would be difficult to implement because of lack of resources. Many other developing countries agreed with this and also voiced concerns about the discussion on Access and Benefit Sharing (ABS), including ABS being part of the "package" for CBD COP10. The International Regime on Access and Benefit Sharing is part of the CBD process and was developed to promote and safeguard the fair and equitable sharing of benefits from the utilization of genetic resources, the third main objective of CBD. For more information on ABS and the Ad Hoc Open-ended Working Group on ABS see: http://www.cbd.int/abs/regime.shtml. Many Parties feel that the post-2010 Strategic Plan, CBD's proposed Resource Mobilization Strategy and the ABS regime/ protocol are part of the same deal – so if one does not move forward, the other two will not be agreed upon. IUCN made some interventions at WGRI3 including asking Parties to consider the driving context underpinning decisions being made for CBD and to commit to halting biodiversity loss now to avoid the larger costs of inaction later. See the final CBD WGRI3 report here: http://www.cbd.int/wgri3/meeting/Documents.shtml or the IISD Earth Negotiations Bulletin coverage here: http://www.iisd.ca/biodiv/wgri3/

65th UN General Assembly

In addition to the previously mentioned CBD meetings that have taken place in 2010, the UN General Assembly for the first time specifically addressed the issue of biodiversity conservation in the context of the Millennium Development Goals on September 22 at the High-Level Meeting of the 65th session of the General Assembly on Biodiversity in New York. At the opening plenary, UN Secretary General Ban Ki-moon called for world leaders to reverse the rate of biodiversity loss and reiterated the central role of biodiversity conservation in achieving the Millennium Development Goals. At the meeting, attention was consistently drawn to the three critical issues to be agreed upon at CBD COP10 – the Strategic Plan, the Protocol on Access and Benefit Sharing and the Strategy for Resource Mobilization (how to fund the work and implement the Convention on Biological Diversity). IUCN was the only UN observer organization able to address the meeting along with two other NGO/ civil society organizations and called upon CBD Parties to push forward in agreeing to a strong post-2010 strategic plan. For more information see: http://www.un.org/en/ga/president/65/issues/biodiversity.shtml.

CBD COP10

The tenth meeting of the Conference of the Parties (COP 10) to CBD will be held in Nagoya, Japan from 18 to 29 October 2010. There will be a high-level ministerial segment that will take place from 27 to 29 October 2010. All the documents for CBD COP10 can be found here: http://www.cbd.int/cop10/doc/. The agenda for the meeting will cover key issues such as the revised CBD Strategic Plan, biodiversity target and indicators; Access and Benefit Sharing; forest biodiversity; mountain biodiversity; protected areas; sustainable use of biodiversity, among other topics. You can view the agenda here: http://www.cbd.int/cop10/agenda/. At CBD COP10, Parties to the CBD will finalize and sign off the proposed documents and associated recommendations related to the various programs of work for CBD.

One of the most important issues that will be dealt with at CBD COP10 is the draft 2011-2020 CBD Strategic Plan. To view the document that will be considered, see page 15 of the Decisions document: http://www.cbd.int/doc/meetings/cop/cop-10/official/cop-10-01-add2-en.pdf. At SBSTTA14, there was much discussion by Parties about the wording for the draft 2011-2020 CBD Strategic Plan and, though consensus was reached on some of the most substantive aspects of the plan, the overall wording to be brought forward to the COP10 meeting was not agreed upon. As a result, the entire 2011-2020 CBD Strategic plan is now currently in square brackets, meaning that the entire strategic plan is up for discussion at COP10. IUCN has thus made strong suggestions on the Strategic Plan a priority focus of its work at the upcoming CBD COP10 meeting (see more below under "IUCN's preparations for CBD COP10"). Encouragingly, at a recent meeting in August, the heads and representatives of five international conventions on biodiversity (CBD, CITES, RAMSAR, Convention on Migratory Species, World Heritage Convention) and major conservation organizations agreed to a common approach to addressing the biodiversity crisis based on the Strategic Plan of the CBD. See the press release here: http://www.cbd.int/doc/press/2010/pr-2010-09-07-mea-geneva-en.pdf. Ahmed

Djoghlaf, Executive Director of the CBD, announced that the CBD Strategic Plan can be regarded as a framework for all Conventions, to do what Djoghlaf calls "mobilizing the whole system to implement the Strategic Plan". Without a strong strategic plan to guide and move forward Parties' work on CBD and its implementation, we run the risk of missing future targets for halting the loss of biodiversity.

GLOSSARY

ABS – International Regime on Access and Benefit Sharing, part of the CBD process and developed to promote and safeguard the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

AHTEG – Ad Hoc Technical Expert Group

CBD SBSTTA – Convention on Biological Diversity, Subsidiary Body on Scientific, Technical and Technological Advice

CBD WGRI3 – Convention on Biological Diversity, 3rd Working Group on the Review of Implementation

CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora

CBD COP10 – 10th Conference of the Parties to the Convention on Biological Diversity. The Conference of the Parties is the governing body of the Convention and advances implementation of the Convention through the decisions it takes at its periodic meetings.

GBO3 – Global Biodiversity Outlook 3.

UNEP-WCMC – the United Nations Environment Programme's World Conservation Monitoring Centre

UNFCCC – United Nations Framework Convention on Climate Change

UN General Assembly – The General Assembly is the main deliberative, policymaking and representative organ of the United Nations. Comprising all 192 Members of the United Nations, it provides a unique forum for multilateral discussion of the full spectrum of international issues covered by the Charter. The Assembly meets in regular session intensively from September to December each year, and thereafter as required.

IUCN's Preparations for CBD COP10

IUCN has been preparing a number of position and information papers for the upcoming CBD COP10 meeting, which correspond to priority areas for the Union. Position papers have been written on the proposed CBD Strategic Plan for 2011-2020, sustainable use of biodiversity, marine and coastal biodiversity, incentive measures, the GSPC, protected areas, mountains, the financial mechanism, biodiversity and climate change as well as several others. The position and information papers are being posted as they become ready to the following IUCN webpage: http://www.iucn.org/about/work/programmes/global_policy/gpu_resources/gpu_position_papers/cbd_cop10/. More information is here: http://www.iucn.org/cbd/meetings/cop10/.

IUCN's position paper for COP10 on the draft 2011-2020 CBD Strategic Plan was developed through a wide-ranging consultation process with IUCN members and Commissions and is here: http://cmsdata.iucn.org/downloads/cbd_cop10___position_paper___strategic_plan_2011_2020.pdf. It suggests changes to CBD's proposed strategic plan in a number of key ways. The 2011-2020 Strategic Plan proposed by CBD contains twenty targets, which IUCN has reviewed and revised into twenty alternative targets as reflected in its position paper and justified with rationales. For example, CBD target 20 specifies that "By 2020, capacity (human resources and financing) for implementing the Convention has been increased tenfold" while IUCN has amended it to say "By 2020, at the latest, capacity (human resources and public and private financing) for achieving the three objectives of the Convention has increased to at least one hundredfold." IUCN emphasizes the importance of having a mission for 2020 and vision for 2050, with the long-term vision for 2050 being "Living in harmony with nature where by 2050, biodiversity is valued and conserved, restored and wisely used, sustaining a healthy planet and delivering benefits essential for all people" and the mission for 2020 "To take effective and immediate action to halt the loss of biodiversity, so that by 2020 all the necessary policies and actions are in place and being implemented".

IUCN also outlines in its position paper that the CBD Strategic Plan should aim not just to halt loss of biodiversity but also comprehensively restore the populations, habitats and ecological cycles that enable biodiversity goods and services to persist. IUCN further believes that the CBD Strategic Plan's Mission should be formulated in terms of a *level* of change rather than *rate* of change. In addition, the direct drivers of biodiversity loss (climate change, resource consumption, pollution,

habitat fragmentation and destruction, unsustainable use of wild living resources, alien invasive species, emerging infectious diseases and bycatch) as well as indirect drivers (resource consumption, globalisation, trade, demographic drivers) need to be addressed specifically and explicitly through the targets of the new CBD Strategic Plan.

IUCN's position paper on the Sustainable Use of Biodiversity comments on the draft decisions that Parties agreed to at SBSTTA14 and which can be seen on page 135 of the Draft Decisions document: http://www.cbd.int/doc/meetings/cop/cop-10/official/cop-10-01-add2-en.pdf. IUCN's position paper on sustainable use is posted on IUCN's COP10 website and can be viewed here: http://cmsdata.iucn.org/downloads/cbd_cop10___position_paper___sustainable_use_of_biodiversity.pdf. The position paper recommends that Parties to CBD "Prioritize actions to implement, monitor and measure sustainable use strategies and their results, including through further developing sustainable use indicators to assess values for biodiversity conservation and human livelihoods". IUCN also notes that the current draft decisions on sustainable use do not mention the potential impacts of climate change on biological systems (e.g. population increases, declines and movements related to climate change) and that this should be rectified by advising Parties to "Encourage the identification of climate change impacts at the national level on the sustainable use of biodiversity and develop recommendations for addressing these impacts". In addition, an Ad Hoc Technical Expert Group (AHTEG) on Sustainable Use is to be considered at COP10 – the group will develop recommendations for the improvement of sectoral policies, international guidelines, certification schemes and best practices for sustainable agriculture and forestry. IUCN has recommended that the remit of the Sustainable Use AHTEG go beyond just forestry and agriculture and also include fisheries and wildlife management.

Dena Cator will be attending CBD COP10 and will be sending out succinct daily updates on the progress of the meeting. The final update on CBD will be circulated in January.

Dena Cator
SSC Network Support Officer
Species Programme
IUCN (International Union for Conservation of Nature)
28 rue Mauverney, CH-1196 Gland, Switzerland
Phone: ++41 22 999 01 48; Fax ++41 22 999 00 15;
www.iucn.org/species

World Tapir Day in Malaysia

Carl Traeholt

In conjunction with the World Tapir Day (27th of April) the Malaysian Nature Society (MNS) and the Malay Tapir Conservation Project joined forces and organized a "tapir talk" on Saturday the 24th of April, 2010.

Formed in 1940 MNS celebrates its 70th anniversary this year and it is Malaysia's largest and oldest environmental NGO. Since its formation by British expatriates in 1940 the Malay tapir has graced MNS's logo (figure 1).

In its 70th anniversary year it was, therefore, appropriate that MNS use the opportunity to manifest its past achievements and celebrate the animal that graces its logo. MNS's conservation division headed by Mr. Yeap Chin Aik and assisted by Miss Chiang Ai Lin organized a half day event with the title "Malay tapir: is there hope for the future?"

The event was held at University Malaya's "Rimba Ilmu" (forest knowledge) auditorium in Kuala Lumpur to inform the public on the current conservation plight of the Malay tapir in Malaysia and efforts in conserving the species and its habitat. Currently, the species is listed as "endangered" the IUCN red-list. The programme included four half hour talks conducted by members of the Malay tapir conservation group namely;

- David Magintan representing DWNP, who gave an interesting talk about DWNP's work and commitment, including the plans for the breeding centre at Sg Dusun.
- Mohd Sanusi, field officer in the Malay tapir conservation project and based in Krau Wildlife Reserve. Sanusi made a talk about all the practical challenges and rewards of being in the field, for example, radio-tracking animals, how to capture wild tapirs, camping and night work in the jungle.
- Boyd Simpson, research officer in the Malay tapir conservation project, who presented the latest research results on Malay tapirs' use and dependency of mineral licks and,
- Carl Traeholt, coordinator of the Malay tapir conservation project, gave the opening talk by explaining tapirs' evolutionary background, dispersal and current population trend in the region.

The event was well attended with 80 participants from schools, universities, Ministry of Environment and Natural Resources and the Ministry of Education. After the talks the four speakers took part in a panel

Malaysian Nature Society (MNS)
Persatuan Pencinta Alam Malaysia

Figure 1. MNS logo.

Figure 2. The original plate from Wallace's "Mammals of Borneo" includes Malay tapir. Whilst there is no doubt that tapirs did indeed occur on Borneo in the past, it is most likely that Wallace made a mistake by including the species in the Mammals of Borneo. The reason for this possible error is most likely because he relied on reports from less experienced staff, or possibly individuals in private animal collections.

Figure 3. Waiting for the remaining participants to arrive. From left: David Magintan (DWNP), Boyd Simpson, Mohd Sanusi and Carl Traeholt.

Figure 4. Yeap Chin Aik (MNS, left) presenting Sanusi with a token of appreciation at the end of the event. Keeping an eye on the activities are from left Carl Traeholt, Boyd Simpson and David Magintan (slightly covered).

discussion where all participants had a chance to ask questions. The panel session lasted for almost an hour where participants asked a variety of questions related to tapir ecology, conservation and future prospects. Particularly the evidence of the species' presence on Borneo until very recently was keenly debated. The great Alfred Russel Wallace reported the presence of Malay tapirs in his original manuscript on Mammals of Borneo in the 1850s (Fig. 2).

The event was a big success and a testament to Malaysians' growing interest in, and awareness about, wildlife conservation and protection. The representative from Ministry of Education disclosed the need to increase both quantity and quality of the natural history science in the primary school curriculum in the future. There can be no better reward for the organizers than to see this happen in the near future.

Carl Traeholt
SE Asia programme coordinator, Copenhagen Zoo

CONTRIBUTIONS

Notas Acerca del Estado de Conservación y Distribución de la Danta *Tapirus terrestris* en el Parque Nacional Natural Paramillo

Javier Racero-Casarrubia[1*], Pedro Hernández[2]

1 Funcionario contratista Parque Nacional Natural Paramillo. Grupo Biodiversidad Universidad de Córdoba – Colombia

2 Téc. Profesional en Gestión de Recursos Naturales. Funcionario contratista Parque Nacional Natural Paramillo

* Dirección de Correspondencia oficina: Barrio El Prado calle 5 N° 13-58 Tierralta Córdoba Colombia Tel (094) 7687576 E-mail: javierracero@yahoo.es E –mail alterno: jaalfo@hotmail.com

Figura 4. Caña agria (*Costus allenii*), planta de la familia Zingiberaceae de la cual las dantas consumen tallos y hojas.

Abstract

By problems of order public many places in protected areas of Colombia are not visited regularly and are little the knowledge about of the status of the populations of wild life. This note shows some aspects of the ecology, distribution and ethno-biology of the Danta (Tapirus *terrestris*) in the natural national park (NNP) Paramillo, where the specie was declared object conservation within the management plan of the Paramillo park. The information comes from primary sources (fieldwork) and secondary from participatory diagnostic made whit the different communities inside of the protected area and with the help of hunters and locals experts. To make the analysis of the distribution of the specie in the NNP Paramillo was discovered than the areas associated to the wetlands of the rivers Manso, Tigre y Sinú specially the swamps El Barrial, La Rosita, Monomacho, El Carmen y La Trampa should be considered of high importance to the conservation of the specie, for the continuous reports in this places. The problems principals of conservation for de Tapir in the NNP Paramillo are the loss of habitat y the pressure by hunting.

Keywords: Córdoba, distribution, Paramillo Natural National Park, *Tapirus terrestris*, uses.

