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Tapir Conservation

The Newsletter of the IUCN/SSC Tapir Specialist Group

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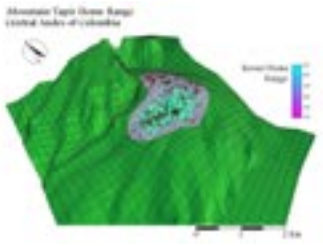
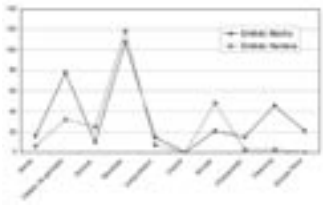
Edited by Siân S. Waters and Stefan Seitz





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HOUSTON ZOO
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The Proyecto Danta poster on the cover is printed with kind permission from Denis Alexander Torres, President, Fundación AndigenA, Venezuela; the picture shows a lowland tapir at Chorros de Milla Zoo, photographed by John Márquez.

Tapir Conservation

Abbreviation **Tapir Cons.**

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Website **www.tapirspecialistgroup.org**

From the Chair

Letter from the Chair
Patrícia Medici

As always, I would like to start this letter by saying that lots has happened over the past six months! It is amazing how much is going on with our Tapir Specialist Group!

First of all, I would like to mention that our group is growing fast in terms of the number of members and also improving in terms of tapir range country representation. We now have 96 members from or working in 25 different countries (Argentina, Australia, Belize, Bolivia, Brazil, Colombia, Costa Rica, Denmark, Ecuador, Germany, Guatemala, Guyana, Honduras, Indonesia, Malaysia, Mexico, Panama, Peru, Portugal, Taiwan, Thailand, The Netherlands, United Kingdom, United States, and Venezuela), and we continue to receive lots of e-mail messages every day from people willing to join our efforts and contribute to tapir conservation.

I would also like to inform you that the TSG Plans for Action 2004-2005, our ambitious list of 27 priority goals and 55 actions to be put into practice by the Third International Tapir Symposium in January 2006, is well on the way to being achieved. So far, approximately 45% of the actions have been taken care of! Our TSG officers, as well as the coordinators and members of all TSG committees, are working really hard to put those actions into practise and reach those goals. Regarding our top priority of developing National Action Plans for Tapir Conservation and Management in all range countries in Central and South America and Southeast Asia, we are happy to announce that an impressive number of countries have already started the process of putting together their Regional Action Planning Committees and are actively working on the first steps of action plan production. We have been able to identify and appoint TSG Country Coordinators for most tapir range countries but, unfortunately, we are still lacking coordinators for French Guiana, Guyana, Malaysia, Nicaragua, Paraguay and Suriname. Therefore, if you have any contacts in these countries or if you know of any professionals or organisations who would be willing to help us with the development of these action plans, we would appreciate it if you could please let us know as soon as you can.

Speaking of the Third International Tapir Symposium, we have changed our plans regarding the venue. As we announced in the previous issue of this newsletter, the original idea was to hold the conference in Chiapas, Mexico. However, after some preliminary surveys of airfare and general costs, we realized that Mexico would be a bit too expensive and decided to think of some other alternatives. Consequently, I would like to announce that the next symposium will be held in Buenos Aires, Argentina, and I am personally very happy with the decision given that this will be the first time the conference will be held in a lowland tapir range country. The date remains the same, January 2006. A small committee of TSG members will travel to Argentina in February 2005 in order to visit the hotel facilities in Buenos Aires, investigate possibilities of local support, and kick off the process of the organisation of our third conference. We will certainly keep you all posted about any developments regarding the next symposium.

Still on the topic of TSG meetings and events, I would like to mention that 66 mountain tapir conservationists and experts from Colombia, Ecuador and Peru, as well as many TSG officers and representatives from other countries, got together in Colombia a few weeks ago. The TSG, in partnership with the Colombian Tapir Network (Red Danta de Colombia) and the IUCN/SSC Conservation Breeding Specialist Group (CBSG), held the Mountain Tapir Conservation Workshop: Population and Habitat Viability Assessment (PHVA) at the Otún-Quimbaya Sanctuary of Fauna and Flora, Pereira, Colombia, from October 12 to 15, 2004.

Logo of the Colombian Tapir Network (Red Danta de Colombia).

As you can see, our TSG Action Planning Committee keeps working hard towards achieving the goal of revising and updating the first version of the IUCN/SSC *Tapir Status Survey and Conservation Action Plan* (Brooks *et al.* 1997). Once the final report of this second PHVA is published and distributed, we will have achieved 50% of our goal of producing a second version of the Tapir Action Plan!!! Institutional supporters of the Mountain Tapir PHVA were the IUCN/SSC CBSG, Colombian Tapir Network (Red Danta de Colombia), American Zoo and Aquarium Association (AZA) Tapir Taxon Advisory Group (TAG), European Association of Zoos and Aquaria (EAZA) Tapir Taxon Advisory Group

Mountain Tapir (*Tapirus pinchaque*). Photo by: William Konstant.

TSG Members from Colombia: The major players in the organisation of the Mountain Tapir PHVA. Photo by: Diego J. Lizcano.

(TAG), Houston Zoo Inc., World Wildlife Fund (CEAN-WWF) Colombia, and Conservation International (CI) Colombia. Financial supporters of the workshop were the AZA Tapir TAG, WWF-CEAN Colombia, Conservation International Colombia, Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales de Colombia (UAESPNN), U.S. Fish and Wildlife Service – Division of International Conservation, Houston Zoo Inc., Copenhagen Zoo, Los Angeles Zoo, and Cheyenne Mountain Zoo. We are extremely grateful for all these contributions.

As soon as we all came back from Colombia we got started on the organisation of the third workshop, the Baird's Tapir PHVA, which will be held at The Belize Zoo and Tropical Education Center (TEC), Belize, Central America, in August 2005. Approximately 70 participants including field and captivity researchers and conservationists, representatives from governmental agencies, non-governmental organizations, local and international conservation organizations, universities, research institutes, members of local communities, zoological institutions etc. from the eight Baird's tapir range countries (Belize, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, and Panama) are expected to attend this third PHVA. The members of the TSG Action Planning Committee are still discussing the best venue and dates for the Lowland Tapir PHVA.

As regards our TSG Fundraising Committee, I am very happy and proud to announce that we have just concluded our TSG Conservation Fund (TSGCF) 2004 Funding Cycle! As reported in the previous issue of this newsletter, the silent and live auctions held during the Tapir Symposium in Panama earlier this year raised approximately US$4,500 for the TSGCF, and a large part of these funds were distributed to three tapir research projects – Tony Lynam and Leonardo Salas in Myanmar (Malay tapir), Nereyda Estrada Andino in Honduras (Baird's tapir), and Olga Lucía Montenegro in Colombia (lowland tapir) – in the form of small grants. For further information about this last funding cycle and the selected projects and researchers see the article "TSG Conservation Fund 2004" in this issue. Once again, I would like to mention that we are all extremely happy about the fact that we are finally moving in the direction of being able to support some projects financially. This is, in my opinion, one of the major accomplishments of the TSG!!!

Still on the subject of funding, our TSG Fundraising and Marketing Committees, in partnership with the Houston Zoo Inc., have recently launched our 2004 fundraising campaign for private donors. Gilia Angell, the coordinator of our Marketing Committee has designed and printed 2,000 copies of a TSG brochure, and I must tell you Gilia has done an excellent job! The brochure looks amazing and includes lots of information about tapirs and the TSG, as well as tapir photos and Stephen Nash's incredible tapir drawings. Most importantly, the brochure includes details about how to make donations to the TSGCF! With financial support from the Woodland Park Zoological Gardens in Seattle, United States, copies of the brochure were mailed to approximately 600 people and organisations on our "tapir mailing list" and we are expecting this campaign to be a major success! I would like to thank Gilia for all her hard work helping us to put together the brochures, developing our marketing strategies, managing our Website, and so many other things! Additionally, I would like to thank the Woodland Park Zoo staff, espe-

cially Harmony Frazier, Darin Collins, Helen Shewman, and Andrea Sanford, as well as the zoo's tapir keepers and many other friends and volunteers, for all their help organising this fundraising campaign!!!

Finally, I would like to mention that I have just returned from the Annual Conference of the American Zoo and Aquarium Association (AZA), which was held in New Orleans, Louisiana, United States. This was a very productive event and during the conference, members of the AZA Tapir TAG and myself made sure to promote the Tapir Specialist Group and work on funding possibilities for the TSG Conservation Fund, as well as for the upcoming tapir meetings, such as the Baird's Tapir PHVA in Belize and the Third International Tapir Symposium in Argentina.

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TSG Chair Patrícia Medici wins IUCN's Messel Leadership Award

Patrícia Medici

At this year's IUCN World Conservation Congress in Bangkok, Thailand, TSG chair Patrícia Medici received the newly created Harry Messel Conservation Leadership Award. This award seeks to honor "individuals from within the SSC network who have made a significant contribution to conservation on the ground. The contribution must have been made in the context of their participation in an SSC Specialist Group or Task Force, and should reflect a specific event rather than a career contribution." Please join us in congratulating Pati. She is an inspiring and dedicated leader of the TSG and it's wonderful that her work on behalf of tapir conservation has been recognized. Pati received this award at the end of a series of SSC meetings, and it came as a complete surprise. She was asked to say a few words, but found herself rendered speechless! Needless to say, we are very proud of her and she graciously includes all TSG members in her appreciation of receiving the award: "It was an honor to accept this award on behalf of all TSG members and supporters. After all ... we all know I don't do anything by myself and it's our team work that was recognized."