Resumen

Debido a problemas de orden público muchas zonas en áreas protegidas de Colombia no son visitadas con regularidad y se sabe muy poco sobre el estatus de las poblaciones de animales silvestres. En esta nota describimos algunos aspectos de la ecología, distribución y etnobiología de la danta *Tapirus terrestris* en el Parque Nacional Natural (PNN) Paramillo, donde la especie ha sido declarada Valor Objeto de Conservación dentro de su plan de manejo. La información proviene de fuentes primarias (recorridos de campo) y secundarias mediante diagnósticos participativos realizados con las diferentes comunidades al interior del área protegida y con la ayuda de cazadores y expertos locales. Al realizar el análisis de la distribución de la especie para el PNN Paramillo encontramos que las zonas asociadas a los humedales de los ríos Manso, Tigre y Sinú especialmente las Ciénagas El Barrial, La Rosita, Monomacho, El Carmen y La Trampa, tienen alta importancia para la conservación de la especie, por los continuos registros en estos lugares. Los principales problemas de conservación para el tapir en el PNN Paramillo son la pérdida del hábitat y la presión sobre la especie por parte de los cazadores.

Palabras claves: Córdoba. Distribución, Parque Nacional Natural Paramillo, *Tapirus terrestris*, Usos.

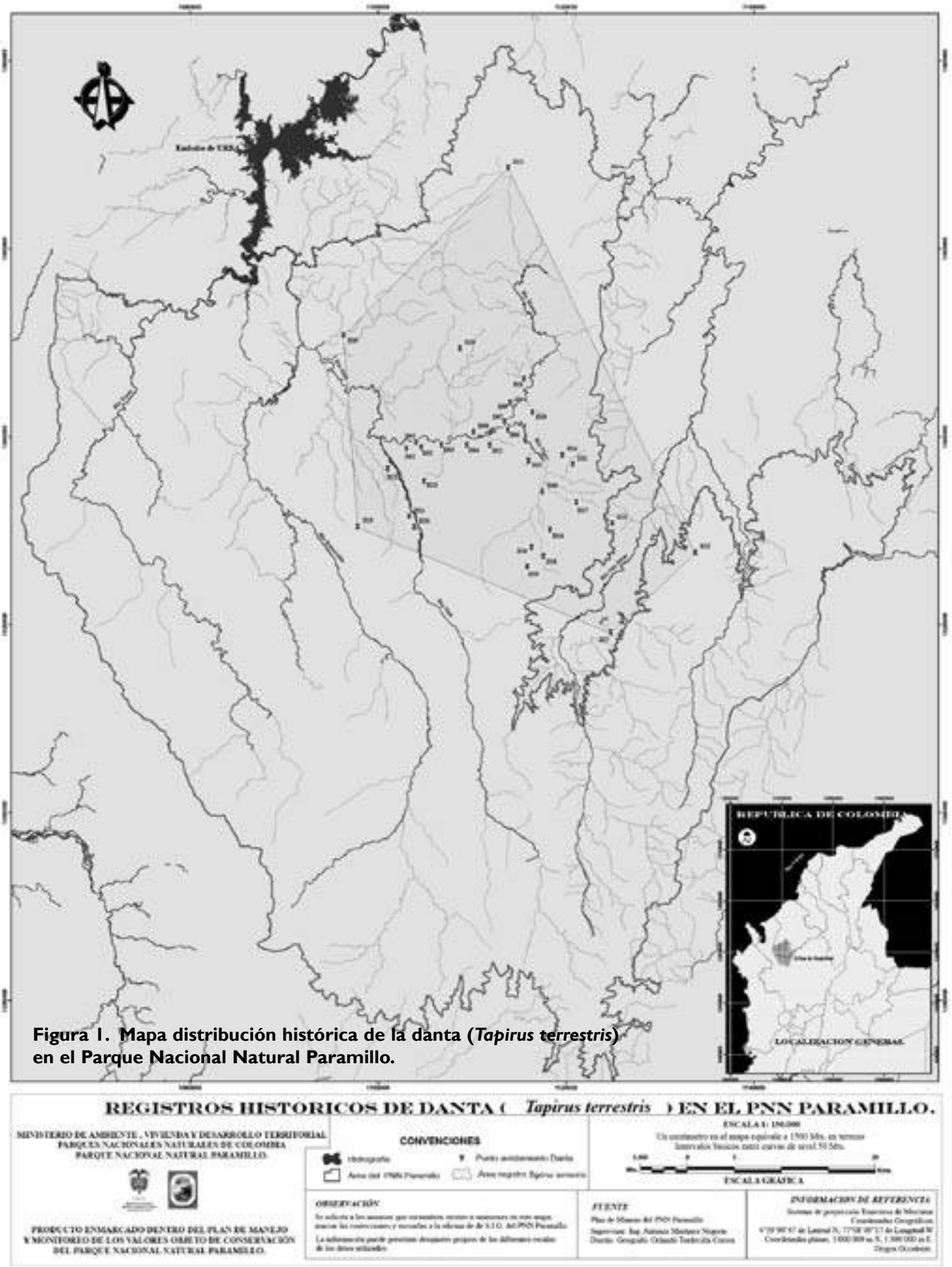


Figura 1. Mapa distribución histórica de la danta (*Tapirus terrestris*) en el Parque Nacional Natural Paramillo.

Introducción

Según el patrón de distribución de las especies de dantas propuesto para Colombia, para el PNN Paramillo se registra la especie *Tapirus terrestris* que se considera propia de la región Caribe, con la subespecie *Tapirus terrestris colombianus* (Montenegro, 2005); pero se asume la presencia de *Tapirus bairdii* (danta centroamericana) en el área protegida posiblemente por la ubicación y la influencia de la provincia Chocó–Magdalena, la primera con los distritos Turbo y Río Sucio y en la última es donde se ubica el distrito Sinú y San Jorge, la combinación de estos distritos en la cuenca del Río Sinú plantea que la biota presente involucre elementos de las vertientes orientales y occidentales del norte de Suramérica, ya que en el sector Magdalena se encuentran varias subespecies de la fauna chocoana y parece ser el límite oriental de distribución para varios elementos centroamericanos y chocoanos (Etter, 1997b).

En Colombia se reconoce la presencia de *T. terrestris* y *T. bairdii* para el PNN Paramillo por registros en las cuencas altas de los ríos Sinú y San Jorge y se reconoce la posible simpatria de las dos especies en la región del alto valle del Río Sinú, que puede extenderse quizás al alto valle del río San Jorge al occidente de la Serranía de Abibe en la región de Urabá y la margen derecha del Río Atrato en los departamentos de Antioquia y Chocó, Constantino *et al.* (2006). Hasta el momento los registros obtenidos en campo y por la descripción hecha por los campesinos la especie de tapir presente para el área protegida es *T. terrestris.*

La danta (*T. terrestris*) conocida vulgarmente como burro danto por los habitantes locales de las cuencas altas de los Ríos Sinú y San Jorge en el Departamento de Córdoba hace parte de las especies declaradas Valor Objeto de Conservación (VOC) en el marco del plan de manejo ambiental del Parque Nacional Natural Paramillo 2004-2011. En la actualidad se considera que las únicas poblaciones de la especie en el departamento se encuentran restringidas a los Bosques Húmedos Tropicales (Bh-T) existentes en las cuencas altas de los Ríos Sinú y San Jorge dentro del Área Nacional protegida (AP) (Ballesteros *et al,* 2006).
Existen muchos vacíos acerca de la bioecología de los tapires para el departamento, por lo tanto cualquier información obtenida al respecto es de gran importancia a la hora de identificar y proponer alternativas de conservación. La inclusión de la especie dentro del plan de manejo del Parque Nacional Natural Paramillo se realizó luego de identificar que al igual que otras especies animales es afectada por los procesos de alteración y reducción de los hábitats naturales a causa de la destrucción de los bosques para extracción de especies maderables, la instauración de cultivos ilícitos y la caza selectiva. Esto hace que se acentúe la problemática que pone en riesgo su conservación, por lo que se han iniciado acciones de identificación de zonas de potencial distribución al interior del parque, aprovechando recorridos realizados en algunas localidades que durante muchos años no eran visitadas por los funcionarios por los problemas de orden público, además de obtener información secundaria por parte de campesinos e indígenas cazadores. La siguiente nota pretende contribuir al conocimiento referente a la distribución, ecología y conservación de la especie *T. terrestris* al interior del Parque Nacional Natural Paramillo, además de mostrar una aproximación histórica de la percepción que tienen las comunidades acerca de su estado de conservación, esperando que esta información se convierta en una herramienta de decisión para futuras investigaciones.

Metodología

Área de Estudio

El Parque Nacional Natural Paramillo (PNN Paramillo) se ubica al norte de la Cordillera Occidental y cobija los departamentos de Córdoba y Antioquia entre los 7° y 8° 6´ de latitud norte y 75° 30´ de longitud oeste con alturas entre los 100 - 3960 msnm. La temperatura media anual es de 27°C, la precipitación media anual sobrepasa los 2400 mm, estos valores de precipitación se deben fundamentalmente a la alta precipitación en la cuenca del río Atrato, causada por el movimiento de las masas de aire saturado de humedad provenientes del Pacífico, que chocan con la Cordillera Occidental y sobre las estribaciones que forman el extremo sur de la cuenca del río Sinú, causando movimientos convectivos de las masas de aire. La humedad relativa en la zona tiene un promedio anual de 84.6%. El PNN paramillo es una de las 56 áreas del sistema de áreas protegidas de Colombia y constituye casi el 50% del área comprendida en el proyecto de manejo integral de los Parques Nacionales Naturales del Chocó Biogeográfico (Katíos, Utria, Munchique, Tatáma, Farallones de Cali, Las Orquídeas y Gorgona) (González, 1999).

El PNN Paramillo con sus 460.000 ha es uno de los principales ecosistemas estratégicos del departamento de Córdoba; presenta un gradiente altitudinal que abarca diferentes ecosistemas como Páramo, Bosque Alto Andino, Bosque Andino (bosques de niebla: 700-1200 msnm), Bosques Húmedos Tropicales de Piedemonte (200-700 msnm) y Bosques Húmedos en Planos Inundables (Manso y Tigre 100-200). La presencia de estos ecosistemas permite una alta diversidad de especies faunísticas y florísticas, cuyas distribuciones se hayan limitadas a Centroamérica, Choco bio-

Tabla 1. Localidades con registros de dantas al interior del Parque Nacional Natural Paramillo.

Cuenca	Subcuenca	Quebrada	Coordenadas	
			X	Y
Río Sinú	Río Manso	Sanconalito	1103016	1338633
Río Sinú	Río Manso	El Viejo	1104611	1338813
Río Sinú	Río Manso	Chontaduro	1106746	1339012
Río Sinú	Río Manso	Zancón	1109439	1339021
Río Sinú	Socorro	Changara	1047833	1330353
Río Sinú	Caimán	Caimán	1117475	1334075
Río Sinú	Caimán	Caimán Arriba	1108722	1349306
Río Sinú	Río Manso	Barasantal	1104042	1339336
Río Sinú	Río Manso	Molenillo	1113808	1340615
Río Sinú	Río Manso	El Guáimaro	1113457	1341543
Río Sinú	Río Manso	Múcura	1110151	1340426
Río Sinú	Río Manso	Vijagual	1114051	1343534
Río Sinú	Río Manso	Guarumal	1116404	1342520
Río Sinú	Río Manso	Batatal	1115530	1346074
Río Sinú	Río Manso	Crisanta	1111895	1339000
Río Sinú	Río Manso	El Silencio	1113844	1368549
Río Sinú	Río Tigre	El Carmen	1118309	1330010
Río Sinú	Río Tigre	Burra	1116003	1337347
Río Sinú	Río Tigre	Aguas Negras	1119606	1337986
Río Sinú	Río Tigre	Madre de Dios	1121114	1332924
Río Sinú	Río Tigre	La Rosita	1117597	1327181
Río Sinú	Río Tigre	Monomacho	1115868	1326082
Río Sinú	Río Tigre	Cañita	1116313	1328127
Río Sinú	Río Tigre	El Barrial	1120718	1336986
Río Sinú	-	Chontaduro	1101036	1336496
Río Sinú	-	La Gloria	1104885	1335174
Río Sinú	-	Batatal	1103319	1331447
Río Sinú	-	Charuas	1103857	1330312
Río San Jorge	-	Cañaveral	1124769	1319084
Río San Jorge	-	Chimurrillo	1133739	1327597
Río San Jorge	-	Cerro la fecha	1124918	1330698

geográfico y Valles interandinos. Muchas de las especies de mamíferos silvestres que se hallan en el PNN Paramillo aparecen en los listados de la IUCN entre las que se encuentran: el oso congo (*Tremarctos ornatos*), Burro danto (*Tapirus terrestris*), Titi (*Saguinus oedipus*), Nutria (*Lontra longicaudis*), Tigrillo (*Leopardus pardalis*), Tigre mariposo (*Panthera onca*) y león colorado (*Puma concolor*) entre otras. Para el parque hasta el momento se han registrado más de 250 especies de plantas (74 familias y 176 géneros) en donde a nivel florístico las familias Rubiaceae, Arecaceae, Moraceae, Mimosaceae y Caesalpinaceae son las más diversificadas (Estupiñan-Gonzales *et al,* 2009).

Métodos

La información de la especie se obtuvo mediante recorridos de campo realizados por funcionarios del área protegida, durante las visitas realizadas a los diferentes sectores del parque en donde se registraban rastros como huellas y excrementos; los recorridos fueron diurnos de longitud variable (> 3 km), a lo largo de senderos establecidos, orillas de quebradas, trochas hechas por los animales e interior del bosque. La información secundaria se obtuvo a través de entrevistas abiertas (n = 40) en su mayoría a campesinos e indígenas cazadores mayores de 30 años, estas fueron de forma individual en las cuales se indagaba acerca de aspectos como, sitios de caza, registros históricos, percepciones de abundancia y estado de conservación, alimentación de la especie, preferencia de hábitats, usos y amenazas. El listado de plantas que consume la especie se obtuvo a partir de la información suministrada por los cazadores, y se consideraron aquellas especies vegetales que presentaban señales de desgarramiento, principalmente en el cogollo, tallo y hojas con huellas de danta a su alrededor (Lizcano y Cavelier, 2004). La elaboración del mapa de distribución histórica y potencial de la especie se realizo con base a los puntos georeferenciados (GPS) en campo durante los recorridos, además se confronto la información obtenida durante las entrevistas y diferentes talleres realizados con las comunidades indígenas y campesinas y por diferentes funcionarios del parque, en donde se elaboraban mapas a mano alzada (mapas parlantes) en los cuales los cazadores indicaban las localidades donde con frecuencia cazan o encuentran rastros de la especie, información que posteriormente se ubicó en cartografía básica del parque (IGAC) y que al final permitió la elaboración del mapa de distribución de la especie empleando el software ArcGis 9.3.