TSG Committee Reports

TSG Conservation Fund 2004

By Patrícia Medici

The Tapir Specialist Group Conservation Fund (TSGCF) was established in January 2003 as a vehicle to raise and contribute funds towards tapir conservation initiatives. The organisations involved in the management of the TSGCF are the IUCN/SSC Tapir Specialist Group (TSG), Houston Zoo Inc., American Zoo and Aquarium Association (AZA) Tapir Taxon Advisory Group (TAG), and European Association of Zoos and Aquaria (EAZA) Tapir Taxon Advisory Group (TAG), who are, today, the key groups working on coordinating and implementing tapir research, conservation and management programmes. The money in this Fund consists of personal donations from tapir researchers, supporters and enthusiasts worldwide, as well as contributions from conservation organisations and tapir holding institutions and zoos.

A TSGCF committee reviews each application submitted and decides to fund projects based on the merits of each proposal, its significance for tapir conservation and several other criteria. Grants are given to projects targeted at research with wild and/or captive tapirs; projects targeted at restoration, protection and conservation of tapir habitat in South and Central America and Southeast Asia; education and capacity-building programmes for local communities within the tapirs' range in South and Central America, and Southeast Asia; and implementation of the recommendations of the IUCN/SSC *Tapir Status Survey and Conserva-*

The Successful Applicants of TSGCF 2004

PROPOSAL

A Preliminary Study of Habitat Selection, Abundance, and Threats to Malay Tapirs (*Tapirus indicus*) in the Tenasserim Hills, Southern Myanmar.

APPLICANTS

Antony Lynam & Leonardo Salas

Tony Lynam, Associate Conservation Ecologist with Wildlife Conservation Society Thailand. Photo by: Charles Foerster.

Leonardo Salas, Animal Population Biologist with Conservation International Papua New Guinea. Photo by: Charles Foerster.

ABSTRACT

The Malay tapir is the single large forest ungulate species in Southeast Asia of a little-known family of mammals (Tapiridae) most closely related to rhinoceroses and horses (Order Perissodactyla). Because of the extensive decline of tapir populations, increased incidental or accidental extraction of animals, and rapid loss and fragmentation of forests in Southeast Asia, the IUCN Tapir Specialists Group (TSG) initially assigned the Malay tapir as Vulnerable (IUCN 1996). A recent revision (IUCN 2003) listed it as Endangered. This status was revised and confirmed in a recent Population and Habitat Viability Analysis (PHVA) workshop, and priority conservation actions were established. The present proposal stems directly from this workshop as a means to address some of the most pressing conservation needs for this species. One of the four range countries for Malay tapirs is Myanmar, and inside the country, the species appears to be restricted to the rainforests of the Tenasserim Hills. While hunting appears not to be a problem for tapirs, habitat clearance certainly is. Some of the largest tracts of remaining lowland rainforest in mainland Asia lie in these southern Myanmar forests. This project intends to determine the status of Malay tapirs in a region of the Tenasserim Hills in southern Myanmar, their habitat needs, critical habitats, hunting threats and extraction levels.

PROPOSAL

Abundance, Distribution and Conservation of Baird's Tapir (*Tapirus bairdii*) in the Natural Area of Rus-Rus, La Moskitia, Honduras.

APPLICANT

Nereyda Estrada Andino

Nereyda Estrada Andino, M.Sc. Graduate Student, Posgrado en Biología, Universidad de Costa Rica. Photo by: William Konstant.

ABSTRACT

This research project will assess the abundance, distribution and habitat use of the Baird's tapir population in the proposed protected area of Rus-Rus, southeast Honduras. This natural area is located near the border with Nicaragua in the area known as La Moskitia and is part of the largest area of continuous pristine forest in Central America. The *Tapirs Status Survey and Conservation Action Plan* (IUCN/SSC 1997) mentions that it is highly important to do baseline status surveys of tapir population in Honduras and Nicaragua. Transects will be located in all the habitats represented in the area, the presence and the number of tracks per transect will be used to assess abundance and distribution. Householders and hunters from the

The Successful Applicants of TSGCF 2004

Rus-Rus village will be interviewed to assess the importance of tapir meat for this indigenous community and the possible human impact on the tapir population. All sampling areas will be recorded with a GPS and maps will be generated using ARC/VIEW 3.2. Dietary information will be obtained from faecal samples. All data will be presented to the Honduran office in charge of protected areas and to the community of Rus-Rus in the hope that it may be helpful in the management and protection of this natural area.

Olga Lucía Montenegro, Ph.D. Candidate, University of Florida.
Photo by: William Konstant.

PROPOSAL

Lowland Tapir Distribution Update in the Colombian Orinoquia Region.

APPLICANTS

Olga Lucía Montenegro, Juliana Rodríguez and Hugo López

ABSTRACT

One of the goals of the National Programme for Tapir Recovery and Conservation in Colombia is to update the current distribution of lowland tapir in the Colombian Amazonia and Orinoquia regions in order to assess current threats to the population. An initial enquiry revealed quite a large area for the potential existence of lowland tapir, based on past and current distribution records and spatial distribution of tapir habitat. In the Orinoquia region, however, very few current records were found and in some departments only past records exist. It is unclear, however, whether absence of tapir records in the area reflects a lack of research, absence of suitable habitat, or is, in fact, the result of local extinctions in this region. The proposed study aims to confirm the current presence/absence of lowland tapir populations in four departments of the Colombian Orinoquia. Field visits will be conducted to those departments and surveys of local inhabitants, researchers in the area and institutional representatives will be conducted. Current distribution records will be placed on maps at scales of 1:500.000 and 1:100.000. Information on the presence of remnant tapir populations in the Orinoquia region will be provided to the regional environmental institutions in order to be used in their regional conservation planning.

tion Action Plan. The proposals must be cooperative in nature and have matching funds. The fund does not support salary, tuition fees, scholarships, conferences, courses and meetings, or operational/overhead costs for institutions or established projects and/or programmes. The proposal must be scientifically significant and sound, logistically feasible, must have a high probability of success and clearly contribute to the conservation of tapirs and their remaining habitats.

During the 2004 Funding Cycle, the TSG Conservation Fund received eleven proposals and three of those were selected to receive US$1,000 grants. On the following page, you can see the titles and coordinators of each project, as well as brief abstracts from each one. I would like to congratulate Tony and Leo, Nereyda and Olga, Juliana and Hugo for the excellent job they have been doing in Myanmar, Honduras and Colombia respectively!!!

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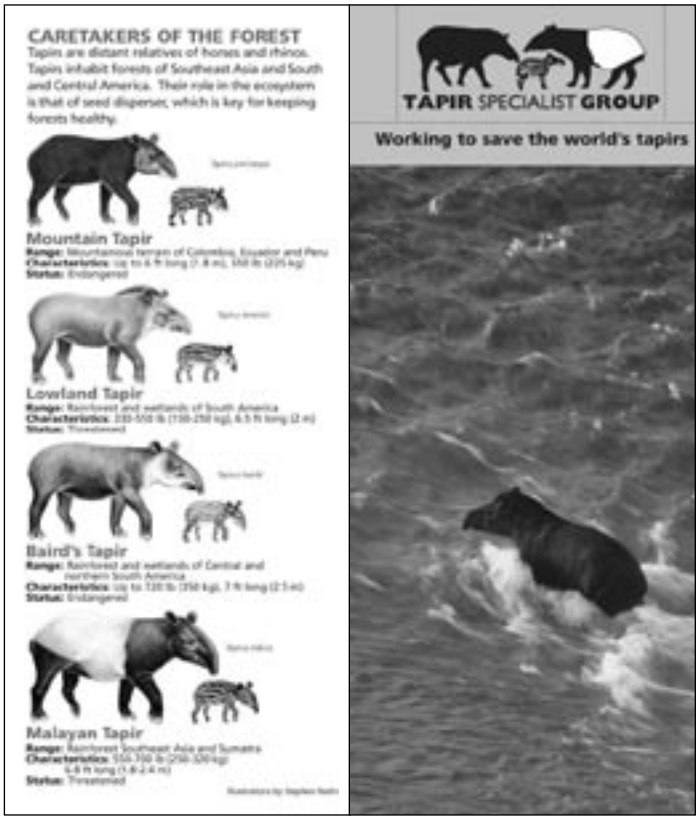
If you would like to make a contribution to the Tapir Specialist Group Conservation Fund (TSGCF), please make checks payable to the IUCN/SSC Tapir Specialist Group (TSG) and mail them to the Houston Zoo Inc., General Manager, Rick Barongi, 1513 North Mac Gregor, Houston, Texas 77030, USA. We appreciate any support and thank you in advance.

Website and Marketing Committee Report

By Gilia Angell

The TSG Website, http://tapirspecialistgroup.org continues to grow. Keep sending your news, updates on zoo births, your captures in the field, and questions for our committee chairs. The site is taking terrific shape, and reflecting the great content that members have been sending to me to post, including many beautiful photos of wild and captive animals and members in the field.

Over the nine months the site has existed, use of the site has grown steeply upwards as more and more people discover and use it. For instance, in March of 2004, daily site hits averaged 174, with an average of two pages viewed per visit. In September, daily site hits averaged 349 with an average of four pages viewed per visitor. Our site hit numbers grow by about 1000 each month. September's total hits were around 10,000. People who aren't familiar with our url appear to find us mostly through Google and Yahoo search crawlers, and enter in keywords that include species names, "tapir baby news", and the names of our researchers. Our largest number of hits come from US commercial and network servers (total of 38%), and US educational servers (5.5%), followed closely by Denmark accounting for 5% of the traffic to our site, with smaller percentages including Mexico, Italy, Colombia, UK and others. Keep in mind that 29% of our traffic comes from "Unresolved/Unknown" server sources.



Everyone is welcome to view the site stats themselves at http://tapirspecialistgroup.org/stats/

Also in July and August, the marketing committee produced our first full colour tri-fold brochure in English (see extracts on this page). TSG Chairs Patrícia Medici and William Konstant, as well as Education & Outreach Co-chair, Kelly Russo, distributed these brochures to fellow zoo professionals at the American Zoo & Aquarium Conference in New Orleans. In the weeks following the brochure publication Patrícia Medici distributed copies at the Mountain tapir PHVA in Colombia and at the IUCN Conference in Bangkok. Gilia Angell distributed copies at the Wildlife Conservation Expo in Palo Alto, California. In addition to the presence at conferences, TSG made an appearance in the mail boxes of over 500 tapir supporters around the world. Woodland Park Zoo graciously underwrote and supported the mailing costs and labor to send our brochure to our existing mailing list of donors and other interested tapir advocates, zoo professionals and researchers. According to the Houston Zoo, which manages our conservation fund, we're

receiving strong response to the fundraising solicitation contained in these brochures.

The brochure features beautiful photos by TSG members and a cover photo donated by wildlife photographer Kevin Schafer; and most exciting, drawings of each of the four species of tapir drawn by Conservation International artist Stephen Nash, who provided them free of charge. We have definitely experienced "ask and ye shall receive" this year.

Please let Marketing Committee Chair Gilia Angell know if you'd like a handful of brochures to distribute to your community. Copies are limited, and only in English, so first come first served. Our goal is to use these colour brochures as educational and fundraising materials for those already familiar with tapirs, namely our colleagues, conservation NGOs, zoos, and citizens already engaged in conservation advocacy. PDF copies of the brochure may also be found at our website under the Downloads section.

One more note: TSG logos, logo usage information and logo files are all now available in the Downloads section of the site. Please use these files for your speeches, web links, and other references, as they are the most up to date. Thanks!

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Project Updates

Cooperative Efforts for Lowland Tapir Conservation in Venezuela

By Denis Alexander Torres

The lowland tapir *(Tapirus terrestris)* is one of the least known and most threatened mammal species in Venezuela. Tapirs are key species in the ecological dynamics of tropical forests as well as being a cultural icon in Venezuela. Its current population status is uncertain in the country, which can be argued to be due to a lack of information and field research. Nevertheless, the species was classified as *Vulnerable* in the "Red Data Book" of Venezuelan Fauna (Rodríguez & Rojas-Suárez 1999). Its range has been severely fragmented by habitat conversion. These habitats, must be shared with humans and are, in fact, some of the most intensively-used and threatened landscapes on the continent.

The fact that important areas of tapir habitat still remain in the southern portion of Venezuela, gives us reason to assume that there are viable populations in this region. The opposite scenario is found to the north of the Orinoco River, where the species has vanished from many areas, and just a few populations remain in the region and are in decline due to poaching and habitat destruction.

Although lowland tapirs are threatened with extinction, very few conservation initiatives have been implemented in their countries of origin. Consequently, AndígenA, a Venezuelan non-profit foundation whose mission is the conservation of Neotropical Biodiversity, has undertaken the only initiative focusing on tapir conservation in Venezuela. The project began in 1999 and during its preliminary stages "Proyecto Danta", was focused on two main lines of action: 1) environmental education and 2) captive breeding (Torres 2000).

In 1999, we promoted a pilot captive breeding programme accompanied by a series of environmental education activities at Chorros de Milla Zoo located in Mérida city, Venezuela. At that time the zoo had only one lowland tapir male named "Pijiguao" in its animal collection. In order to achieve one of our actions, we were in touch with the authorities of Barinda Zoo & Botanical Gardens, located in Lara State, for the purpose of obtaining a female tapir. In 2000 we obtained a young female tapir called "Simona" from Barinda Zoo. A breeding pair was formed and in May 2002, a calf was born, this was the first tapir calf in the history of Chorros de Milla Zoo (Torres & Rodríguez-Hernández 2004). During this time, we received valuable support from the Tapir Preservation Fund, an American non-governmental organization devoted to tapir conservation.

As part of a preliminary assessment of the captive tapir population status in Venezuela (Naveda-Rodríguez

& Torres 2002), we verified that there were a number of individuals housed in many private collections and zoological parks. However, In spite of this, a coordinated breeding programme for the species did not exist. The main goal of this initiative was to build a database or studbook including information on most if not all the captive individuals in the country. In 2002 the first studbook was completed and distributed among all the Venezuelan zoos thanks to valuable support provided by the Houston Zoo Inc. We hope to continue this pioneering work and compile updates of the studbook for this species (Naveda-Rodríguez & Torres 2002). This will serve as a framework to promote the exchange of individuals between Venezuela's zoos, to develop captive breeding protocols and to promote a series of research projects both *in* and *ex situ*.

In 2003, the second stage of "Proyecto Danta" began by developing and promoting a pragmatic conservation programme for this species at the national level. We intend to develop the programme by focusing on three main topics:

1. Field research to determine the current distribution and status of the wild populations.

2. Environmental education in rural areas and zoos.

3. Awareness-building and training of governmental officials in order to prevent poaching.

Through a proposal entitled "PROYECTO DANTA: *Fostering International Cooperation for Tapir Conservation in Venezuela*" sent to several international organizations we propose as a first step to design and implement a series of environmental education activities to provide the public with information about tapir biology, ecology and conservation. The development of these initiatives will give us a base from which to strengthen the IUCN/SSC Tapir Specialist Group (TSG) at the local level and to develop more complex actions for the future. This approach has recently been used to coordinate and publicise a worldwide internet-based forum called "Tapir Talk" (www.tapirback.com/tapirgal/tapirtalk). During six months in 2002 we have coordinated this initiative thanks to support from Cleveland Zoological Society through a generous donation made by Mrs. Ann Griss. However, our limited capacity has not enabled us to continue this activity and "Tapir Talk" is currently coordinated by Patricia Medici, chair of the IUCN/SSC Tapir Specialist Group.

After a lot of hard work and many setbacks we began work on the design, production and distribution of a high-quality poster and pamphlets. This was due to financial support from the Houston Zoo Inc. The experience gained by our organisation in environmental education issues has allowed us to propose launching a campaign to heighten awareness about lowland tapirs amongst the people throughout the whole Venezuelan territory where the species is found. In order to make a public impact, we are relying on the effectiveness of the poster as an educational tool over time, attractive appearance and relatively low cost of production.

In this way, the lowland tapir poster was designed with the assistance of two professional graphic designers and the central image was taken by the photographer, John Márquez at Chorros de Milla Zoo. During the creative process we decided that this poster must be universal in content, whilst taking into account local variations in common names, public perception of tapirs, principal threats, and their importance for the conservation of the tropical forests and the local culture. The poster is illustrated in the photograph on the cover of this newsletter.

A thousand posters were printed and they will be distributed through national environmental agencies or private companies, who will deliver the posters at no cost to the project.

We have already established links with a number of organisations willing to serve as partners in each of the Venezuelan states where the tapir occurs. This partnership allows us to impart the information to schools, government offices, conservation memberships and, most importantly, the villages closest to tapir habitat. Their contribution will be acknowledged during the media campaigns, which will accompany the release of the poster.

Partner organizations will keep a detailed record of their activities while distributing posters, and will be invited to use them in the context of larger conservation programmes they may currently be developing. Special emphasis will be given to distributing the poster as part of environmental education programmes in rural areas near the rain forest, and in using it to promote tapir conservation amongst environmental law enforcement agencies. As the project progresses it will open the door for future joint activities. We also aim to produce an informative pamphlet directed at the general public with emphasis on the rural inhabitants as a future project.

This year we will be receiving additional support from Houston Zoo Inc. in order to:

1. To reinforce the environmental awareness campaign focused on tapir conservation.

2. To increase public knowledge and awareness about the importance of taking action in favour of tapir conservation. This will be achieved by:
   - Holding a public technical workshop for governmental officials and the scientific and conservation community.
   - Publicising the information gained from the

project.
- The publication of a second edition of the lowland tapir studbook in Venezuela.

3. To help strengthen environmental organisations located in the tapir range areas by:
   - Holding a public technical workshop.
   - Creating a scientific advisory council led by Foundation AndígenA and its partners in Proyecto Danta.

4. To assess the management of the captive tapir population in the Venezuelan zoos:
   - Through a survey supported by a questionnaire and personal visits to the zoos.

5. To assess the status of *T. terrestris* in the western region of Venezuela.

6. To determine the distribution pattern of *T. terrestris* in Venezuela.

7. To compare the distribution pattern of *T. terrestris* with the current distribution of National Parks and determine if extensions of these areas are necessary to protect threatened populations.

This international joint effort among AndígenA, the IUCN/SSC Tapir Specialist Group, Tapir Preservation Fund and American zoos, is a good example of how it is possible to work for the benefit of a threatened species. With a small budget it is possible to have a big social impact. It is a pragmatic way to demonstrate that small actions can make a lot of difference.

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Is the Andean Tapir (*Tapirus pinchaque*) Present in the Mamapacha Massif (Boyacá, Colombia)?

By Javier Adolfo Sarria Perea & Diana S. F. Vargas Munar

Mountain or Andean tapirs (*Tapirus pinchaque*) inhabit the niche of montane rain forest and paramos, at elevations between 2000 to 4500m in the Northern Andes (Downer 1996).

Before 1500 AD, the species probably extended throughout the Eastern and Central cordilleras of the Northern Andes, in the territory of what are now Peru, Ecuador, Colombia and Venezuela.

Recently, this distribution has been severely reduced and the population fragmented because of human activities such as deforestation, agriculture, cattle ranching, establishment of slums and cities, over-hunting and road building, leading the species to be classified as critically endangered (IUCN 1997).