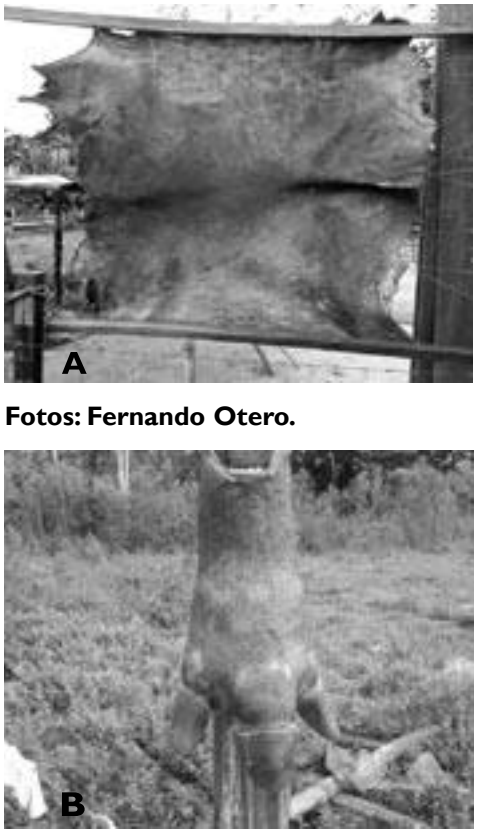


Figura 2. (A) Piel secada y templada al sol la cual es empleada en la fabricación de asientos de cuero. (B) Pata Posterior de *T. terrestris* (♀) cazado en el mes de diciembre en la Vereda Santa Cruz del Manso interior del PNN Paramillo. Generalmente esta parte del animal (pie) es secada y empleada como adorno por los cazadores.

Fotos: Fernando Otero.

Resultados y Discusión

Distribución de la Especie

Durante nuestros recorridos de campo y entrevistas con comunidades locales pudimos constatar la presencia de una especie de danta en PNN Paramillo. Según la descripción hecha por los campesinos, la especie presente es la danta amazónica (*T. terrestris*). En total, recogimos información de 32 localidades con presencia de la especie en el parque (Tabla 1). La presencia de la danta amazónica en el aérea de estudio se ajusta con los esperado por el patrón de distribución de la especie en Colombia (Montenegro, 2005). En nuestro estudio, no obtuvimos ninguna evidencia de la presencia de la danta de Baird (*T. bairdii*), aunque no podemos descartar completamente su presencia puesto que la especie es registrada para el año 1949 por Philip Hershkovitz durante sus exploraciones a las cuencas altas de los ríos Sinú y San Jorge en lo que hoy hace parte del Parque Nacional Natural Paramillo (PNN Paramillo).

Los registros comprobados se encuentran localizados en las cuencas hidrográficas de los Ríos Tigre, Manso, Sinú y San Jorge (figura 1) y la ubican en su gran mayoría a las zonas asociadas a los humedales de los ríos Manso, Tigre y Sinú especialmente en las

Tabla 2. Plantas consumidas por *Tapirus terrestris* en el Parque Nacional Natural Paramillo.

Familia	Nombre científico	Nombre común	Parte consumida *
Anacardiaceae	*Spondias mombin*	Jobo	F - S
Bonbacaceae	*Ocroma Piramidae*	Balsa	H
Cecropiaceae	*Cecropia sp*	Yarumo	F
Euphorbiaceae	*Manihot sculenta*	Yuca	H
Fabaceae	*Dipteryx oleifera*	Almendro de monte	‡ S
Melastomatacea	*Bellucia sp*	Coronillo	F
Mimosaceae	*Inga sp*	Guama	F
Moraceae	*Ficus sp*	Higuerón	F
Moraceae	*Artocarpus sp*	Fruta de pan	F - S
Musaceae	*Mussa sp*	Banano	F
Myrtaceae	*Psidium guajava*	Guayaba	F
Piperaceae	*Piper reticulatum*	Santamaría canelón	F
Piperaceae	*Piper sp*	Cordoncillo	H-F
Rubiaceae	*Borojoa patinoi*	Borojo	F
Rubiaceae	Desconocido	Clavito	H - T
Sapotaceae	*Manilkara zapota*	Sapote	F
Zingiberaceae	*Costus allenii*	Caña agria	T - H

* F: Flores, S: Semillas, H: Hojas, T = Tallos, ‡ = Esp VOC

Ciénagas El Barrial, La Rosita, Monomacho, El Carmen y La Trampa, zonas que son consideradas importantes para la especie ya que estas ciénagas y las grandes extensiones de bosque húmedo tropical podrían ser habitas permanentes de la especie y en la cual se tiene registros periódicos por los funcionarios del parque.

Durante los años 2007 al 2010 se han incrementado los registros de la especie en aquellos sectores en donde se han retomado actividades de trabajo por parte de los funcionarios del parque, como es el caso de los registros de huellas y comederos en la Quebrada Crisanta (Río Manso); para la misma localidad en el mes de enero de 2008 se presenta el ataque de un macho danta a un campesino en un cultivo de arroz, quien se vio forzado a treparse en un árbol para evitar la embestida; este evento según lo expresado por la persona implicada es atribuido a que los machos de „burros danto“ para los meses de noviembre y enero se encuentra en época de celo y cortejo, y es cuando posiblemente estos sean más agresivos en defensa de las hembras que cortejan (M. Molina, com.pers); además se tiene un reporte de un animal cazado en el mes de enero del 2008 en el Sector del Silencio (Cerro Murrucucú). Durante los recorridos de control y vigilancia realizados por los biólogos del PNN Paramillo, en marzo de 2009 se verificó la denuncia de la caza de una danta en la Vereda Santa Isabel del Manso, dicho animal media 1,20 m de alto x 1.65 m de largo aproximadamente y pesaba 75 kg (Figura 2), y para el mes de junio de 2010 durante exploraciones realizadas por un grupo de científicos de diferentes universidades colombianas y funcionarios del parque, al interior de los bosques húmedos tropicales en los sectores de los Llanos de los ríos Manso y Tigre obtuvieron varios registros de la especie a orillas de los diferentes cuerpos de agua y en los senderos (figura 5).

El área de ocupación de la especie es de unas 106.472 ha (23% del Área Protegida); y la zona de ocupación registrada se caracteriza por presentar un mosaico de formaciones vegetales que van desde zonas

de rastrojo ubicados en las orillas de los Ríos Sinú, Manso y algunos sectores del Río Tigre (bosques de chaparral e inundables), bosques primarios poco intervenidos que comprenden las zonas internas entre los valles de los Ríos Sinú, Manso y Tigre, además de las zonas adyacentes a las quebradas Caimán y Múcura. Es importante aclarar que a pesar de la colonización que presentan estas zonas, aún existen bosques muy conservados en algunos sitios entre los valles de los Ríos Sinú y Tigre y que deben ser consideradas áreas de obligada conservación no sólo para los tapires sino también para toda la diversidad faunística que ahí se encuentra, como el caso de jaguares (*P. onca*) y osos de anteojos (*T. ornatus*) los cuales en la actualidad son muy presionados y que revisten importancia para la conservación a nivel nacional.

Aspectos Ecológicos

Para el PNN Paramillo hasta el momento se han identificado 17 especies de plantas (14 familias) que son consumidas por los tapires; dentro de las cuales se encuentra una especie VOC del PNN Paramillo, el almendro – *Dicteryx oleifera* del cual la especie consume los frutos y semillas (tabla 2).

En cuanto a los hábitos de la especie los cazadores y habitantes del área protegida consideran que ésta presenta poca actividad durante el día, observándose actividad temprano en las primeras horas de la mañana (06:00-09:00) el resto del día comúnmente son encontrados durmiendo dentro de la vegetación densa, en especial en bosques achaparrados (arrapales), y presentando mayor actividad en horas cercanas al atardecer (15:00-17:00) cuando es posible observarlas alimentándose entre los bordes de los pastizales, en claros dentro de la vegetación hechos por el hombre, en bosques secundarios intervenidos, cerca a cultivos de pancoger (arroz, yuca, maíz), dentro de vegetación arbustiva densa, a orillas de quebradas y ríos con bosques riparinos de pendientes suaves y en humedales, concordando con lo documentado por diferentes autores (Naranjo, 1995[a]; Salas, 1996; Matola *et al*. (1997); Naranjo & Bodmer (2002); Foerster & Vaughan (2002); Además los campesinos reconocen que la danta tiene una preferencia por los hábitats con gran disponibilidad de fuentes de agua, reconociendo que ésta acostumbra defecar dentro del agua quizás como estrategia para no ser detectados por sus enemigos naturales como jaguares (*Panthera onca*) y pumas (*Puma concolor*), comportamiento también documentado por Fragoso, (1987). En cuanto al tamaño general de los animales según los datos suministrados por algunos cazadores de dantas cazadas en el PNN Paramillo, en promedio los animales adultos miden 1.90 m de largo, y pesan entre 80 y 90 kg.

Figura 5. Macho juvenil de tres años capturado en el año 1985 de *T. terrestris* y mantenido como mascota en una vivienda del casco urbano del Municipio de Tierralta-Córdoba. Generalmente estos especímenes eran capturados luego de cazar a la madre los cuales eran criados y terminaban convertidos en mascotas. (Foto: Gertrudis Pacheco).

Los campesinos reconocen que los machos de la especie son muy territoriales en época de celo y que el periodo inicia en el mes de noviembre, observándose hembras con crías entre los meses de junio y agosto, y por tener un crecimiento rápido estas pierden el patrón de rallas a los tres meses.

Percepciones Acerca de la Conservación de la Danta

La información obtenida en los talleres con las comunidades campesinas e indígenas además de lo expresado por diferentes funcionarios del parque, permitió constatar que desde la llegada de los primeros colonos a los terrenos que posteriormente serían declarados en el año 1977 como Parque Nacional Natural, la historia de las dantas ha estado ligada a los patrones de ocupación de las comunidades al interior del área protegida. Con la aparición de los primeros campesinos entre los años 1846 a 1950 empieza la transformación de los ecosistemas naturales por la tala y quema de miles de hectáreas para la siembra de cultivos de pan coger y la creación de potreros para ganadería, acentuándose la problemática entre los años 1980 a 1992 con la aparición de aserradores con motosierras que extraían especies maderables de forma selectiva en zonas de colinas y planicies, sitios considerados como hábitats naturales para la danta, además la especie entró a ser objeto de caza por su

Figura 5. Huella de danta registrada a orillas del Río Tigre - PNN Paramillo (Foto: Javier Racero-Casarrubia).

Figura 6. Muestra del uso de algunos elementos de fauna silvestre. Pata de ejemplar de Danta (*T. terrestris*) cazado en Palestina (sector Río Manso) convertida en costurero por una habitante de la comunidad.

carne por parte de los aserradores y agricultores; sin embargo es importante reconocer que la caza de tapires no era practicada en la zona por los primeros colonos, ya que ésta estaba orientada a otras especies consideradas muy abundantes como los cerdos de monte (*Tayassu pecary* y *Pecari tajaccu*), la caza de caimanes (*Caiman crocodilus acutus*) y felinos (*Panthera onca, Puma concolor* y *Leopardus pardalis*) para la comercialización de pieles, además de la pesca de especies ícticas como el Bocachico (*Prochilodus magdalenae*), Charúa (*Brycon amazonicus*) y Doncella (*Ageniosus caucanus*) (P. Hernández, com. pers).

Se considera que la mayor presión sobre la especie inicia con el segundo proceso de colonización del área protegida en 1985, acentuándose la problemática entre los años 1992 y 1997 donde se considera que la especie fue muy presionada por actividades de cacería por los colonos y era común la captura de hembras con crías, las que eran separadas de su madre con el fin de comercializarlas como mascotas en los mercados locales y regionales (figura 3).

Conservación y Amenazas

En cuanto a la caza de la danta en el parque, ésta se considera un evento fortuito ya que los cazadores reconocen que la especie es muy rara y esquiva, debido a que generalmente cazarla se considera un trofeo, especialmente para las comunidades indígenas Embera katios quienes la llaman „Dânda“ en su lengua nativa, considerándose tal vez a estas comunidades como los principales usuarios de la carne de danta, reconociendo las comunidades indígenas que la especie fue muy presionada al interior de los resguardos y que en la actualidad es raramente observada en sus territorios. Como técnicas de caza identificadas se mantiene el uso de bodoqueras y escopetas calibre 12mm por los indígenas, y por los colonos la escopeta y perros, algunos cazadores construyen trojas elevadas en los senderos y orillas de quebradas donde ubican comederos y cuando se quiere capturar vivo el animal es perseguida con perros y obligada a lanzarse a las quebradas donde luego es enlazada.

Encontramos que algunos campesinos acostumbraban fabricar suvenires con partes del animal especialmente las patas y en el pasado algunos animales eran embalsamados para tenerlos de adorno en las fincas de recreación por parte de algunos hacendados (figura 6), la piel también es empleada para fabricar asientos y lazos para ganadería; en la actualidad se desconoce el estado real de las poblaciones al interior del AP por la falta de estudios poblacionales, pero históricamente las localidades mencionadas son de gran importancia para la especie por ser sitios donde es habitual encontrar rastros de dantas.

En general durante la recopilación de información acerca de la especie en el PNN Paramillo, se encontró que las dantas son reconocidas por los campesinos y comunidades indígenas como una fuente importante de proteína animal por su gran tamaño y por ser importantes dispersores de semillas, asignándole el valor que tienen al participar en el mantenimiento y conservación de los bosques; pero a pesar de esto para algunas comunidades de la cuenca de los Ríos Manso, Tigre y Sinú la especie aún es cazada. La información obtenida en cuanto a la percepción global acerca del estado de conservación que tienen las comunidades acerca de la especie apunta a una progresiva reducción de las poblaciones principalmente por causa de la destrucción de los hábitats naturales como cativales, arrapados (bosques de chaparral), pérdida de la cobertura vegetal en las márgenes de las quebradas para la siembra de cultivos de pan coger y cultivos ilícitos, además de la amenaza externa que representa la posible zona de inundación del proyecto hidroeléctrico Río Sinú que se traslapa aproximadamente en un 80% con el área de ubicación y distribución; algo que es alarmante al considerar que el desarrollo de infraestructuras (obras civiles) es una importante amenaza para la conservación de la especie puesto que estas transforman los hábitats naturales de la vida silvestre (Montenegro, 2005).

Consideraciones Finales

Este primer aporte acerca de la distribución y conservación de la danta en el Parque Nacional Natural Paramillo es de gran importancia al momento de definir sitios potenciales para la investigación de la especie en el área protegida y también se convierte en un referente teórico que motive a investigadores del país a centrar su mirada en las poblaciones de dantas del parque de las cuales se desconoce su estado de conservación y la presión que puedan estar ejerciendo los colonos en algunas zonas en particular y especialmente las comunidades indígenas que al parecer son quienes están ejerciendo mayor presión sobre la especie.

Aunque se considera la caza de la especie como un evento esporádico, es importante reconocer el impacto que esto pueda estar ocasionando en las poblaciones del parque, por lo cual el área protegida está adelantando campañas de educación ambiental con las comunidades con el fin de dar a conocer la importancia que tiene la especie en los ecosistemas, además de realizar actividades de monitoreo y seguimiento de la especie.

Aunque algunos autores confirman la presencia de la especie *T.bairdii* para el parque, es importante corroborar y determinar su presencia puesto que durante la recopilación de información para esta nota los campesinos y cazadores reconocieron en su gran mayoría a la especie *T. terrestris*.

Aun falta por explorar las 9000 ha de paramo del parque sobre los 3000 msnm, ubicado en los municipios de Peque e Ituango (Departamento de Antioquia) en donde algunos campesinos comentan la presencia de la danta de paramo, pero que por problemas de seguridad no se han podido realizados prospecciones biológicas de ningún tipo en la zona.

Agradecimientos

Los autores agradecen a los expertos locales Guillermo Nerio Guerrero, Mario Molina, Marciana Triana, Gertrudis Pacheco, William Sánchez, Luis Correa Mendoza, Arlet López Núñez, Samuel Argumedo, Luis Hernández Durango, Elmer Serna Usuga, Darío Orrego Triana, Clímaco Pitalua, Francisco Sáenz. Al Geógrafo Orlando Tordecilla, al biólogo Carlos Vidal, al educador ambiental Fernando Otero, Oscar Ruiz, al Profesional de apoyo del Parque Nacional Natural Paramillo Roger Pérez, al Funcionario Manuel Martínez, al ingeniero forestal y administrador del PNN Paramillo Antonio Martínez, a los operarios Farid Brango, Gustavo Muñoz y Marcos Gonzales. A las comunidades indígenas Embera Katio y a todas aquellas personas que participaron en los talleres de educación ambiental y que contribuyeron con información para la elaboración de este documento.

Literatura Citada

Ballesteros J, Fernández C, Dueñas R. Introducción a la Diversidad Faunística del Departamento de Córdoba. 2006. Facultad de Ciencias Básicas e Ingenierías, Universidad de Córdoba, Montería-Colombia. Pp.157-181.

Constantino, E. D Lizcano. O. Montenegro & C. Solano. 2006. Danta común *Tapirus terrestris* 108 Pp. En: Rodríguez-M., J. V., M. Alberico, F. Trujillo & J. Jorgenson (Eds.). 2006. Libro rojo de los Mamíferos de Colombia. Serie Libros Rojos de Especies Amenazadas de Colombia. Conservación Internacional Colombia, Ministerio del Medio Ambiente, Vivienda y Desarrollo Territorial. Bogotá, Colombia. Bogotá, Colombia.

Estupiñán-González, A. C, Jiménez-Escobar, N. D. & Avella-Muñoz A. 2009. Informe Composición florística y estructural de dos sectores de bosque primario en la franja tropical del Parque Nacional Natural Paramillo (Córdoba, Colombia). 40 p.

Etter, A. 1997b. Diversidad Ecosistémica. Ecosistemas Terrestres. Bosque humedo tropical. En M.E. Chaves y N. Arango (eds). Informe Nacional sobre el Estado de la Biodiversidad – Colombia. Tomo I. Diversidad Biológica. Instituto Alexander von Humboldt, Ministerio del Medio Ambiente y PNUMA. Bogotá, Pp. 4-9.

Foerster, Charles R., Vaughan, Christopher 2002. Home Range, Habitat Use, and Activity of Baird's Tapir in Costa Rica, Biotropica 34(3), 423-437.

Fragoso, J. M. 1987. The habitat preferences and social structure of tapirs. Ms.c Thesis, University of Toronto.

González, J.A. 1999. Diagnostico Social Económico y Ambiental y posibilidades de actuación por la deforestación en la vereda el Cedral ubicada en la Zona Amortiguadora del Parque Nacional Natural Paramillo, Ituango, Antioquia Colombia. Tesis de maestría. Instituto de Investigaciones Ecológicas. 53. Pp.

Lizcano, D. J. y Cavelier, J. 2004. Características químicas de salados y hábitos alimenticios de la danta de montaña (*Tapirus pinchaque* roulin, 1829) en los andes centrales de Colombia. Mastozoología Neotropical, 11(2):193-201.

Matola, Sharon; Cuarón, Alfredo D.; Rubio-Torgler, Heidi 1997. Status and Action Plan of Baird's Tapir (Tapirus bairdii), Tapirs - Status Survey and Conservation Action Plan. (Brooks D., Bodmer R., Matola S., Ed.), Gland, Switzerland and Cambridge, UK: IUCN/SSC Tapir Specialist Group.

Montenegro, O. 2005. Programa Nacional para la conservación del Género *Tapirus* en Colombia. Ministerio de Ambiente, Vivienda y Desarrollo Territorial. Viceministerio de Ambiente. Dirección de Ecosistemas. República de Colombia. 98 Pp.

Naranjo, Eduardo J. 1995. Abundancia y uso de hábitat del tapir (Tapirus bairdii) en un bosque tropical húmedo de Costa Rica, Vida Silvestre Neotropical 4(1), 20-31.

Naranjo Eduardo J.; Bodmer, Richard E. 2002. Population Ecology and Conservation of Baird's Tapir (Tapirus bairdii) in the Lacandon Forest, Mexico, Tapir Conservation 11(2), 25-33.

Salas, L.A. 1996. Habitat use by lowland tapir (*Tapirus terrestris L.*) in the Tabaro River Valley, Southern Venezuela. Canadian Journal of Zoology, 74: 1452-1458.

Aspects of the Behavior and Management of the Lowland Tapir (*Tapirus terrestris*) in Captivity in Araxa, Minas Gerais, Brazil

Henrique Ferreira de Ávila[1], D.V.M. Laura Teodoro de Oliveira[2], Carlos Henrique de Freitas[3]

1 Biólogo, specialized in animal behavior and its applications - Agronômica Assessoria e Planejamento Ltda. Rua do Ouro, 28 - São Cristóvão, CEP38.184.052 – Araxá, Minas Gerais, Brasil, E-mail: bio-aax@hotmail.com

2 D.V.M Researcher of The Conservation Breeding Centre of the Companhia Brasileira de Metalurgia e Mineração - Córrego da Mata, s/nº, CP 08, CEP 38.183-903, Araxá, Minas Gerais, BRAZIL, E-mail: laura@cbmm.com.br

3 PhD. Instituto de Ciências da Saúde, Centro Universitário do Planalto de Araxá, Av. Ministro Olavo Drummond, nº 05, São Geraldo, CEP 38.180.084 Araxá, Minas Gerais

Abstract

The purpose of this study was to characterize the behavior of the lowland or Brazilian tapir (*Tapirus terrestris*) and determine the possible correlations between environmental factors and the time when births occur in captivity in this region, in order to obtain useful data for ex situ and in situ management and conservation of the species. The study was carried out in the period February - June 2006 at the Conservation Breeding Centre of Companhia Brasileira de Metalurgia e Mineração (CBMM) in Araxá, Minas Gerais, Brazil. The behaviors of Tapirs were observed in two stages using ad libitum and instantaneous scan sampling techniques totaling 90 hours of behavioral observations. The sample comprised eight specimens among three groups, kept in three different enclosures. Data were also collected on ten tapir births at the Breeding Centre and on historical averages of temperature and rainfall at the site for the period 1987-2006. The observations performed for this study allowed the identification and description of 22 behavioral events expressed for Brazilian tapir in captivity. The behavioral events "chasing", "biting" and "sniffing genitalia" were performed only by males, apparently relating to sexual interest in females. On the other hand, "Caring parentally" was seen only in females. "Vocalization distress" was also observed only in females, when looking for their young and being chased by males. The "urine marking" was performed only by adult animals, both male and female. All other behavioral events in the repertoire were observed for both males and females. Three different types of vocalizations were observed at high frequencies among the social events and seemed to play an important role for the species in social interaction. The events were grouped into five behavioral categories with significant difference ($X^2 = 107,06$; $p \leq 0.001$) in their relative frequencies: Rest, 59.35%; Locomotion/Movement 17.76%; Feeding/Maintenance 16.26%; Social Interaction 6.49%; and Agonistic 0.13%. Births are correlated with temperature and ($rs = 0.57$; $p = 0.05$) not correlated with rainfalf ($rs = -0.11$; $p = 0.72$). The main conclusions were that the individuals studied at the CBMM Conservation Breeding Centre displayed sociable behavior and a varied and frequent vocal communication repertoire. They were mostly observed resting in groups, and performed activities both by day and by night. The reproduction is correlated with the ambient temperature in this region. The type of management followed at CBMM Breeding centre could be seen as a good practice for Brazilian Tapir.

Key words: Brazilian tapir, behavior, management in captivity

Introduction

The Brazilian tapir (*Tapirus terrestris*) is found in transition rainforests and near rivers. Its typical habitat includes areas with 2000-4000 mm annual rainfall, mean temperature of 20°C, and relative humidity of 75% (GOROG, 2001). This species occurs in northern South America, from Colombia to French Guyana, and all the way down to northern Argentina and southern Brazil (Mangini, 2006).

According to The International Union for Conservation of Nature (IUCN), in global terms the status of the Brazilian Tapir is Vulnerable in its

natural habitat as a result of its loss of habitats due to agricultural and cattle breeding expansion in the Caribbean (Mangini, 2007). In the State of Minas Gerais, in Brazil, Tapir is already considered to be at risk of extinction because of the reduction of its habitats (INSTRUÇÃO NORMATIVA COPAM 41/1995).

Tapirs are commonly found in zoos and breeding facilities in their areas of occurrence in the neotropics and Asia, as well as in Europe and Northern America (Mangini, 2006). In captivity, tapirs are relatively easy to maintain and breed, provided those responsible to take care have a good working knowledge of their biology and behavior (Barongi, 1999).

The continued survival of *ex situ* populations will depend on increased scientific knowledge about the management of the species in captivity and increased exchange of information between in-situ researchers and keepers (Medici, 2007).

The purpose of this study was to characterize the behaviors and prepare a behavioral repertoire of the species, as well as verify the possible correlations between environmental factors, such as temperature and rainfall levels, with the time when births occur in captivity in this region, in order to obtain useful data for improvement of *ex situ* and *in situ* management and conservation.

Methodology

The study was carried out at the Conservation Breeding Facility of Companhia Brasileira de Metalurgia e Mineração (CBMM) in Araxá, Minas Gerais, Brazil. The municipality of Araxá lies entirely within the so-called Cerrado biome, in the Macro-Region of the Upper Paranaíba, in the State of Minas Gerais, located at the geographic coordinates of 19º25'53" - 19º50'09" south latitude and 46º44'27" - 47º13'38" west longitude relative to the Greenwich meridian (Rocha; Rosa, 2007). It is within the tropical rainy climate zone, with hot and wet summers and dry winters, characterized by a rainy season, that occurs from October to March and a dry season, from April to September. The mean annual adjusted temperature is 20.1ºC, with the mean annual rainfall ranging from 1300 to 1600 mm (Ribeiro; Walter, 1998).

The study was carried out in the period from February to June 2006. The groups were observed in their normal management conditions, without any changes to their diet, enclosures and time of feeding. The sample comprised eight specimens taken from three groups. The specimens were of different ages and some of them had been bred in captivity while the others originated in the wild (Table I).

The three groups were held in enclosures with the following dimensions: group I, 1632 m^2; group II, 1200 m^2; group III, 3080 m^2. These enclosures were surrounded by 2-meter high chain-link fences and planted with grasses such as Brachiaria (*Brachiaria decumbens*), with a height of about 80 cm, and clumps of elephant grass (*Pennisetum glaucum*), as well as trees such as *Tabebuia alba*, *Mimosa caesalpiniaefolia*, *Schinus molle*, *Bougainvillea glabra*, and *Caesalpinia peltophoroides*, to offer shade for the animals. There were also fruit trees such as avocado (*Persea americana*) and guava (*Psidium guajava*) trees available. In each enclosure food and water containers were placed in a 16 m^2 covered holding area with a concrete floor. There were no pools or tanks in the enclosures.

The animals were fed every day in the afternoon with a mixture of leaves (from a variety of sources as lettuce, cabbage, broccoli and chard, among others), fruit rind or peel (pineapple, banana, papaya, water melon and melon), vegetables (sweet potato, squash and zucchini), corn, and horse feed (Table II).

The behaviors of Tapirs were observed in two stages. During the first stage of the study (February 21 - March 15, 2006) *ad libitum* observations were performed at random times to describe the relevant behavioral events for the species. Behavioral events or acts were described using the empirical or descriptive method, as described by Del Claro (2004). The sample comprised six animals, from two groups (groups 1 and 2), kept in two different enclosures. The two couples already had a history of reproduction in the CBMM breeding centre. Each group was observed separately one hour a day, at different times each day, in the morning and in the afternoon, totaling 10 hours for group, in this stage. The period also served for the animals to get accustomed to the observer's presence. The observer remained outside of the enclosure at a distance of 3 to 4 meters from the fence. Based on the *ad libitum* observations and a review of the literature on *T. terrestris,* an ethogram was drawn up including a protocol for recording behavioral activities (Cullen et al., 1997). **Appendix I.**

During the second stage (April 4 - June 15, 2006), observations were performed using instantaneous scan sampling techniques. All animals in each group were observed and notes on the behavior of each individual were recorded on the ethogram or protocol for recording behavioral activities (Martin; Bateson, 1993). The sample comprised eight specimens taken from the three groups, 1, 2 and 3, kept in three different enclosures. The third group was formed in the end of March of 2006, when the male nicknamed Burrinho came from another breeding unit for reproduction at CBMM Breeding Centre. Each group was observed separately, at different times in each day. Observations lasted for one hour and took place at 60-second intervals. They were performed two or three

Table I. Identification and origin of specimens maintained at CBMM Conservation Breeding Centre.

Identification	Nickname	Sex	Origin	Age (in June 2006)
Group 1	Sarney	Male	Belo Horizonte Zoo	> 19 years
	Edinha	Female	Belo Horizonte Zoo	14 years 10 months
	Milênio	Male	Born CBMM	5 years 11 months
Group 2	Capadinho	Male	Born CBMM	10 years 9 months
	Filó	Female	Wild	> 4 years
	Monaliza	Female	Born CBMM	2 years 3 months
Group 3	Burrinho	Male	Antapaca Breeding Facility	Unknown
	Jade	Female	Born CBMM	4 years 4 months

times per week for each group, independently, in a total of 23 hours for the group 1, 22 hours for the group 2, and 25 hours for the group 3, totaling 70 hours of behavioral observations in this stage. Fifty-five out of the 70 hours of observations were performed during the day and 15 hours at night. A stopwatch was used to control the observations and intervals. The animals were observed in the enclosures through binoculars. Based on the observations performed during the firs stage, they were deemed to be in groups when the distance between them was less than 6 m and alone when the distance was greater than 6 m.

Table II. Diet for an adult tapir specimen at CBMM Conservation Breeding Centre.