In Colombia the species has been identified in several Andean forest patches of variable size, from the Andean Massif in the department of Nariño to the southern limit of the Los Nevados National Park and from the departments of Quindío and Tolima as the northern limit in the central Cordillera, and the Sumapaz National Park in the department of Cundinamarca as the northern limit in the eastern Cordillera (Lizcano et al 2002). However, its presence has recently been reported in the south of the department of Boyacá, located north of Sumapaz (Corpochivor 1997; Montenegro 2002).

The Mamapacha Massif in the department of Boyacá, is the most representative fragment of montane rain forest and paramo in the region, and has a total area of 27,511.77 hectares distributed among five municipalities (See Figure 1). Although this region has been affected by cattle ranching and agriculture over decades, these activities have been considerably reduced, and large expanses of the forest have been

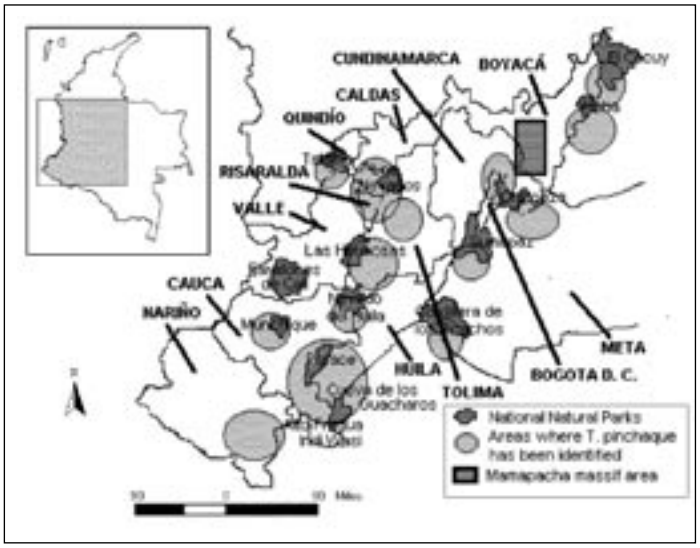

Figure 1. Map of Proposed Study Area.

conserved. The most important preserved area in the region is the Private Reserve, created 20 years ago by Mr Eduardo Fernandez. This reserve holds important populations of endangered Colombian species such as the spectacled bear (*Tremarctos ornatus*), little red brocket deer (*Mazama rufina*), and possibly the Andean tapir.

The aim of this project is to confirm the presence of Andean tapir in the Mamapacha massif, Colombia, from local peoples' knowledge, indirect sampling surveys looking for tracks, faecal samples, hair and rest areas, and the use of trail cameras in order to capture images of the animals in the Private Reserve. If its presence in the area is confirmed, then there is the possibility that it also occurs in other areas of the department.

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News from Captivity

Documenting Changes in the Development and Pelage of a Malay Tapir Calf

By Masayuki Adachi

Chiba Zoological Park in Japan has been successfully breeding Malay tapirs since 1998. The calves' development is carefully monitored and documented photographically.

The calves have always been mother-reared. During the first birth, suckling was noted as taking place three times a day during the first days and lasting sometimes for 15 minutes. The calf in the photographs is the male calf born in July 1998. He began to eat solid food at five days old and nibbled grass at 18 days old. The calf was first observed entering the pool at 40 days old. The photographs (Fig. 1-8) show the change in pelage to that of an adult over a period of weeks. This calf was finally separated from his dam at about seven months old. The adult female has since successfully reared another male calf born in early September 2000.

Figure 1. Malay tapir calf „Daifuku", day of birth.

Figure 2. „Daifuku", 11 days.

Figure 3. „Daifuku", 35 days.

Figure 4. „Daifuku", 51 days.

Figure 5. „Daifuku", 62 days.

Figure 6. „Daifuku", 76 days.

Figure 7. „Daifuku", 91 days.

Figure 8. „Daifuku", 105 days.

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Contributed Papers

Habitat Use by Malay Tapir (*Tapirus indicus*) in West Sumatra, Indonesia

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Abstract

This study on habitat use by the Malay tapir (*Tapirus indicus*) was conducted in Taratak Village, West Sumatra, Indonesia, from September to December 2003. Twenty track plots (1.5 x 3 m) were set up in four different habitat types, including primary forest, secondary forest, rubber plantation and riparian forest. Two plots were placed around salt lick areas located in secondary forest. All plots were checked every week. The results show that the Malay tapir prefers secondary forests over primary forests. Based on footprint analyses, the population density of Malay tapir in the study area was estimated to be 0.08-0.36 ind./km^2. High preference for *Symplocos cochicinensis* as a food item was also recorded in this study. Forest fragmentation and hunting (accidental extractions?) are the most serious threats for tapirs in the region.

Introduction

The Malay tapir is a flagship species inhabiting a number of small and isolated forest fragments in Sumatra. During the past decade, increasing rates of human population growth and habitat loss have been the most serious threats to the survival of tapirs in the region. Recently, illegal logging and concession areas, as well as human resettlements and oil palm plantations have been major causes of forest fragmentation. In the light of this, experts have predicted that the Sumatran forests may have completely vanished by 2005 (Jepson *et al.* 2001).

Sumatra and Peninsular Malaysia are the world's strongholds for the Malay tapir. However, the rate of forest destruction for agriculture and plantations in Sumatra is immense, and conservation law enforcement both inside and outside the protected areas is insufficient (Meijaard & Van Strien, 2003).

Malay tapirs are able to wander outside forested areas to explore nearby patches, thus crossing protected area boundaries and venturing into logging concessions and plantations. Since Malay tapirs are herbivores and depend on good forest conditions, forest fragmentation has been seen as the major threat, thereby causing population declines. Based on this aspect of Malay tapir natural history, this study was conducted to evaluate the effects of deforestation on Malay tapir populations, including habitat use and focusing particularly on use of mineral licks.

Methodology

Study Area

The study was conducted at a protected forest in Taratak Village, located at 100-500 masl, 30 km from Padang, West Sumatra Province. The slope of this area varies from 0-2%, with fluctuations in several areas that can reach 40%. The habitat includes primary and mature secondary forest, traditional mixed plantations and riparian forest vegetation dominated by Dipterocarpaceae, Myrtaceae and Fagaceae (Novarino 2001). This protected forest is an edge of the Bukit Barisan mountain range. The forest has recently been altered by illegal logging and agricultural encroachments. Some snare traps are set up by local people to protect their crops from wild boar (*Sus scrofa*) and other potential pests, including tapirs, thus becoming

a tangible threat to the local tapir population. Tapir populations are very sensitive to hunting (Miller et al. 2003).

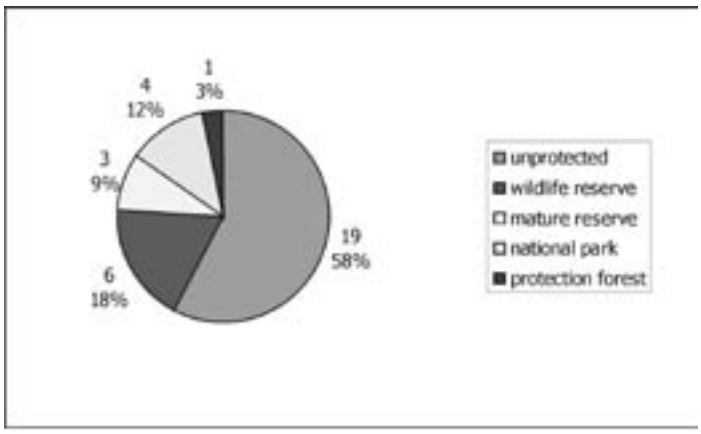

Figure 1. Percentages of confirmed tapir distribution areas in Sumatra, Indonesia. Tabulated from MacKinnon (1997) *cit* Meijaard and Strien (2003).

Methods

Malay tapir habitat use was estimated through the use of 20 track plots (3 x 1.5 m) placed in four habitat types present in the study area (primary forest, mature secondary forest, plantation and riparian) as indicated in Table 1. Two plots were placed in salt licks. The plots were cleared of vegetation and raked in order to ensure the easy detection of tapir footprints. The plots were inspected once a week for four weeks.

Because track plots were unevenly distributed among the four habitat types, the number of tracks recorded for each habitat type was compensated accordingly. That is, the number of tracks recorded was divided by the number of plots used for each habitat type.

Population monitoring was conducted through the use of transects and based on footprint analysis (Rabinowitz 1993). All tracks found were measured, recorded and analysed. Tapir individuals were identified based on a combination of track size (length, width of each part), age and direction. The densities were estimated by comparing the number of estimation of individual and length of trail where the track plot

Table 1. Description of track plot locations.