Type of Food	Quantity	Frequency
Fruit (including peel or rind)	3.2 kg	Daily
Raw vegetables	1.0 kg	Daily
Raw corn grains	0.8 kg	Daily
Horse feed (maintenance)	0.8 kg	Daily
Leaves	1.3 kg	Daily
Bionate *	15.0 g	Daily
Sugarcane stalks & elephant grass (whole)		Twice a week

* „Bionate GA Reforçado“
(vitamin and mineral supplement produced by Indubrás)

The behavioral records obtained by scan sampling were analyzed in terms of the absolute and relative frequencies of the actions or behavioral events involved. Records were used to prepare a behavioral repertoire for each family and also for all samples, listing all behaviors, their relative and absolute frequency, and total number of events observed in captivity, in accordance with Del-Claro (2004). **Appendix II**. Absolute frequency was measured by noting the number of records of actions or behavioral events by each individual during the sampling period. Relative frequency was measured using the following formula (Cullen, 1997):

$$RF\ (\%) = \frac{AF \times 100}{TE}$$

where:

- RF = relative frequency
- AF = absolute frequency
- TE = total number of events recorded during sampling period

To verify the probable correlations between births and environmental factors in this region, an analysis was made of the historical mean temperature and rainfall data and historical birth record data for the period from 1987 to 2006. Data were collected by analyzing records on calving by tapirs maintained at the Breeding Centre and on historical averages for temperature and rainfall at the site, for the same period, derived from the files of the CBMM Meteorological Station, located on the company's premises (46°54'58"W; 19°39'33"S; 1,160 m), in the vicinities of the animal enclosures, the same range within which the births took place. Such data were

Table III. Actions or behavioral events performed by six specimens of lowland tapirs in captivity recorded during 20 hours of *ad libitum* observation and on the basis of a review of the literature.

No.	Behavior	Description
1	Bite (B)	Animal bites another.
2	Care parentally (CP)	Female scratches offspring with head or proboscis.
3	Chase (C)	Animal pursues another by running after it. Usually followed by mounting.
4	Copulate (CO)	Male mounts female, followed by penetration of male's genital organ into female's genital organ
5	Drink (D)	Animal drinks from water container.
6	Eat (E)	Animal feeds on grass or food offered by keepers.
7	Excrete (EX)	Animal defecates or urinates, regardless of location in enclosure (physiological only).
8	Expose penis (EP)	Male exposes genital organ and is excited, with or without erection.
9	Lie laterally (LLS or LLG)	Animal lies on side, with one side of body totally in contact with ground and body not resting on forelegs. May be solitary (LLS) or in a group (LLG).
10	Lie on forelegs (LFS or LFG)	Animal lies on its belly, which rests on folded forelegs. May be solitary (LFS) or in a group (LFG).
11	Mount (MO)	Male mounts female by placing both forelegs on female's dorsum, without penetration of male's genital organ into the female's genital organ.
12	Push away (PA)	Animal pushes another away with head or body.
13	Run (RS or RG)	Animal moves relatively fast or gallops. May be solitary (RS) or in a group (RG).
14	Scratch (SC)	Animal scratches itself as self-maintenance action.
15	Sit (SIS or SIG)	Animal sits by resting its weight on folded hind legs while holding forelegs straight. May be solitary (SIS) or in a group (SIG).
16	Sniff (SN)	Animal sniffs another (except genitalia) or sniffs faeces, urine or food.
17	Sniff genitalia (SNG)	Animal sniffs another's genitalia, placing its snout close to or up against other animal's genitalia; may be associated with licking genitalia.
18	Stand still (SSS or SSG)	Animal stands still and is inactive, with all four hooves on ground and legs straight. May be solitary (SSS) or in a group (SSG).
19	Suckle (S)	Infant sucks milk from mother's udder.
20	Urine mark (U)	Animal sprays urine from standing posture, in rapid series of short sharp jets. Usually occurs at specific points of enclosure, evidencing the intention of marking the bounds of this territory.
21	Vocalization click (VCL)*	Two or three clicks emitted in rapid succession
22	Vocalization distress (VDI)*	Similar to long whistle (about 2 seconds).
23	Vocalization squeal (VSQ)	Loud shrill screech or squeal.
24	Walk (WS or WG)	Animal moves around enclosure. May be solitary (WS) or in a group (WG).

* Literature review

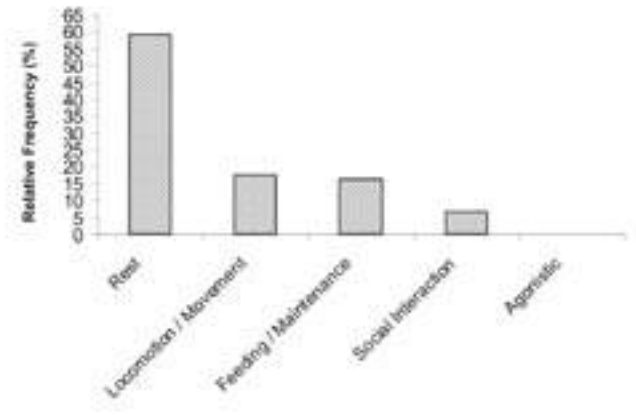


Figure 1. Relative frequencies of behavioral categories for Brazilian Tapir in captivity. This is the result of 70 hours of behavioral observations using scan sampling technique for 8 (eight) Tapir specimens taken from 3 (three) groups among the others at CBMM Breeding facility. This was done from April 4Th to June 12th. (X^2 = 107,06; p ≤ 0.001)

grouped by month, the Spearman's rank correlation tests were performed, with significance p ≤ 0.05. Temperature and rainfall data were converted using the base 10 logarithm for the purpose of displaying the results graphically. The temporal budget equi-distribution in the different behavioral categories were X^2 (chi-square) goodness-of-fit tested for expected equal proportions (p ≤ 0.05). The statistic program used was BioEstat 4.0 (Ayres, 2005).

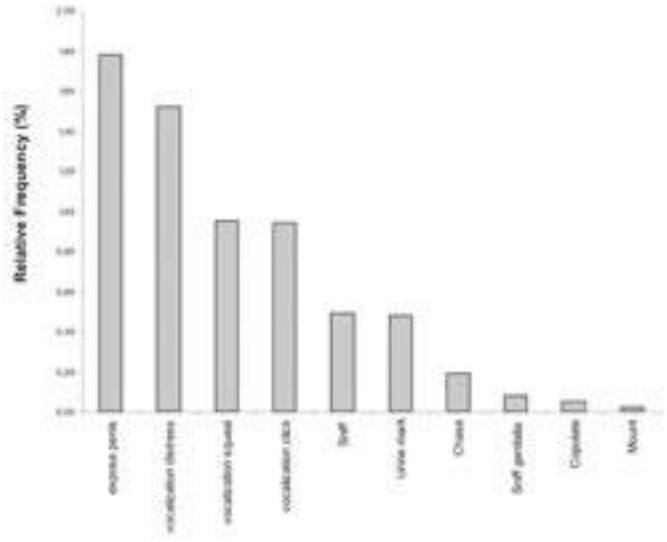


Figure 3. Relative frequencies of behavioral events classified as social interaction among eight lowland tapirs in captivity.

Results

The *ad libitum* observations technique performed at the first stage of the research allowed the identification and description of 22 behavioral acts or events expressed for Brazilian Tapir in captivity, as showed in Table III. Among 22 events, only two types of vocalization were not observed at this stage and was described from literature. However, during the second stage of observations, all types of vocalization could be observed in captivity.

The "urine marking" was performed only by adult animals, both male and female. The behavioral events "chasing", "biting" and "sniffing genitalia" were performed only by males, apparently relating to sexual interest in females. On the other hand, "Caring parentally" was seen only in females. "Vocalization distress" was also observed only in females, when looking for their young and being chased by males. All other behavioral events in the repertoire were observed for both males and females.

The individuals studied displayed sociable behavior, spending most of the day in groups and were active both by day and by night. Both males and females squealed (VSQ) when the pickup truck approached the enclosures with food and also in response to vocalization by another individual, suggesting that this vocalization was used to convey a warning or alert. Clicking was also observed at feeding times and when couples approached each other in the enclosures, confirming use of this vocalization to identify conspecifics. Another type of vocalization observed in the study was the distress call made by females when chased by males and when separated from their young.

Two mountings were observed during the study, each lasting one minute and including penis exposure but not leading to penetration. They preceded and occurred on the same day as the single act of copulation observed during the period. It occurred on the first day when the animals were placed together in the same enclosure. One of the copulation event was preceded by the male chasing the female for the most part of the day (approximately 10 hours). Whenever the male drew close to the female, he would try to bite her hindquarters. While chasing the female, the male vocalized with recurrent clicks. The female issued distress calls during the chase. When the male finally succeeded in closing on the female, he sniffed her genitalia, exposed his penis and mounted her. Copulation then ensued. Vocalizations became more frequent and intense during approximation and mounting. Copulation occurred on dry ground in the early evening and lasted five minutes. During copulation, the male made recurrent clicks, which became more frequent and intense as copulation proceeded. The female did not vocalize during copulation.

The actions or behavioral events were grouped into five behavioral categories with significant differences ($p \leq 0.05$) in their Relative Frequency (RF): Rest, with a RF of 59.3%; Locomotion/Movement 17.8%; Feeding/Maintenance 16.3%; Social Interaction 6.5%; and Agonistic 0.1%, according to Figure 1. The Rest and Agonistic categories are the ones that deviated the furthest from the expected proportion. There is no significant difference in RF between families.

In the Social Interaction category, the most frequently observed events were "exposing penis", "vocalization squeal", "vocalization click" and "vocalization distress", as showed in Figure 3.

Another analysis of the data showed that the environmental settings most frequently used by the groups were *Brachiaria* grass (44.4%), clumps of elephant grass (21.3%) and tree shade (14.0%), where they remained much of the time refreshing.

An analysis of the history of 10 births that occurred in the period 1987-2006, together with time series for average temperature and rainfall at the CBMM Conservation Breeding Facility, showed that births are correlated with ambient temperatures ($rs = 0.57$; $p = 0.05$) and not correlated with rainfall ($rs = -0.11$; $p = 0.72$). Thus, births tend to occur when the average monthly temperature is higher. The relationship between birth occurrences and historical average temperature and rainfall levels at CBMM Conservation Breeding Facility is expressed in Figure 4.

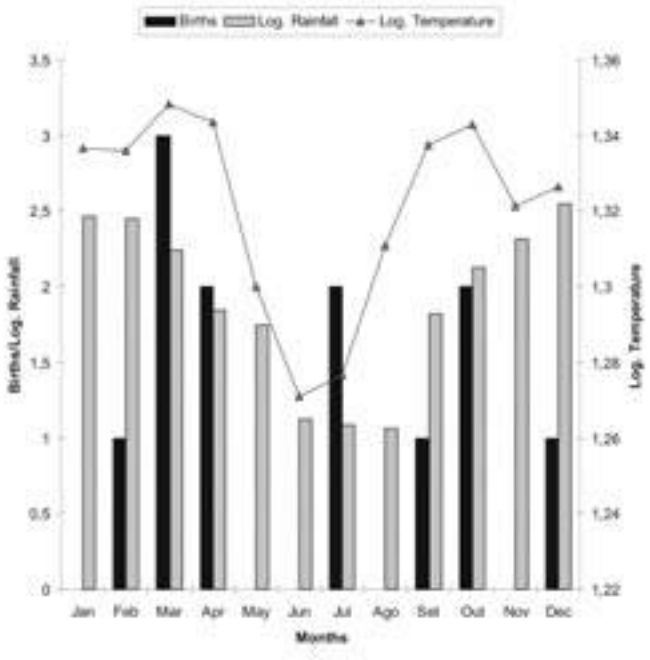


Figure 4. Relationship between 10 birth occurrences and historical averages for temperature and rainfall in the period 1987-2006, at CBMM Conservation Breeding Facility, showing the significant relationship between births and temperature levels. Births are correlated with temperature and ($rs = 0.57$; $p = 0.05$) not correlated with rainfall ($rs = -0.11$; $p = 0.72$).

Discussion

The individuals studied at the CBMM Conservation Breeding Centre displayed sociable behavior, were mostly observed while resting in groups, and performed activities both by day and by night. In the wild, tapirs are considered solitary and nocturnal (Barongi, 1999), although females with dependent young, adults with juveniles, or feeding groups are not unusual, showing that the species may live in groups (Medici, 2001). In captivity, while breeding, however, tapirs can be found in groups and may be active during the day (Shoemaker, 2006). Medici (2001) also observed that in some regions, such as Argentina's El Rey National Park, tapirs are typically diurnal, possibly because of the absence of humans. The results showed that this environment and the type of management conducted at CBMM allowed these species to perform behaviors that are similar to the behaviors they may usually have in their natural habitats. The type of management adopted at CBMM breeding centre includes the maintenance of the animals in groups, which are placed in big enclosures planted with grass and trees and with a very good environmental enrichment.

The frequency of agonistic events was very low and the time spent resting was relatively high. According to Barongi (1999), the social behavior of tapirs in captivity is largely dependent on individual animal personalities, past experiences, food availability and size and layout of enclosure. The low degree of aggressiveness observed can be explained by the type of management used in the Breeding Center where consideration is given to the size and composition of the group kept in each enclosure and particular traits of each individual are taken into account when forming the groups. In addition, the enclosures are very large if compared to the minimum size standard recommended for this species while kept in captivity, namely, 18,6 square meters for the outside area (Barongi, 1999), thereby enabling animals to mark out their territories and freely express their behaviors. Also, large amounts of food are available for the animals, including food offered as part of their everyday diet as well as grass, fruits and leaves that naturally occur in the enclosures. In addition, the amount of time spent resting was relatively high, and the frequency of rest events was found to be high during daytime. Tapirs usually rest during daytime and are more active at nighttime

(Emmons; Feer, 1997; Barongi, 1999). In our study, sampling was done mostly (79%) during daytime. Rest frequencies may be different during nighttime, but such conclusion cannot be supported by the small amount of sampling done during the night period (21%).

Vocalizations were found to occur with high frequency among the social events and seemed to play an important role for the species in social interaction. Vocalizations were observed among males prior to copulation; among females while with their young, as part of their parental behavior; and among individuals as alert calls when identifying conspecifics. In nature, tapirs are usually quiet, but may snort and stamp in alarm (EMMONS;FEER,1997). Tapirs communicate using shrill whistling sounds which are associated with urine scent-mark (NOWAK, 1999).

According to Barongi (1999), mounting may occur with or without penetration of the male's genital organ into the female's genital organ. In our study, the mountings observed preceded and occurred on the same day as the single act of copulation observed during the period. The copulation lasted 5 minutes and was preceded by the male chasing the female for most of the day. It was preceded by olfactory, visual and auditory contact between the animals. These findings corroborate the statement in Barongi (1999) that copulation may last from a few to 20 minutes, occurs during estrus, and is preceded by running and chasing, with the possibility of biting.

The event "urine marking" by adults was observed for both females and also for males. They spray urine while standing, in rapid series of short sharp jets. This usually occurs at specific points of the enclosure, evidencing the intention of marking the bounds of their territory. Such finding was somewhat expected for Tapirs, since mammals usually mark out their territories with urine, which may emit scents, or with exudates from various tegumentary glands. In mammals, scent glands are quite developed and most mammals have an acute sense of smell, which plays an import role in their communication and territory defense (ORR, 1986). Thus, with respect to the management of this species in captivity, including how enclosures are designed and groups are managed, it must be taken into account that tapirs are territorial animals.

The environmental settings that were most frequently used by the animals observed in this study were *Brachiaria* grass, with a height of about 80 cm, followed by clumps of elephant grass and tree shade. This can be explained by the fact that tapirs are typically found in forest environments, where animals usually hide from predators and sunlight on the shades of the trees and on clumps of grasses (Barongi, 1999). They are found in rainforest, gallery forest, dry forest, savannah (Chaco), and more open grassy habitats with water and dense vegetation for refuge (Emmons; Feer, 1997). The result shows the importance of the environmental enrichment of the enclosures for these species.

An analysis of the history of 10 births that occurred in the period 1987-2006, under the same type of management, together with time series for average temperature and rainfall at the CBMM Conservation Breeding Facility, showed that births are correlated with ambient temperatures and not correlated with rainfall levels, and that the highest the ambient temperature is, the higher the number of births will be. According to Shoemaker (2006) the reproductive behavior appears to be not seasonal and varies as a function of the age, experience and reproductive compatibility of each couple. Even though the literature (Nowak, 1999) indicates that births do not follow a seasonal pattern among Brazilian Tapirs, in spite of a tendency for births to occur prior to the commencement of summer rain, a different pattern was observed at the Breeding Center. There were births taking place during the months of February, March and April, which correspond to the end of the summer rain period, and also in July, which is the local dry season. This is an important fact that must be taken into account in respect of the management of tapirs in captivity, since it may be an effective strategy to ensure the reproductive success and preservation of this species.

Conclusions

The main conclusions were that the individuals studied at the CBMM Conservation Breeding Centre displayed sociable behavior and a varied and frequent vocal communication repertoire. For the most part they were observed while resting in groups, and performed activities both by day and by night. The vocal communication repertoire observed was varied and frequent. There are differences in how animals of different gender and age express their behaviors. Their reproduction is correlated with the ambient temperature. The type of management provided at CBMM Breeding centre could be seen as a good practice for Brazilian Tapir in captivity.

References

Ayres, M.; M. Ayres Jr.; D. L. Ayres; A.S. Santos. 2005. BioEstat 4.0: Aplicações estatísticas nas áreas das ciências biológicas e médicas. Belém: Sociedade Civil Mamirauá, CNPq.

Barongi, R. Minimum Husbandry Standards Tapiridae (tapirs). Avaiable at: http://www.tapirs.org/Downloads/standards/tapir-TAG-min-hus-guide-eng.doc. Accessed October 1, 2009.

BEHAVIORAL REPERTOIRE FOR LOWLAND TAPIR IN CAPTIVITY							APPENDIX I	
	GROUP							
Behavioral Categories	**1**		**2**		**3**		**Total**	
Behavioral events	**FA**	**FR**	**FA**	**FR**	**FA**	**FR**	**FA**	**FR**
Feeding / Maintenance	**657**	**22,57**	**455**	**14,18**	**390**	**12,50**	**1502**	**16,26**
Eat	631	21,68	440	13,72	354	11,35	1425	15,43
Drink	13	0,45	11	0,34	29	0,93	53	0,57
Excrete	6	0,21	1	0,03	5	0,16	12	0,13
Push away	7	0,24	3	0,09	2	0,06	12	0,13
Locomotion / Movement	**579**	**19,89**	**428**	**13,34**	**634**	**20,33**	**1641**	**17,76**
walk (single or in group)	560	19,24	414	12,91	597	19,14	1571	17,01
Run (single or in group)	15	0,52	9	0,28	37	1,19	61	0,66
Other	4	0,14	5	0,16	0	0,00	9	0,10
Social Interaction	**136**	**4,67**	**280**	**8,73**	**184**	**5,90**	**600**	**6,49**
Sniff	15	0,52	21	0,65	9	0,29	45	0,49
Sniff genitalia	2	0,07	0	0,00	5	0,16	7	0,08
Urine mark	19	0,65	12	0,37	13	0,42	44	0,48
Chase	5	0,17	1	0,03	12	0,38	18	0,19
Expose penis	32	1,10	51	1,59	81	2,60	164	1,78
Mount	0	0,00	0	0,00	2	0,06	2	0,02
Copulate	0	0,00	0	0,00	5	0,16	5	0,05
Vocalization squeal	14	0,48	60	1,87	14	0,45	88	0,95
Vocalization click	13	0,45	90	2,81	37	1,19	140	1,52
Vocalization distress	36	1,24	45	1,40	6	0,19	87	0,94
Agonistic	**3**	**0,10**	**4**	**0,12**	**5**	**0,16**	**12**	**0,13**
Push away	2	0,07	3	0,09	0	0,00	5	0,05
Bite	1	0,03	1	0,03	5	0,16	7	0,08
Rest	**1536**	**52,77**	**2041**	**63,62**	**1906**	**61,11**	**5483**	**59,35**
Sit (single or in group)	0	0,00	5	0,16	4	12,98	9	0,10
Stand still (single or in group)	366	12,57	491	15,31	405	12,98	1262	13,66
Lie on forelegs (single or in group)	740	25,42	770	24,00	1191	38,19	2701	29,24
lie laterally (single or in group)	430	14,77	775	24,16	306	9,81	1511	16,36
Total of Behavioral Events	**2911**	**100,00**	**3208**	**100,00**	**3119**	**100,00**	**9238**	**100,00**
Total of Hours of Observations	**23**		**22**		**25**		**70**	
FA - absolute frequency	FR - relative frenquency							

Cullen, L. Jr. et al. (1997). Métodos para estudos de ecologia, manejo e conservação de primatas na natureza. Manejo e conservação de vida silvestre no Brasil. Belém: Sociedade Civil Mamirauá, p. 239-269.

Del-Claro, K. (2004). Comportamento animal uma introdução à ecologia comportamental. Jundiaí. Editora Livraria Conceito, 132p.

Emmons, L. H.; Feer, F. (1997). Neotropical rainforest mammals: a field guide. 2ª ed. Illinois. University of Chicago Press Chicago, 1997, p. 307p.

Gorog, 2001. *Tapirus terrestris* (On line), Animal Diversity Web. Available at: http://animaldiversity.ummz.umich.edu/site/accounts/information/Tapirus_terrestris.html. Accessed on March 13, 2006.

Mangini, P.R. Perissodactyla – Tapiridae (Anta). In: Cubas, Z.S.; Silva, J.C.R.; Catão – Dias, J.L. Tratado de animais selvagens. 1ª ed. Roca: São Paulo, 2006. p. 598-614.

Martin, P.; Bateson, P. (1993). Measuring behaviour: an introductory guide. 2ª ed. Cambridge: Cambridge University Press, 222p.

PROTOCOL FOR RECORDING BEHAVIORAL ACTIVITIES		APPENDIX II
CDA - CBMM	Started at: 6:50 PM	Finished at: 7:50 PM
ambient temperature:		
Animal A: Burro (male)	Animal B: Jade (female)	Enclosure: CDA
Researcher :Henrique	Date: 25 / 05 / 06	Section: Tapirs

Behavioral Categories

	FEEDING / MAINTENANCE	LOCOMOTION / MOVEMENT	REST	SOCIAL INTERACTION	AGONISTIC
Behavioral Events	eat (E)	walk (W S) or (WG)	Sit (SIS) or (SIG)	care parentally (CP)	bite (B)
				sniff (SN)	
				sniff genitalia (SNG)	
	drink (D)	run (RS) or (RG)	Stand still (SSS or SSG)	urine mark (U)	push way (PA)
				suckle (S)	
				chase (C)	
	suckle (S)		lie on forelegs (LFS) or (LFG)	expose penis (EP)	
				mount (MO)	
	excrete (EX)			copulate (CO)	
	scratch (SC)		lie laterally (LLS) or (LLG)	vocalization (VCL-VDI-VSQ)	

MIN	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1				WS	WS										
2				WS	WS										
3	E						SSS	SSS							
4	E				WS		SSS								
5	E						SSS	SSS							
6							SSS	SSS							
7				WS	WS										
8							SSS	SSS							
9							SSS	SSS							
10							SSS	LFS							
11							SSS	LFS							
12					WS		SSS								
13					WS		SSS								
14	E				WS		SSS								
15							SSS	SSS							
16				WS	WS										
17				WS	WS										
18					WS		SSS								
19				WS				SSS							
20				WS	WS										
21							SSS	SSS							
22							SSS	SSS							
23				WS	WS										
24					WS		SSS								
25	E						SSS	SSS							
26					WS		SSS								
27				WS	WS										

Excerpts translated and whole article revised by Traduz Central de Traduções Ltda 1/3/2010.

28				WS	WS										
29				WS	WS										
30				WS	WS										
31				WS	WS										
32				WS				SSS							
33				WS				SSS							
34				WS				SSS							
35				WS	WS										
36				WS	WS										
37				WS	WS					VSQ					
38				WS				SSS							
39				WS	WS										
40		E		WS				SSS							
41				WS	WS										
42				WS	WS		SSS								
43				WS	WS										
44							SSS	SSS							
45				WS	WS										
46				WS				SSS							
47							SSS	SSS							
48				WS	WS										
49							SSS	SSS			VDI				
50				WS	WS					VE	VDI				
51				WS	WS						VDI				
52				WS	WS					VSQ	VDI				
53							SSG	SSG		MO	VDI				
54							SSG	SSG		SNG					
55							SSG	SSG		SNG					
56							SSG	SSG		EP					
57							SSG	SSG		MO					
58							SSG	SSG		CO					
59							SSG	SSG		CO					
60							SSG	SSG		CO					
TOTAL															
observation:															

Medici, E. P. et al. Order Perissodactyla, Family Tapiridae. In: Fowler, M.E.; Cubas, Z.S. Biology, Medicine and Surgery of South American Wild Animals. 1ª ed. Iowa: Iowa State University Press, 2001. p. 363-376.

Medici, E. P. et al., 2007. Workshop para a Conservação da Anta Brasileira (*Tapirus terrestris*) – Análise de Viabilidade Populacional e de Habitat (PHVA). Available at: http://www.tapirs.org/downloads/actions-plan/action_plan_lowland_tapir_port.pdf. Accessed on December 4, 2009.

Nowak, R.M. (1999). Walker's Mammals of the World. 6ªed. Baltimore. The Johns Hopkins University Press. 1936p.

Orr, R.T. (1986). Biologia dos Vertebrados. 5ª ed. São Paulo. Editora Roca. 508p.

Ribeiro, J.F.; Walter, B.M.T. Fitofisionomias do bioma cerrado. In: Sano, F.M.; Almeida, S.P. Cerrado: ambiente e flora. Planaltina: Embrapa – CPAC, 1998.p.89-166.

Rocha, M. B. B.; Rosa, R. Monitoramento do uso da terra no município de Araxá – MG em 1985 e 2005, utilizando técnicas de sensoriamento remoto e SIGs. In: XIII SIMPOSIO BRASILEIRO DE SENSORIAMENTO REMOTO, 2007, Florianópolis, Anais...Florianópolis: INPE, 2007. P. 4179-4186.

Shoemaker, A. H. et al. Linhas Mestras para a Manutenção e Manejo de Antas em Cativeiro. Available at: http://www.tapirspecialistgroup.org/Downloads/standards/tapir-TAG-husband-stan-port.doc. Accessed May 16, 2006.

A Preliminary Study of Habitat Selection by Malayan Tapir, *Tapirus indicus*, in Krau Wildlife Reserve, Malaysia

Nor Zalipah Mohamed[1], Carl Traeholt[2]

1 Institute of Biodiversity, Department Of Wildlife And National Parks, Bukit Rengit, Lanchang, Pahang, Malaysia.
Corresponding author, present address: Department Of Biology, Faculty of Science and Technology, University Malaysia Terengganu, Kuala Terengganu, E-mail: zalipah@umt.edu.my

2 Copenhagen Zoo, Research and Conservation Division, SE Asia Programme, Kuala Lumpur, Malaysia,
E-mail: ctraeholt@pd.jaring.my

Introduction

The Malay tapir, *Tapirus indicus*, is the only member of the *Tapiridae* family to exist in Asia with the World's remaining three species found in the Americas. The Malay tapir is believed to have split up from its three American family members approximately 20-23 million years ago (Colbert, 1998, 2005). Whilst the species roamed large parts of Asia, recent finds suggest that the Malay tapir existed on Borneo from the late Pleistocene (~ 45,000 years ago) through the Holocene until as recently as perhaps a few hundred years ago (Cranbrook 2010; Cranbrook & Piper, 2009). It is not known what lead to their disappearance on Borneo, but there has been a suggestion that it is linked to the change of habitat, where Malay tapirs may have preferred the rich savannah landscapes that dominated Sundaland (Cranbrook 2010; Cranbrook & Piper, 2009). With the rising water level Borneo became isolated from continental Asia and forced tapirs and other large ungulates to forage in tropical rainforests that may not have been the optimal habitat for them. The Malay tapir is considered a hindgut fermenter and have a low defecation frequency, which might be linked to their comparatively low food intake. Their gastrointestinal capacity is very similar to that of horses (Clauss *et al*, 2010) suggesting that they are physiologically adapted to diets more similar to that of horses rather than as browsers in a tropical rainforest. Being hindgut fermenters, however, allows them to consume sugar-rich fruits and possibly act as seed dispersers in tropical rainforest habitats (Corlett, 1998).

Since 2002, the Malay tapir conservation project (MTCP) have undertaken extensive population and activity pattern studies on the Malay tapirs and found that the individual Malay tapirs roam over a relatively small area of 10-15 km^2 (Abdul Ghani, 2009; Traeholt, 2005; Traeholt & Sanusi, 2009) where they forage on up to 115 species of plants (Williams & Petrides, 1980). Although these results suggest that Malay tapirs consume a wide variety of herbaceous plants, Williams & Petrides (1980) and Abdul Ghani (2009) recorded that there are certain species that make up more than 60% of the diet. This could indicate that Malay tapirs prefer certain types of habitat rich with the preferred species. As such the preferred habitats contain the resources and conditions in an area that produce occupancy including survival and reproduction (Hall *et al*., 1997).

This study aimed at describing the micro-habitat of selected areas with known occupancy of Malay tapirs to emphasize on habitat usage and its relation to the feeding selection of *Tapirus indicus* at Krau Wildlife Reserve, Pahang.

Materials and Methods

Study Area

Krau Wildlife Reserve covers approximately 63.000 ha of largely undisturbed tropical rainforests. About 50% of this consists of lowland dipterocarp forest wtih the rest varying from hill forest at Bukit Tapah (~800 m) in the south to montane forest at Gunung Benom (~2000 m) in the north. Krau is home to other large mammals such as gaur, *Bos gaurus*, sambar deer, *Cervus unicolour*, wild pig, *Sus scrofa* and Malaysia's two largest terrestrial predators tiger, *Panthera tigris corbetti* and leopard, *Panthera pardus*. Elephants are known to occasionally venture into Krau from the adjacent forest reserve although no resident elephant population is found in Krau anymore.