PLOT	HABITAT	SUBSTRATE	SLOPE (%)	VEGETATION		
				Trees	Saplings	Seedlings
1	Secondary forest	soft, dry land	10 - 20 %	common	common	abundant
2	Salt lick	mud	10 - 20 %	common	common	abundant
3	Secondary forest	Dry land	0 - 10 %	common	common	common
4	Salt lick	mud	0 - 10 %	abundant	common	common
5	Secondary forest	dry land, clay	45 - 50 %	rare	rare	rare
6	Secondary forest	dry land, clay	0 - 10 %	rare	abundant	abundant
7	Primary forest	dry land, clay	0 - 10 %	abundant	rare	abundant
8	Primary forest	dry land, clay	5 - 10 %	abundant	abundant	rare
9	Primary forest	dry land, clay	30 - 45 %	abundant	common	common
10	Primary forest	dry land, clay	0 - 10 %	abundant	rare	abundant
11	Primary forest	dry land, clay	20 - 30 %	abundant	abundant	rare
12	Primary forest	dry land, clay	0 - 10 %	abundant	abundant	common
13	Primary forest	dry land	0 - 10 %	common	abundant	rare
14	Primary forest	dry land	0 - 10 %	rare	abundant	rare
15	Primary forest	muddy	30 - 40 %	abundant	rare	rare
16	Plantation / riparian	sandy	0 - 10 %	rare	rare	abundant
17	Plantation / riparian	dry land	20 - 25 %	abundant	rare	abundant
18	Plantation / riparian	soft, dry land	0 - 10 %	abundant	common	rare
19	Plantation / riparian	soft, dry land	0 - 10 %	abundant	abundant	abundant
20	Plantation / riparian	soft, dry land	0 - 10 %	abundant	abundant	abundant

Note: Trees and saplings were considered "abundant" if the number of individuals was more than 5, "common" if the number was 2 - 5 individuals and "rare" if there was only one individual; seedlings were considered "abundant" if almost all the plot area was covered by them, "common" if they covered only half or less, and "rare" if only a few individuals were observed.

was located. Casts of some tracks were taken using gypsum. Threats to tapirs and other animals were obtained by direct observation of hunting activity and through information obtained from local people by means of casual conversations.

Results and Discussion

Footprints from at least six mammal species were recorded during the study period (see Figure 2). In general, 63.33% of the track plots recorded the occurrence of mammal species in the area and only 36.67% did not record any footprints. This result shows that the location of the track plots was good enough to detect terrestrial mammals in the area. 191 tracks were recorded during the studies and these were predominantly wild boar footprints (46.67%) and only 9% of tracks were from tapirs. Other mammal footprints recorded were Sumatran goat (*Capricornis sumatrensis*), Sumatran tiger (*Panthera tigris sumatrensis*), porcupine (*Hystrix brachyura*), muntjac (*Muntiacus muntjac*) and Sambar deer (*Cervus unicolor*).

Figure 2 shows that the occurrence of Malay tapir is only superseded by that of wild boar, and is higher than for other herbivores/folivores. This result shows the importance of the tapir's ecological role as a browser in Sumatran forests. Primary forest shows the highest amount of footprints recorded, followed by secondary, plantation and salt licks. However, if we correct the numbers by the amount of track plots deployed in each habitat type, the salt licks show the highest amount of footprints and primary forest then becomes the least used habitat (see Fig. 3). Thirty footprints have been recorded from two track plots in salt lick areas, 44 from four plots in secondary forest, and 60 footprints were recorded at nine track plots in primary forest, as shown in Figure 3. This result shows that salt licks have an important role for animals. The mineral content of salt licks, including their micronutrients, are believed to be crucial in the diet of animals (Stein 1993). The slope of salt lick areas was flat and located in valley areas, which perhaps affected the occurrence of the animals there.

Salt licks appear to be more important for Malay tapirs, 63% of tapir footprints were recorded at salt licks, 22% in secondary forest, 15% in primary forest and no records for plantation/riparian (Fig. 4). In Taman Negara National Park, Malaysia, Kawanishi (2002) conducted a camera trapping study and found that most tapir photographs were taken near or on trails leading to salt licks. However, based on total footprints recorded along line transects, tapirs became most abundant in secondary forest, followed by primary forest and plantation/riparian. Based on camera trap results, Holden *et al*. (2003) found that tapirs

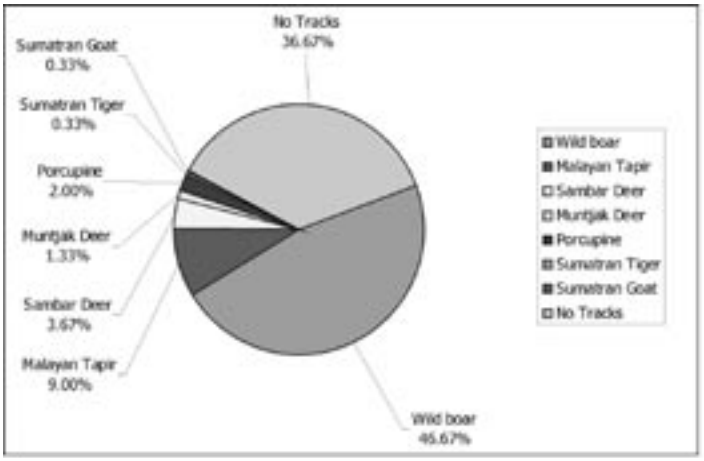

Figure 2. Proportion of footprints recorded in the track plots.

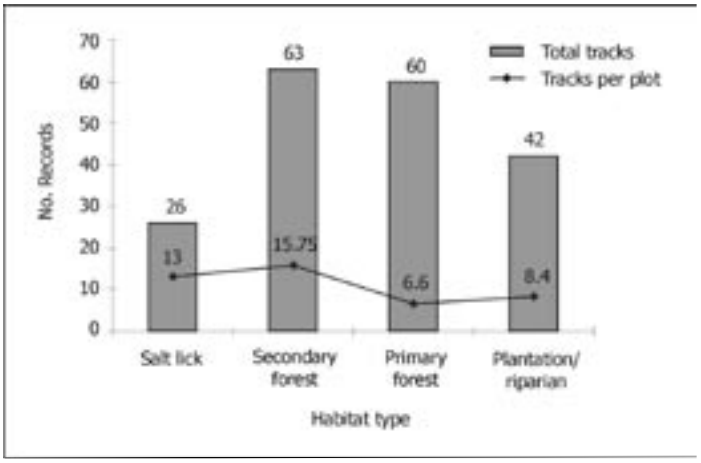

Figure 3. Footprints recorded at four types of habitat.

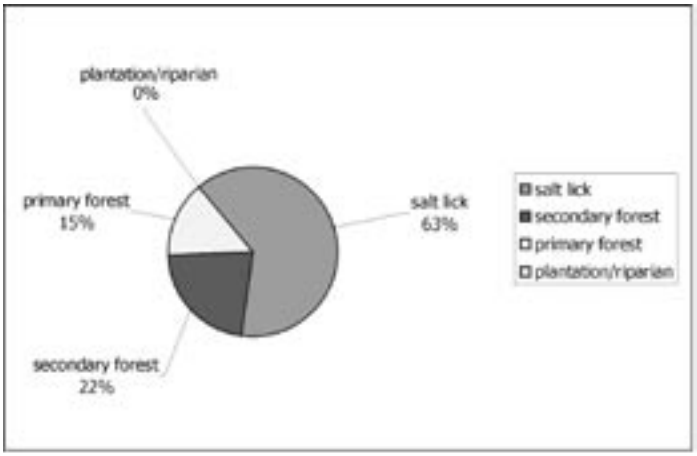

Figure 4. Malay tapir footprints recorded at four types of habitat.

use primary forest, recently logged forest, old rubber plantations, and disturbed forest edge and crossed an open cultivated area. Foerster & Vaughan (2002) using radio telemetry also found that secondary forest was the most commonly used habitat type (61.3%) rather than primary forest (25.0%) for the Baird's tapir (*T. bairdii*) in Costa Rica.

Basal vegetation and secondary tree growth is more abundant and varied in secondary forest than in primary forest and plantations, which makes the area more suitable for tapirs according to their need for plentiful foliage, fruit and soft twigs. Field observations show that tapirs tend to move inside shrub or basal vegetation to obtain more varied food items.

During the study, some tapir faecal samples were found and collected. We also recorded plants showing evidence of browsing along tapir paths and some trees that were "climbed" and had fallen because tapirs fed on them. Previous studies recorded more than 20 plant species as tapir food items, and tapirs showed a high preference for *Symplocos cochichinensis*. Tapirs were also recorded feeding on traditional mix plantation which is a cultivated plant along with gambir (*Uncharia gambir*) and rubber (*Hevea brasiliensis*). However, there was no record of tapir visits to rubber and gambir plantations during this survey. This indicates that tapirs do not feed on the old foliage and fruit of these plant species. Malay tapir eat small fallen fruits and large fruits such as durian (*Durio zibethinus*) and jackfruit (*Artocarpus integra*) in Sumatra. Durian seedlings were often observed sprouting from mounds of old tapir dung (Holden *et al*. 2003). Downer (2001) found that the mountain tapir assisted in the potentially successful seed dispersal of many species of Andean plants through faecal germination experiments.

The occurrence of pairs of footprints on several occasions indicates that Malay tapirs are not absolutely solitary. Based on camera trap results Holden *et al*. (2003) also found this tendency, where the percentage of tapirs photographed in pairs was 20%: two adults 14% and adult and calf 6%.

The most serious threat to Malay tapir in Sumatra is the continued destruction of its habitat. Forest conversions io resettlement, plantation and concession areas are mainly responsible for the loss of forest cover over the past decade. In Bukit Barisan Selatan National Park (BBSNP), based on GIS analysis and modelling, Kinnaird *et al*. (2003) predicted that by 2010 70% of the BBSNP would be agricultural lands or village enclaves. Lowland forests will have declined to 28%, and hill/montane forests will account for 2% of the BBSNP land cover, a cumulative area of little over 700 km^2 in forest.

New government policies, such as decentralisation, in addition to political instability, agricultural encroachment and illegal logging, all affect forest management. Sumatra is experiencing the most rapid deforestation rate in the Indonesian archipelago. Furthermore, even though it is stated that tapirs are not hunted in Sumatra (Santiapillai & Ramono 1990), we found some cases of hunting of large mammals, including tapir, in this area. This was evidenced by the presence of snare traps and other signs. In the same area, seven tapir skulls were found from 1999 onwards.