An ongoing radio-telemetric study of the Malayan tapir has produced hundreds of waypoints where tapirs have been recorded. The first sixty GPS waypoints of the dataset of two Malay tapir individuals, A and B, were chosen to test for possible habitat preference in Krau Wildlife Reserve, Malaysia. Samplings of habitat

characteristic were conducted from October 2006 to June 2007. A total of 28 habitat variables were selected based on Kemper & Bell (1985), Patterson (1990) and Zainab (2001). At each waypoint, data were recorded from an area of 3m radius. All trees with DBH less then 5cm were collected for species identification as potential food plants.

Data were analyzed using Principal Component Analysis (PCA). From the total variables, only 23 were selected as some variables showed little variation with a constant value.

Results and Discussion

The records of 28 habitat variables reveal a high number of trees below 5cm at DBH, lots of shrubs below 50 cm in height, wines and gingers (Tab. 1). A total of 776 individual trees of DBH < 5 cm were identified in this study. Based on Williams (1978), the total number of species consumed by tapir in Taman Negara National Park was 115 species, with 5 species included in the most preferred category. The highest number of species consumed by tapir belongs to the family *Euphorbiacea* (5 species) (Tab. 2). Nizam *et al*. (2006) reported that the *Euphorbiacea* family contained the highest number of species recorded in Krau Wildlife Reserve.

For tapir A, 391 individual trees from 47 families were recorded in the study areas. This amounted to a total of 166 species of which 13 species were recorded to be consumed by Malay tapirs, two of which were in the most preferred category listed by Williams (1978). For tapir A 36 individual trees belonging to the 13 recorded food species where found that constitutes 9.2% of the total number of trees being potential tapir food. In the area utilised by tapir B, 385 trees from 47 families and 165 species were recorded. Of this, 18 individual trees belonging to 10 food species were recorded, of which four species belonged to in the most preferred category. This constitutes 4.67% of the total number of trees that could be tapir food.

Only climbers showed a significant difference between the two tapir habitats ($t = -2.05$, $P = 0.045$, $df = 58$). Eigen value of the first two principal components accounted for 23.6% of variation in the 23 data dimensions (Tab. 1). Individually, tapir A showed the highest affinity towards habitat with many climbers while tapir B showed the highest affinity for habitat with lots of ginger (Tab. 1).

Although Malay tapirs are generally classified as browsers, Williams (1978) recorded eight species of herbs and one species of moss in the tapir diet, but no ginger species. Williams & Petrides (1980) also recorded six species of climbers consumed by tapir.

Based on the preliminary data in this study canopy height and the abundance of climbers may be factors determining habitat preference and utilization of tapir in Krau Wildlife Reserve. However, with results from only two individuals it is not possible to make any specific conclusion as to what factors determine Malay tapirs' habitat choices. Tall canopy habitat may provide better shade cover and cooler micro-climate preferred by tapirs but in this case the bias towards tall canopy is most likely a result of the study taking place in an undisturbed lowland *dipterocarp* rainforest that is dominated by tall canopy habitat. The same reason may apply to the abundance of climber species that are not normally present in disturbed habitat. To get a clearer picture of tapir's habitat usage and preference a comparison with habitat characteristic of random sites, including areas were tapirs do not live, should be conducted and combined with browsing signs. Such data may help to determine differences in consumption volume and frequency of preferred species and, subsequently, provide more details on what drives tapirs' habitat selection.

Acknowledgement

This study was supported and funded by Department of Wildlife and National Parks, Malaysia, and Copenhagen Zoo, Denmark.

References

Abdul Ghani, Siti K. (2009). Home range size, density estimation and behaviour of Malayan tapirs *(Tapirus indicus)* at Krau wildlife reserve. MSc thesis, University of Science, Malaysia. 226 pp.

Clauss, M., Lang-Deuerling, S., Muller, D. W. H., Kienzle, E., Steuer, P. and J. Hummel (2010). Retention of fluid and particles in captive tapirs (Tapirus sp.). *Comparative Biochemistry and Physiology A* **157(1):** 95-101.

Corlett, R.T. (1998). Frugivory and seed dispersal by vertebrates in the Oriental (Indomalayan) Region. *Biological Reviews* **73(4):** 413-448.

Colbert, M.W., and R.M. Schoch (1998). The Tapiroidea and other moropomorphs. In: Evolution of Tertiary Mammals of North America. C. Janis & L. Jacobs, eds. Cambridge University Press:. 569-582.

Colbert, M.W. (2005). The facial skeleton of the Early Oligocene *Colodon* (Perissodactyla, Tapiroidea). *Palaeontologia Electronica* **8(12A):** 27p.

Cranbrook, E. (2010). Late quaternary turnover of mammals in Borneo: the zooarchaeological record. *Biodiversity and conservation* **19(2):** 373-391.

Table 1. The results of each habitat variable recorded for each individual tapir (mean + SD, white columns). Value of Eigen vectors for the first two principal components (N = 60). PC1 and PC2 and value of Eigen vectors for the first principal component (PC1) for each tapir individual (grey columns).

	Habitat Variable	Tapir A	Tapir B	PC1	PC2	Tapir A (N=30)	Tapir B (N=30)
1	Canopy cover (%)	89.93±6.49	89.00±6.96	0.081	-0.07	0.139	-0.046
2	Canopy height (m)	7.00±5.15	6.75±5.03	0.421	0.228	0.32	0.353
3	Height of tallest tree (m)	10.57±4.02	10.81±5.32	0.362	0.326	0.144	0.319
4	Number of tress DBH > 5 cm	0.56±0.77	0.76±0.89	-0.073	-0.197	-0.069	0.011
5	Number of tress DBH > 10 cm	0.36±0.55	0.16±0.37	0.026	-0.005	0.057	-0.02
6	Number of tress DBH > 15 cm	0.16±0.37	0.26±0.44	0.219	0.338	0.089	0.225
7	Number of tress DBH < 5 cm	13.00±6.70	12.56±5.28	0.304	-0.249	0.322	0.196
8	Number of fallen log diameter > 5 cm	0.03±0.18	0.13±0.34	-0.16	0.16	-0.16	-0.014
9	Number of fallen log diameter < 5 cm	0.03±0.18	0.03±0.18	0.011	-0.076	-0.062	-0.333
10	Number of shrub less than 50 cm height	204.90±107.51	187.10±135.66	0.287	-0.018	0.276	0.172
11	Number of shrub 50-100 cm height	38.13±19.39	39.06±15.39	0.278	-0.319	0.267	-0.043
12	Number of Climber	6.60±6.50	10.03±6.46	0.413	-0.186	0.437	0.154
13	Number of Herb	12.60±14.00	13.30±14.39	0.088	-0.326	0.294	-0.278
14	Number of Fern	3.06±4.90	6.23±8.22	0.139	-0.314	0.283	-0.292
15	Number of Rattan	7.56±3.92	4.20±9.60	0.181	-0.075	0.219	0.179
16	Number of Bertam	1. 40±2.02	1.33±1.45	-0.136	0.018	-0.18	-0.073
17	Number of Palm	6.40±4.41	6.56±4.30	-0.106	-0.274	-0.064	-0.248
18	Number of Pandan	0.26±0.76	0.20±0.78	0.135	0.142	-0.133	0.244
19	Number of Ginger	2.53±3.73	2.60±3.79	-0.064	-0.173	0.024	-0.399
20	Ground cover, Soil (%)	8.46±5.54	7.10±5.27	0.137	0.229	-0.063	0.168
21	Ground cover, Litter (%)	88.53±5.24	92.56±15.66	-0.185	0.065	0.021	-0.062
22	Ground cover, Rock (%)	3.00±0.91	0.16±16.43	0.126	-0.171	0.288	0.005
23	Litter depth (cm)	12.23±2.85	11.06±3.68	0.042	0.18	0.118	0.058
	Eigen-value			**2.995**	**2.4442**		
	Proportion			**0.13**	**0.106**		
	Cumulative			**0.13**	**0.236**		

Table 2. List of tree species consumed by tapir at Krau Wildlife Reserve.

Family	Species	Local Name (growth form)	Tapir A	Tapir B
Ebenaceae	*Diospyros buxifolia*	- (tree)	√	√
	Diospyros sumatrana	Behtne (tree)	√	
Euphorbiaceae	*Antidesma tomentosum*	- (-)	√	
	Aporusa symplocoides	Metkot (-)		*
	Baccaurea parviflora	Kemai (small tree)	*	
	Elateriospermum tapos	Perah (tree)	√	√
	Pimelodendron griffithianum	- (-)	√	√
Gnetaceae	*Gnetum gnemon*	- (tree)	√	√
Guttiferae	*Garcinia nigrolineata*	- (-)		*
Melastomataceae	*Memecylon dichotomum*	Klandis (shrub-tree)	√	√
Moraceae	*Ficus semicordata*	Ara (tree)	*	*
	Streblus elongatus	- (tree)	√	
Rubiaceae	*Timonius wallichianus*	- (tree)	√	
	Lasianthus griffithii	Tenboh (srub)		*
Sapotaceae	*Payena lucida*	- (-)	√	√

* most preferred species as recorded by Williams (1978)

Cranbrook, E.O. and Piper, P.J. (2009). Borneo Records of Malay Tapir, Tapirus indicus Desmarest: A Zooarchaeological and Historical Review. *International Journal of Osteoarchaeology* **19(4):** 491-507

Hall, H.L., Krausman, P.R. and Morrison, M.L. (1997). The habitat concept and a plea for standard terminology. *Wildlife Society Bulletin*. **25**: 173-182.

Nizam, M.S., Fakrul-Hatta, M. and Latiff, A. (2006). Diversity and tree species community in the Krau Wildlife Reserve, Pahang, Malaysia. *Malaysian Applied Biology*. **35(2)**: 81-85.

Kemper, C. and Bell, D.T. (1985). Small mammals and habitat structure in lowland rain forest of Peninsular Malaysia. *Journal of Tropical Ecology*. **1**: 5-22.

Patterson, B.D., Meserve, P.L. and Lang, B.K. (1990). Quantitative habitat associations of small mammals along an elevational transect in temperate rainforest of Chile. *Journal of Mammalogy*. **71 (4)**: 620-633.

Traeholt, C. (2005). Malay Tapir Conservation Project: Completion Report. Kuala Lumpur.

Traeholt, C. and Sanusi, M. (2009). Population Estimates of Malay Tapir, Tapirus indicus, by Camera Trapping in Krau Wildlife Reserve, Malaysia. *Tapir Conservation* **18(1):** 18-26.

Williams, K.D. and Petrides, G.A. (1980). Browse use, feeding behavior, and management of the Malayan tapir. *Journal of Wildlife Management* **44(2):** 489-494.

Williams, K.D. (1978). Aspects of the ecology and behavior of the Malayan Tapir (Tapirus indicus Desmarest) in the National Park of West Malaysia. MSc Thesis Dissertation, Michigan State University

Zainab, B. (2001). Kajian Transek Altitud Mamalia Kecil (non-volan) di Gunung Nuang, Hulu Langat, Selangor. Thesis Sarjana Sains, Universiti Kebangsaan Malaysia.

TSG MEMBERSHIP DIRECTORY

ABD GHANI, SITI KHADIJAH (Malaysia)
Public Service Department of Malaysia
E-mail: nctapir@gmail.com

AMANZO, JESSICA (Peru)
Universidad Peruana CayetUmano Heredia
E-mail: jessica_amanzo@yahoo.com

AMORIM JR., EDSEL (Brazil)
Instituto Biotrópicos
E-mail: edsel@biotropicos.org.br

AÑEZ GALBAN, LUIS GUILLERMO (Venezuela)
Fundación Parque Zoológico Metropolitano del Zulia
E-mail: galbanluis70@hotmail.com; galbanluis97@yahoo.com

ANGELL, GILIA (United States)
Amazon.com
E-mail: gilia.angell@gmail.com

ARIAS ALZATE, ANDRÉS (Colombia)
Grupo de Mastozoología - CTUA, Universidad de Antioquia
E-mail: andresarias3@yahoo.es

AYALA CRESPO, GUIDO MARCOS (Bolivia)
WCS - Wildlife Conservation Society, Bolivia
E-mail: gayala@wcs.org; guidoayal@gmail.com

BARONGI, RICK (United States)
Houston Zoo Inc. / AZA Tapir TAG
E-mail: rbarongi@houstonzoo.org

BECK, HARALD (United States)
Towson University
E-mail: hbeck@towson.edu

BERMUDEZ LARRAZABAL, LIZETTE (Peru)
Parque Zoologico Recreacional Huachipa
E-mail: lizettelarrazabal@yahoo.com

BERNAL RINCÓN, LUZ AGUEDA (Colombia)
Mountain Tapir Project
E-mail: aguedabernal@gmail.com

BODMER, RICHARD E. (United Kingdom)
DICE, University of Kent
E-mail: R.Bodmer@ukc.ac.uk

BOSHOFF, LAUTJIE (Costa Rica)
Rafiki Safari Lodge
E-mail: lautjie@gmail.com

CALMÉ, SOPHIE (Canada)
Université de Sherbrooke, Canada / El Colegio de la Frontera Sur (ECOSUR)
E-mail: sophie.calme@gmail.com; sophie.calme@usherbrooke.ca

CALVO DOMINGO, JOSÉ JOAQUÍN (Costa Rica)
Sistema Nacional de Áreas de Conservación, Ministerio del Ambiente y Energía (MINAE)
E-mail: joaquin.calvo@sinac.go.cr

CAMACHO, JAIME (Ecuador)
Fundación Ecuatoriana de Estudios Ecológicos - EcoCiencia
E-mail: tulias@hotmail.com

CARTES, JOSÉ LUIS (Paraguay)
Asociación Guyra Paraguay
E-mail: jlcartes@guyra,org,py; jlcartes@gmail.com

CASTELLANOS PEÑAFIEL, ARMANDO XAVIER (Ecuador)
Fundación Espíritu del Bosque
E-mail: iznachi@yahoo.com.mx

CHALUKIAN, SILVIA C. (Argentina)
Proyecto de Investigación y Conservación del Tapir Noroeste Argentina
E-mail: schalukian@yahoo.com.ar

COLBERT, MATTHEW (United States)
University of Texas at Austin
E-mail: colbert@mail.utexas.edu

CORDEIRO, JOSÉ LUIS (Brazil)
Fundação Oswaldo Cruz, Rio de Janeiro
E-mail: zeluis@fiocruz.br

CRUZ ALDÁN, EPIGMENIO (Mexico)
Instituto de Historia Natural y Ecología
E-mail: ecruz5910@prodigy.net.mx; pimecruz5910@hotmail.com

CUARÓN, ALFREDO D. (Mexico)
SACBÉ - Servicios Ambientales, Conservación Biológica y Educación
E-mail: cuaron@gmail.com

de THOISY, BENOIT (French Guiana)
Kwata Association
E-mail: thoisy@nplus.gf; bdethoisy@pasteur-cayenne.fr

DEE, MICHAEL (United States)
AZA Tapir TAG
E-mail: mjdrhino@yahoo.com

DELLA TOGNA, GINA (Panama)
University of Maryland
E-mail: gdellat@hotmail.com; gdellat@umd.edu

DESMOULINS, AUDE (France)
ZooParc de Beauval / EAZA Tapir TAG
E-mail: aude.desmoulins@zoobeauval.com