Conclusions and Recommendations

Malay tapirs mainly preferred secondary forest. Around 63% of tapir footprints were recorded on salt licks located in secondary forest, 22% in secondary forest, and 15% in primary forest with no records on plantation/riparian habitats. Based on footprint analysis, the population of Malay tapirs in our study area is estimated at 0.08-0.36 ind./km^2. High preference of tapir for *Symplocos cochicinensis* as a food item was also recorded in this study.

Despite improvements to legislation and established protected areas, monitoring of Malay tapirs in secondary forest throughout Sumatra must be undertaken. Long term, systematic studies would obtain more information regarding the status of this species in Sumatra and will be very useful for the conservation of the species in general.

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Using GPS Collars to Study Mountain Tapirs (*Tapirus pinchaque*) in the Central Andes of Colombia

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Introduction

Probably the least known of the four tapir species is the mountain tapir (*Tapirus pinchaque*), which occurs, in the high Andes (2000-4800 m) of Colombia (Acosta *et al.* 1996; Lizcano *et al.* 2002), Ecuador (Downer 1996) and northern Peru (Lizcano & Sissa 2003). The mountain tapir is the smallest of all the tapir species, and is currently threatened by hunting and the destruction of its habitat, tropical montane forests and páramos (*i.e.* Neotropical alpine plant formations).

Understanding the factors determining the distribution and movements of animals around the landscape is a major objective for scientists, conservationists and natural resource managers alike. It is only through developing this knowledge that animal populations can be managed to meet conservation, sporting or natural heritage objectives. Researchers have long battled with the logistics of gathering information on the movement and distribution of individuals and populations, often relying on tedious visual observation or VHF technology to gather data. Development of Global Positioning Satellite (GPS) technology has offered the opportunity to overcome a number of these limitations. However, whilst there has been a growing interest in the use of GPS amongst biologists, there has only been limited uptake to date. In part this reflects the expense of the units and the weight of the battery supply, which, until recently, has prohibited the use of collars except for larger animals. However, it also reflects the lack of information available to biologists as to what equipment is

available and the experience of others in its use.

In every study area, environmental influences on animal radio tracking signals are different. Different methods to overcome the problem of inaccurate bearings and errors have been discussed (Kenward 2001; White & Garrot 1990), but this is a bigger problem in inaccessible mountains where signals bounce and where the common technique of "homing-in" cannot be used. In addition, the highly complex topography and harsh weather conditions complicate the taking of bearings and the movements of investigators. To gain some knowledge on mountain tapir natural history and to gain experience in GPS technology we report results from our pilot study of two GPS collars in a study of mountain tapirs in the Central Andes of Colombia.

Study area

This study was carried out on the western slope of the Central Andes of Colombia (4º 42'N, 75º 29'W), within Los Nevados National Park and Ucumari Regional Park, in Risaralda State. The region is the watershed of the Otún and Barbo rivers. There are deep valleys, high mountains and rocky cliffs. Mature and secondary montane forest *sensu* (Grubb 1977) cover the region. The montane forests in this area are mostly continuous. In a study of vegetation cover of 147,000 ha in this region, there were 98,000 ha of montane forests (1200-3600 m) and 19,200 ha of pastures, mostly at lower altitudes (Lizcano & Cavelier 2000b). The rest of the area was covered by páramo (Smith & Young 1987). Upper montane rain forest can be found between 2500 and 3700 m elevation, in contact with lower montane rain forest (1500-2500) and páramo vegetation (above 3700 m). At the lower altitude, the canopy is much higher (30-35 m), and is dominated by *Brunellia goudotii, Miconia* sp., *Weinmannia* cf. *hirtella, Weinamannia rollottii, Nectandra* sp. and *Ocotea* sp. The understory is dominated by *Chusquea* and tree ferns *Cyatheacea* (Cleef *et al*. 1983). The epiphytic flora includes abundant *Bromeliaceae* and mosses. The canopy of the secondary forest is 2-10 m and this is dominated by *Weinmannia pubescens*, *Miconia* spp. and *Tibouchina grossa*. The forest is usually open, with small to large patches of the introduced grass *Penisetum clandestinum*. The secondary forest is 15 years old, and has resulted from the abandonment of pastures originally created during the 1950's for high altitude cattle ranching (Londoño 1994). The original mature forests were cleared for the extraction of fine woods and for the production of charcoal. Weather varies from mild to cold as the altitude increases. Mean annual rainfall decreases from 2500 mm at 2120 m (Estación El Cedral; 4º 42' N, 75º 32' W) to 980 mm at 4000 m (Estación Laguna del Otún; 4º 47' N, 75º 25' W). Rainfall is distributed in a bimodal way with drier seasons during December and July - August. Mean annual temperature at 4000 m is 5.58ºC and 15.8ºC at 2120 m.

Methods

Two adult mountain tapirs, a male and a female were captured, darted and anaesthetised in June 2000 with the assistance of an experienced veterinary surgeon and trained dogs. A male of about 180 kg and a female of 200 kg were captured using a solution of Detomidine, 100 mg of Ketamine, 500 mg of Tiletamine/Zolazepam and 5 mg of Atropine, as a single mixture inside an anaesthetic dart (Lizcano *et al.* 2001a; Lizcano *et al.* 2001b; Mangini *et al.* 2001). Each captured animal was inspected for parasites, measured, examined to determine sex and age and marked with a 2.5 cm diameter coloured plastic tag (Rototags, Dalton House, Newtown Road, Henley-on-Thames, Oxon, RG9 1HG) in each ear. Captured animals were fitted with a GPS collar (Model GPS-1000, Lotek Inc., Canada). Tapirs were placed in a secluded location and monitored from a distance until they recovered.

Each GPS collar was equipped with a traditional telemetry signal, a six-satellite GPS engine, an environmental temperature sensor, an activity sensor, a data storage device, and a drop-off mechanism activated by time. Additionally, each GPS collar was equipped with a radio modem link that allows the transmission of data from the collar to a laptop computer without recapturing the animal. The weight of each collar was 1,600 g, which is less than one percent of the weight of an adult mountain tapir. The collars were programmed to take three locations per day at different hours, and once a week, locations each hour during a 24-hour period of time. The drop-off mechanism was programmed to release the collar after six months. Once recovered, the data were downloaded onto a computer and analysed in ArcView 3.2 (ESRI, Redlands, California) with the extension Animal movement 1.1 (Hooge P. & Eichenlaub 1997). Home range was defined as the area where animals travelled in their normal activities (Caughley & Sinclair 1994) and was estimated using Minimum Convex Polygon and Kernel methods (White & Garrot 1990) taking into account surface area relation provided by topography. Home ranges were calculated for individual tapirs by season and differences among periods were tested using chi square tests and G tests (Zar 1996). Montecarlo simulations were carried out to detect the effect of sample size in home range area and movement pattern. Activity was measured by the collar's sensor in a 1-200 index, where 1 is total inac-

tivity in the past minute and 200 is full activity during the last minute. Correlations were made to search for patterns between several variables.

Results

After six months of collecting data on mountain tapirs, the GPS collars were found by traditional telemetry in February 2001 after intensive searching for three weeks. The male's collar was found in a deep valley near Barbo River at 3200 m. This region is covered by mature mountain forest with a dense understory. The female's collar was found at 3400 m, in a small stream near Otún River – secondary forest and grasslands cover this region. The collars were found in good condition externally. However, water had permeated inside the female's collar and damaged the data recovery mechanism. A month before the collar was recovered, the female was located in order to try and download the data using the radio modem link but without success. The data from the male's collar were recovered and downloaded to a computer easily. This collar had fixed 343 locations of total programmed locations (1236) during six months. Average dilution

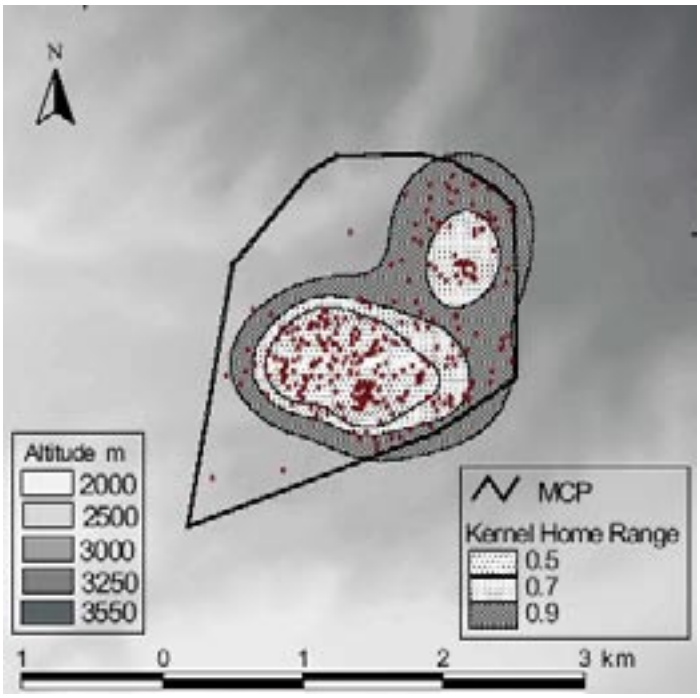

Figure 1. Flat representation of the home range of a male mountain tapir (*Tapirus pinchaque*). The double line represents minimum convex poligon method (MCP). Kernel home range method is the single line shadowed polygon with 50, 70, 95% probability polygons. Areas are; MCP 3.5 km^2, Kernel 2.5 km^2. Notice how MCP is influenced by a few separate points.

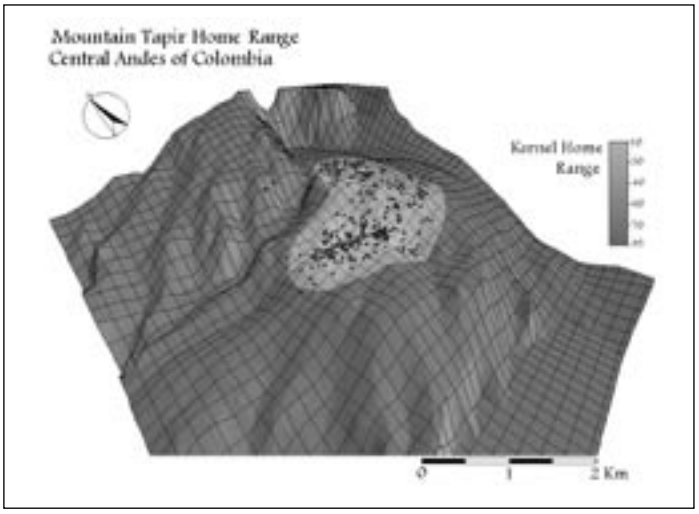

Figure 2. 3D representation of Kernel home range of a male mountain tapir (*Tapirus pinchaque*) in the Central Andes of Colombia.

of position index (DOP) was 3.6 and more than 50% of locations showed a DOP of less than 2.5. The average number of hours between locations was nine hours with a maximum number of days without locations of four days. Total travelled distance during six months was 91.4 km. The average distance travelled between fixed locations was 326 meters at an average speed of 0.6 km/h. The observed movement was more constrained than random movement paths (Montecarlo simulation, n=100 number of random movement paths, p = 99.0099). Fixed locations showed a regular pattern (nearest neighbour analysis, R=1.89, p=0.045) close to a uniform distribution.

Home range calculated by Minimum Convex Polygon (MCP) was 3.5 km^2 and 2.5 km^2 using the fixed Kernel method (Fig. 1) and, if the surface - area relation is taken into account, the surface home range is bigger (Table 1, Fig. 2) this difference is statistically significant (G-test significant and Chi square > 0.05). Seasonal differences in home range were not statistically significant.

Bootstrap analysis using the GPS data set with an interval size of 5 and 300 simulations (Fig. 3) suggest that there is an influence of sample size on home range and that the sample size is not enough to get a representative home range. No correlations were found between DOP, slope and altitude. There was a statistically significant negative correlation between temperature and activity (P = -0.63) indicating that when temperature decreases activity increases and the opposite is also true (Fig. 4). Activity was higher between 7:00 - 8:00 hours and 13:00 - 14:00 hours, showing a three modal pattern with a decrease in activity at noon and in the late afternoon.

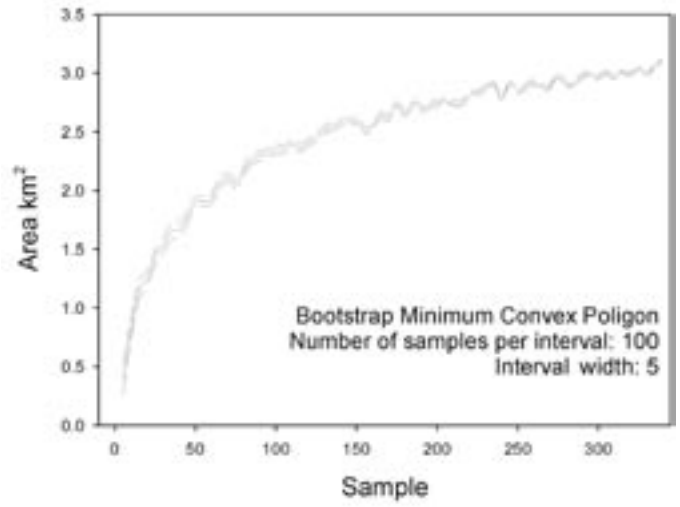

Figure 3. Montecarlo simulation of fixed points. Number of samples per interval = 100, interval width = 5. Notice that the curve did not reach a stabilization point with 340 fixes. Non-continuous line represents standard error.

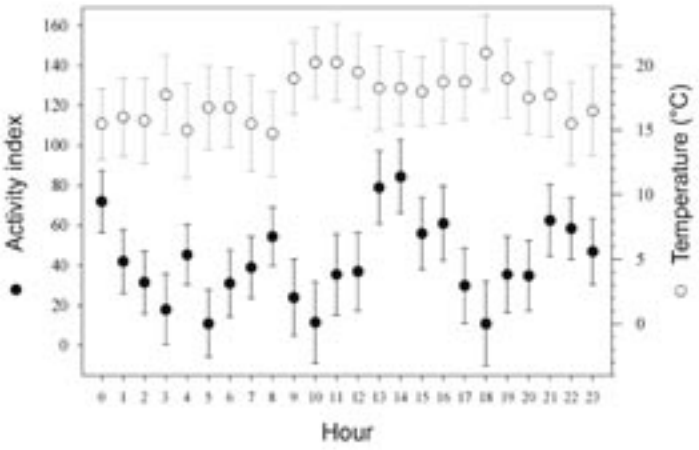

Figure 4. Activity and temperature correlation. There is a negative, statistically significant relation between activity and temperature (p = -0.62). Tapirs are more active when the weather is cooler.

Discussion

In spite of the complex topography, the cloudy sky and dense forest cover, the collar fixed 28% of total programmed points. The number of fixed points (343) in six months is an average of two locations per day, which corresponds to a higher average number of positions per day than many traditional radio-tracking studies use (Kenward 2001). Additionally dilution of position index DOP of fixed points was low. DOP is a measure of accuracy of each point. This index is the sum of square errors in all dimensions including time and satellite geometry and it depends on the position of the satellites: how many satellites you can see, how high they are in the sky, and the bearing towards them. For example, a DOP of two means that whatever the input errors were, the final error will twice as big. Usually it is considered that a DOP of three or less is an accurate position probably closer to being correct. Additionally, GPS data obtained in this study were after the Selective Availability, the random error, which the USA government intentionally add to GPS signals, was disabled. So, we considered that average error in our data ranges varied between 15 and 40 meters, taking into account that DOP average in our data is 3.6. This error is less than average in traditional telemetry where the triangulation of large mammals introduces a bigger error (Haller *et al.* 2001), which can range between 50-100 m for each location.

Home range data provided by this study are probably not representative of a mountain tapir population because the data is from one animal for only six months, but it constitutes an interesting exercise to be compared with other studies and traditional telemetry. There is only one other study using radio tracking on mountain tapirs. In this study, three adult mountain tapirs were tracked for a year and the home range size was 8.8 km² of flat area in Sangay National Park in Ecuador (Downer 1996). The differences in home ranges could be due to the number of animals tracked or to the effect of sample size on home range size (Fig. 3). Montecarlo simulations (300) of the fixed points-home range and the equation of their curve ($y = 629518\ln(x) + 416691$, $R^2 = 0.9955$), indicate that a sample size of 650 could be enough to saturate the home range accumulation curve. The differences in home range are even bigger if we compare mountain tapir and Baird's tapir, which has an average annual home range of 10.7 km² (Foerster 2001). These data are from an extensive study of 26 animals over five years. It is important to highlight the significant difference between flat areas and areas which constitute mountainous regions, which include much more surface area when home range is calculated for animals in mountains. We did not find any evidence indicating that mountain tapir shift home range areas, but slight seasonal shifts in home range can occur when habitat use is correlated with the core area of a seasonal home range. Many local people living within mountain tapir distributions suggest that mountain tapir present altitudinal migrations correlated with the seasons and lunar phases. However, our data in this study are not conclusive, but a correlation between the lunar phase and mountain tapir activity was found in a previous study in the same area (Lizcano & Cavelier 2000a).

An interesting correlation between activity and tem-

Table 1. Home range areas by season and discriminated by flat area and surface area. * significant differences

Season	Method	Area (flat)	Area (surface)	n
Dry	MCP	3.3	4.0	171
	Kernel 95	2.5	2.8	171
	Kernel 50	0.4	0.5	171
Rainy	MCP	2.8	3.1	172
	Kernel 95	2.0	2.3	172
	Kernel 50	0.4	0.6	172
Both	MCP *	3.5 *	4.1 *	343
	Kernel 95 *	2.5 *	2.9 *	343
	Kernel 50 *	0.6 *	0.7 *	343

perature was found (Fig. 3) indicating that mountain tapirs rest in hotter locations or during the hours when temperatures are high. Activity was higher between 7:00 - 8:00 hours and 13:00 - 14:00 hours, showing a three modal pattern with a decrease in activity at noon and late afternoon. A similar pattern was found in a previous study in the same area (Lizcano & Cavelier 2000a) using camera traps. The variations in temperature during the day are because the study area is located in a mountain forest, very close to the páramo where temperature variation during the day is higher than average temperature variation during the year (Smith & Young 1987). In the páramo, temperatures vary from 1-3ºC below zero before sunrise to 20-25ºC in the afternoon.

In spite of the failure in the sealing mechanism of one of our GPS collars and the low percentage of fixes (28%), we believe that the use of GPS collars is a good option to study mountain tapirs, and even better than traditional telemetry for several reasons. Error due to triangulation is higher (50-100 m) in VHF telemetry than in GPS collars and it increases much more when there are signal bounces, which occur in mountainous areas. In a study of mountain ungulates to evaluate VHF telemetry and GPS collars, an average triangulation angle error of 14.5 degrees resulted in an average error in distance of 342.9 m. The average distance error with non-differential GPS collars was 78.8 m (Haller *et al.* 2001). Traditional telemetry demands high logistical support; paths, trails or fixed stations and trained personal continuously tracking the animals. This situation is hard to attain in the study of large mammals in the high Andes, where there are very inaccessible areas and the topography is very complex. In this case GPS collars can have the advantage, because they do not require continuous tracking. This also means less human disturbance in the study area. GPS collars are expensive but with the arrival of two new brands on the market in the last three years, prices are decreasing. If we compare costs, a long term GPS project can be less expensive than a traditional telemetry project because it does not present hidden costs such as trail station maintenance, wages of trained personnel in the field continuously tracking the animals and all the logistics that that represents.