DINATA, YOAN (Indonesia)
Fauna & Flora International - Indonesia Program
E-mail: yoan7dinata@gmail.com

DOWNER, CRAIG C. (United States)
Andean Tapir Fund
E-mail: ccdowner@yahoo.com

ESTRADA ANDINO, NEREYDA (Honduras)
E-mail: nerestr@yahoo.com; nereyda.estrada@gmail.com

FINNEGAN, MITCH (United States)
Oregon Zoo
E-mail: mitch.finnegan@oregonzoo.org

FLESHER, KEVIN (Brazil)
Michelin Brasil
E-mail: kevinmflesher@yahoo.com.br

FLOCKEN, JEFFREY (United States)
International Fund for Animal Welfare
E-mail: JFlocken@ifaw.org

FLÓREZ, FRANZ (Colombia)
Fundación Nativa
E-mail: tapirlanudo@hotmail.com; fkaston@nativa.org

FRAGOSO, JOSÉ MANUEL VIEIRA (United States)
Stanford University
E-mail: fragoso@stanford.edu

GARCÍA VETTORAZZI, MANOLO JOSÉ (Guatemala)
Universidad de San Carlos de Guatemala
E-mail: manelgato@gmail.com

GARRELLE, DELLA (United States)
Cheyenne Mountain Zoo
E-mail: dgarelle@cmzoo.org

GATTI, ANDRESSA (Brazil)
Universidade Federal do Espírito Santo (UFES)
E-mail: gatti.andressa@gmail.com

GLATSTON, ANGELA (The Netherlands)
Rotterdam Zoo
E-mail: a.glatston@rotterdamzoo.nl

GOFF, DON (United States)
Beardsley Zoological Gardens /
AZA Tapir TAG
E-mail: dgoff@beardsleyzoo.org

GONÇALVES DA SILVA, ANDERS (Australia)
CSIRO
E-mail: andersgs@gmail.com

GREENE, LEWIS (United States)
Columbus Zoo
E-mail: Lewis.Greene@columbuszoo.org

GUIRIS ANDRADE, DARIO MARCELINO (Mexico)
UN.A.CH., Policlinica y Diagnóstico Veterinario
E-mail: dmguiris@hotmail.com

HANDRUS, ELLIOT (United States)
E-mail: ebh12345@hotmail.com

HERNANDEZ DIVERS, SONIA (United States)
University of Georgia
E-mail: shernandez@warnell.uga.edu

HOLDEN, JEREMY (Indonesia)
Flora and Fauna International - Indonesia
E-mail: jeremy_holden1@yahoo.co.uk

HOLST, BENGT (Denmark)
Copenhagen Zoo / EAZA Tapir TAG /
CBSG Europe
E-mail: beh@zoo.dk

JANSSEN, DONALD L. (United States)
San Diego Wild Animal Park
E-mail: djanssen@sandiegozoo.org

JULIÁ, JUAN PABLO (Argentina)
Reserva Experimental Horco Molle /
Universidad National de Tucumán
E-mail: jupaju@yahoo.es

LEONARDO, RAQUEL (Guatemala)
Fundación Defensores de la Naturaleza
E-mail: raque.leonardo@gmail.com

LIRA TORRES, IVÁN (Mexico)
Dirección General de Zoológicos y Vida Silvestre de la Ciudad de México (DGZVSDF)
E-mail: ilira_12@hotmail.com

LIZCANO, DIEGO J. (Colombia)
Universidad de Pamplona
E-mail: dj.lizcano@gmail.com; dlizcano@unipamplona.edu.co

LUÍS, CRISTINA (Portugal)
Universidade de Lisboa
E-mail: cmluis@fc.ul.pt; cmluis@museus.ul.pt

LYNAM, ANTONY (Thailand)
Wildlife Conservation Society - Asia Program
E-mail: tlynam@wcs.org

MANGINI, PAULO ROGERIO (Brazil)
IPÊ - Instituto de Pesquisas Ecológicas (Institute for Ecological Research)
E-mail: pmangini@uol.com.br; pmangini@ipe.org.br

MARINEROS, LEONEL (Honduras)
IRBIO Zamorano
E-mail: lmarineros@gmail.com

MARTYR, DEBORAH (Indonesia)
Flora and Fauna International - Indonesia
E-mail: ffitigers@telkom.net

MATOLA, SHARON (Belize)
Belize Zoo and Tropical Education Center
E-mail: matola@belizezoo.org

MAY JR, JOARES A. (Brazil)
University of São Paulo (USP)
E-mail: joaresmay@ig.com.br

MEDICI, PATRÍCIA (Brazil)
IPÊ - Instituto de Pesquisas Ecológicas (Institute for Ecological Research)
E-mail: epmedici@uol.com.br

MENDOZA, ALBERTO (United States)
AZA Tapir TAG
E-mail: alumen@aol.com

MONTENEGRO, OLGA LUCIA (Colombia)
Universidad Nacional de Colombia (UNAL)
E-mail: olmontenegrod@unal.edu.co

MORALES, MIGUEL A. (Paraguay / United States)
Conservation International (CI)
E-mail: mamorales@conservation.org

MUENCH, CARLOS (Mexico)
CIEco-Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México
E-mail: muench@oikos.unam.mx; carloserik@yahoo.com

NARANJO PIÑERA, EDUARDO J. (Mexico)
El Colegio de la Frontera Sur (ECOSUR)
E-mail: enaranjo@ecosur.mx

NOGALES, FERNANDO (Ecuador)
Instituto Ecuatoriano de Propiedad Intelectual (IEPI)
E-mail: fbnogales@utpl.edu.ec; fernogales@yahoo.com

NOVARINO, WILSON (Indonesia)
Universitas Andalas
E-mail: wilson_n_id@yahoo.com

NUGROHO, AGUNG (Indonesia)
Bogor Agricultural Institute (IPB)
E-mail: Pithecellobium98@yahoo.com

O'FARRILL, GEORGINA XoXo (Mexico)
ECOSUR-Chetumal, Mexico
E-mail: elsa.ofarrill@mail.mcgill.ca; georgina.ofarrill@mail.mcgill.ca

OLOCCO, MARIA JULIETA (Argentina)
Universidad de Buenos Aires
E-mail: mjoloccodiz@yahoo.com.ar

ORDÓÑEZ DELGADO, LEONARDO (Ecuador)
Fundación Ecológica Arcoiris
E-mail: tsg.ecuador@gmail.com; leonardo@arcoiris.org.ec

PAVIOLO, AGUSTÍN (Argentina)
Centro de Investigaciones del Bosque Atlántico-CONICET
E-mail: paviolo4@arnet.com.ar

PEDRAZA PEÑALOSA, CARLOS ALBERTO (Colombia)
Instituto de Investigación de Recursos Biológicos "Alexander von Humboldt"
E-mail: cpedraz@gmail.com

PERERA, LUCY (Venezuela)
Wildlife Conservation Society (WCS) – Venezuela
E-mail: lperera@wcs.org; lucy.perera@gmail.com

POÓT, CELSO (Belize)
Belize Zoo and Tropical Education Center
E-mail: celso@belizezoo.org

PRASTITI, SHARMY (Indonesia)
Taman Safari Indonesia / International Studbook Keeper, Malayan Tapirs
E-mail: tamansafari@indo.net.id; amicurator@tamansafari.com

PUKAZHENTHI, BUDHAN (United States)
Smithsonian National Zoological Park
E-mail: pukazhenthib@si.edu

QUSE, VIVIANA BEATRIZ (Argentina)
E-mail: vivianaquse@gmail.com

RESTREPO, HECTOR FRANCISCO (Colombia)
Fundación Wii
E-mail: restrepof@gmail.com

RICHARD-HANSEN, CECILE (French Guiana)
Office National de la Chasse et de la Faune Sauvage -ONCFS / Direction Etudes et Recherches
E-mail: Cecile.Richard-Hansen@ecofog.gf

RODRÍGUEZ ORTIZ, JULIANA (Colombia)
Instituto de Ciencias Naturales, Universidad Nacional de Colombia (UNAL)
E-mail: mjuli2@gmail.com; jrodriguezo@unal.edu.co

ROMAN, JOSEPH (United States)
Virginia Zoological Park / AZA Tapir TAG
E-mail: Joseph.Roman@norfolk.gov

RUBIANO, ASTRITH (United States)
Norbeck Animal Clinic
E-mail: astrithrubiano@yahoo.com

RUIZ FUAMAGALLI, JOSÉ ROBERTO (Guatemala)
Universidad de San Carlos de Guatemala
E-mail: rruizf@yahoo.com

RUSSO, KELLY J. (United States)
Houston Zoo Inc
E-mail: krusso@houstonzoo.org

SANCHES, ALEXANDRA (Brazil)
UNESP Rio Claro
E-mail: lelesanches@gmail.com

SANCHEZ, CARLOS (United States)
Chicago Zoological Society
E-mail: carlos.sanchez@czs.org

SANDOVAL ARENAS, SERGIO (Colombia)
Tapir Preservation Fund (TPF)
E-mail: tpflatin@gmail.com

SANDOVAL CAÑAS, LUIS FERNANDO (Ecuador)
E-mail: luissandoval79@gmail.com

SARMIENTO DUEÑAS, ADRIANA MERCEDES (Colombia)
Universidad Nacional de Colombia (UNAL)
E-mail: adrianasarmi@hotmail.com

SCHWARTZ, KARIN (United States)
Chicago Zoological Society - Brookfield Zoo
E-mail: karin.schwartz@czs.org

SCHWARTZ, RICHARD (United States)
Nashville Zoo at Grassmere
E-mail: rschwartz@nashvillezoo.org

SEITZ, STEFAN (Germany)
4TAPIRS
E-mail: tapirseitz@web.de; info@4tapirs.de

SHEWMAN, HELEN (United States)
Woodland Park Zoo
E-mail: helen.shewman@zoo.org

SHOEMAKER, ALAN H. (United States)
AZA Tapir TAG
E-mail: sshoe@mindspring.com

SHWE, NAY MYO (Myanmar)
Nature and Wildlife Conservation Division, Forest Department
E-mail: nmshwe@googlemail.com

SIMPSON, BOYD (Malaysia)
Malayan Tapir Project, Krau Wildlife Reserve, Copenhagen Zoo
E-mail: boydsimpson@gmail.com

SMITH, DIORENE (Republic of Panama)
Parque Municipal Summit
E-mail: dsmithc@gmail.com

STAHL, TIM (United States)
Stahl Photographics
E-mail: tim11@cox.net

STANCER, MICHELE (United States)
San Diego Zoological Society / AZA Tapir TAG
E-mail: mstancer@sandiegozoo.org

SUÁREZ MEJÍA, JAIME ANDRÉS (Colombia)
Programa KFW Belen de Umbria
E-mail: suarmatta@yahoo.com; jsuarezmejia@gmail.com

TAPIA, ANDRÉS (Ecuador)
Centro Tecnológico de Recursos Amazónicos de la Organización de Pueblos Indígenas de Pastaza
E-mail: sachacristo@gmail.com; centrofatima@andinanet.net

TOBLER, MATHIAS (French Guiana)
E-mail: matobler@gmx.net

TODD, SHERYL (United States)
Tapir Preservation Fund (TPF)
E-mail: tapir@tapirback.com; oregontapir@yahoo.com

TORRES, NATALIA (Ecuador)
Departamento de Educación, Zoológico de Quito
E-mail: ntorres@quitozoo.org; naty175@yahoo.com

TRAEHOLT, CARL (Malaysia)
Malayan Tapir Project, Krau Wildlife Reserve, Copenhagen Zoo
E-mail: ctraeholt@pd.jaring.my

UNDERDOWN, POLLY (United Kingdom)
E-mail: pollyunderdown@yahoo.co.uk; pollyunderdown@gmail.com

VARELA, DIEGO (Argentina)
Conservación Argentina
E-mail: dvarela@conservacion.org.ar

WALLACE, ROBERT B. (Bolivia)
Wildlife Conservation Society (WCS) - Madidi
E-mail: rwallace@wcs.org

WILLIAMS, KEITH (Australia)
E-mail: kdwilliams56@yahoo.co.uk

WOHLERS, HUMBERTO (Belize)
Belize Zoo
E-mail: animalmgt@belizezoo.org; humbertowohlers@yahoo.com

ZAINUDDIN, ZAINAL ZAHARI (Malaysia)
Malaysian Department of Wildlife and National Parks (DWNP)
E-mail: zainal@wildlife.gov.my

ZAVADA, JEANNE (United States)
East Tennessee State University Natural History Museum
E-mail: zavada@etsu.edu

ZAVADA, MICHAEL (United States)
Department of Biological Sciences, East Tennessee State University
E-mail: zavadam@etsu.edu

TAPIR SPECIALIST GROUP STRUCTURE

Chair
Patrícia Medici, Brazil

Steering Committee
Alan Shoemaker, United States
Alberto Mendoza, Mexico/United States
Anders Gonçalves da Silva, Canada
Bengt Holst, Denmark
Carl Traeholt, Denmark/Malaysia
Gilia Angell, United States
Jeffrey Flocken, United States
Kelly Russo, United States
Mathias Tobler, Switzerland/Peru
Michael Dee, United States
Michele Stancer, United States
Rick Schwartz, United States
Viviana Quse, Argentina

Baird's Tapir Coordinator
Manolo García, Guatemala

Lowland Tapir Coordinator
Viviana Beatriz Quse, Argentina

Malayan Tapir Coordinator
Carl Traeholt, Denmark/Malaysia

Mountain Tapir Coordinator
Diego J. Lizcano, Colombia

Red List Focal Point
Alan H. Shoemaker, United States

Tapir Conservation Newsletter Editors
Contributions Editors:
Carl Traeholt, Malaysia
Anders Gonçalves da Silva, Brazil/Australia
Layout & Distribution Editors:
Stefan Seitz, Germany
Kelly J. Russo, United States

Virtual Library Manager
Mathias Tobler, United States/Peru

Fundraising Committee Coordinator
Patrícia Medici, Brazil

Action Planning Committee Coordinator (National Action Plans)
Patrícia Medici, Brazil
TSG Species & Country Coordinators

Action Plan Implementation Taskforce
Patrícia Medici, Brazil

Zoo Committee Coordinator
Viviana Beatriz Quse, Argentina

Veterinary Committee Coordinator
Viviana Beatriz Quse, Argentina

Genetics Committee Coordinators
Anders Gonçalves da Silva, Australia
Cristina Luis, Portugal

Marketing & Education Committee Coordinators
Kelly J. Russo, United States

Webmasters
Kara Masharani, United States
Gilia Angell, United States

Re-Introduction & Translocation Advisory Committee Coordinators
Patrícia Medici, Brazil
Anders Gonçalves da Silva, Canada

Ethics Committee

Evolution Consultant
Matthew Colbert, United States

TAPIR SPECIALIST GROUP

Tapir Conservation

The Newsletter of the IUCN/SSC Tapir Specialist Group

Volume 19/2 ■ No. 27 ■ **December 2010**

Contents

1513 North MacGregor
Houston, Texas 77030
www.houstonzoo.org

Address Service Requested