In the future the development of more sensitive GPS receiving antennae will allow greater deployment on species inhabiting forested and mountainous habitats. Advances in fuel and solar cell technology will raise battery power density while battery longevity will be enhanced by the move to less voltage GPS technology. Both advances will enable longer deployment, greater data acquisition and, if required, the development of smaller collars, all of which will allow a greater understanding of the biology of tapirs and many other animals. The integration of GPS with mobile phone technology is now a reality (Hulbert 2001). This development will provide flexible data retrieval and will assist in gaining a greater understanding of the movement and behaviour of many non-recoverable animals. GPS telemetry offers many opportunities, but perhaps the greatest are the quality and quantity of data potentially available that no other tracking tool can provide.

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Behaviour of Baird's Tapir (*Tapirus bairdii*) in Captivity

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Abstract

The individual and reproductive behaviour of a pair of Central American tapirs, *Tapirus bairdii*, was observed. The adult pair were maintained in captivity in Miguel Alvarez del Toro Regional Zoo, in Tuxtla Gutierrez, Chiapas, Mexico. By means of systematic recording and focal observations we obtained 5264 behavioural events, which were described and classified in 27 categories. Of this total, 2586 events corresponded to the female and 2678 to the male. Most of these events (2424) were emitted by the female, which represented 93.73%. Of the total female behaviours observed, 2245 (92.69%) were individual records and 177 (7.30%) were reproductive. In the case of received events by the female, 58 (35.80%) were individual and 104 (64.19%) were reproductive ones. In the case of the male, 2570 were emitted events (95,97%), and 108 were received (4.03%). Of total events emitted by the male, 2344 (91.20%) represented individual records and 226 (8.80%) were reproductive. In the case of the received events, 42 (38.88%) were individual and 66 (61.11%) were reproductive. Although many of the individual behaviours were similar, they demonstrated noticeable differences regarding courtship and mating. Both animals displayed intense activity in these aspects.

Introducción

Durante varias décadas el Instituto de Historia Natural y Ecología del Estado de Chiapas, México (I.H.N.E), se ha dedicado a estudiar, exhibir, reproducir, proteger y gestionar planes y programas *in situ* y *ex situ* en pro de las diferentes especies de flora y fauna, así como de sus respectivos hábitat en el Estado. Un claro ejemplo de estos programas, es el llevado a cabo con el Tapir Centroamericano *Tapirus bairdii* (Gill, 1865) desde 1995, especie poco conocida biológicamente. Esta especie se exhibe en el Zoológico Regional Miguel Álvarez del Toro (ZooMAT) desde 1947 con planes de reproducción, investigación en cautiverio y estado silvestre en áreas como ecología, biología, epidemiología y etología.

En este sentido, el conocimiento de la etología de una especie, es una valiosa herramienta que permite detectar, mediante simples observaciones, aspectos importantes del comportamiento del animal. No obstante, para numerosas especies silvestres el estudio en cautiverio es la única posibilidad de registrar aspectos básicos de su conducta (Lehner 1979, Drickamer & Vassey 1982, Díaz 2001).

Este es el caso del tapir centroamericano, que en condiciones silvestres es difícil estudiarlo en forma continua y sistemática a causa de factores como: a) sus desplazamientos diarios en su ámbito hogareño, ya que son continuos y de gran extensión; b) las características de su hábitat dificultan el seguimiento del animal; c) las bajas densidades que presentan sus poblaciones; e) el escaso conocimiento en cuanto a su biología y ecología (Brooks *et al.* 1997, Emmons & Feer 1997).

La presente investigación muestra las pautas conductuales obtenidas en una pareja de tapires adultos mantenidos en condiciones de cautiverio, fundamentándonos en la necesidad de adquirir un mayor conocimiento sobre el comportamiento individual, social y reproductivo de esta especie, el cual ayude a la implementación de medidas eficaces para su manejo y conservación.

Material y Métodos

El Zoológico Regional Miguel Álvarez del Toro (ZooMAT) se encuentra ubicado en la Reserva Ecológica El Zapotal, la cual ocupa una superficie total de 100 hectáreas delimitadas por malla ciclónica.

Esta reserva se localiza 3 km al sur de la Ciudad de Tuxtla Gutiérrez, en el Estado de Chiapas, México en la región tropical seca (Aw), con lluvias en verano, con precipitaciones anuales entre 893.6 a 952.8 mm. Los tipos de vegetación presentes son selvas bajas caducifolias y selvas medias subperennifolias. Su topografía es abrupta y rocosa con peñascos. El rango altitudinal de esta reserva varía entre 600-850 msnm y su temperatura media oscila al rededor de los 23.5ºC (Cruz 1992, Lira 1999).

El ZooMAT está constituido por 30 hectáreas donde se exhibe fauna regional, es aquí donde se mantenía en cautiverio a una pareja de Tapires Centroamericanos adultos (*Tapirus bairdii*) (un macho y una hembra), en un albergue de 400 mts^2 de selva mediana subperinnifolia, delimitado con barda de piedra y con arroyos naturales (Cruz 1992, Lira 1999).

Las observaciones fueron hechas entre los meses de noviembre de 1998 a noviembre de 1999. El primer paso para este estudio fue lograr el reconocimiento de cada uno de los individuos, esto tomando en cuenta características tales como sexo, cicatrices, coloración del pelo, tamaño, edad entre otras. Para lograrlo se destinó una semana de observaciones detalladas, posteriormente para delimitar y definir las pautas del comportamiento, se consideró tanto su forma (patrón motor) como su probable función. Las pautas de comportamiento se clasificaron en dos paquetes: 1. Comportamiento Individual y 2. Comportamiento Reproductivo, estos a su vez se dividieron en a) emitidos y b) recibidos. Ya estructurado el catálogo de pautas o despliegues del comportamiento, se efectuaron observaciones directas para cada uno de los individuos, registrando cualitativa y cuantitativamente las frecuencias de ocurrencia de las pautas o despliegues (Altmann 1974, Byers & Bekoff 1981, Drickamer & Vassey 1982, Lehner 1979).

Estos registros sistemáticos se hicieron por medio de observaciones individuales; esto es, un individuo seleccionado es foco de observación y atención durante un determinado periodo de tiempo. El individuo observado es siempre el emisor o receptor de una pauta de comportamiento. Los datos se registraron mediante el empleo de hojas tabuladas, en el que se incluyen condiciones del ambiente, el individuo a observar, las pautas del comportamiento a registrar, así como su emisión y recepción, la fecha y hora. Cada uno de los individuos fue observado durante 10 minutos, a diferentes horas del día, de tres a cuatro veces por semana. Se realizaron registros por la mañana, tarde y noche. Durante las observaciones, se registró información ocasional sobre otros aspectos de la biología y comportamiento de la especie (Altmann 1974, Lehner 1979, Byers & Bekoff 1981, Drickamer & Vassey 1982).

Resultados

Se registraron 400 horas de observación continua, en las cuales se observaron 5,264 pautas conductuales descritas y clasificadas en 27 categorías. De estas, 2,586 pautas (49.12%) representan actividades emitidas o recibidas por la hembra y 2,678 corresponden al macho (50.87%). Para el caso de la hembra, 2,424 fueron emitidas por ella, lo que representa el 93.73% y 162 recibidas (6.26%). Del total emitido por ella, 2,245 (92.69%) fueron registros individuales y 177 (7.30%) fueron reproductivos. En el caso de las pautas recibidas 58 (35.80%) fueron individuales y 104 (64.19%) reproductivas.

Referente al global obtenido para el macho, 2,570 fueron pautas emitidas, lo que representa el 95.97%, y 108 fueron recibidas, o sea el 4.03%. En este caso, los despliegues conductuales emitidos, 2,344 (91.20%) representan registros individuales y 226 (8.80%) representan datos reproductivos. De las pautas recibidas, 42 (38.88%) fueron individuales y 66 (61.11%) fueron reproductivas.

A continuación, se muestra una clasificación detallada de todas las diferencias perceptibles entre pautas individuales y reproductivas; muchos actos fueron similares a otros y podrían ser englobados en una categoría general. En esta descripción, los resultados son presentados de la siguiente forma: Descripción de la categoría; Frecuencia de ocurrencia; Porcentaje obtenido del total de pautas registradas individualmente; por la hembra (H) y el macho (M), y en ciertos casos se mencionará si la actividad fue emitida (E) o recibida (R) por el individuo.

1. Catalogo de Comportamiento

a. Conductas Individuales

Echado. Situación donde el animal se encontraba en postración, ya sea en decúbito esternal o lateral: 304 (11.75%) H y 231 (8.62%) M.

Caminar. Es la marcha de menor velocidad y durante un ciclo completo, un animal se apoyaba alternativamente en tres extremidades: 398 (15.39%) H y 459 (17.13%) M.

Comer. Situación en la que el animal tomaba con el hocico la dieta elaborada y proporcionada por personal del zoológico: 191 (7.38%) H y 197 (7.35%) M.

Beber. Momento en que el animal introducía el hocico en el agua del arroyo o poza y succiona: 54 (2.08%) H y 57 (2.12%) M.

Galopar. El galope es una marcha en la que se puede adquirir gran velocidad y durante un ciclo completo, el animal podía apoyarse sobre una, dos y ocasionalmente tres extremidades; en este

último caso se da sólo cuando el galope es lento: 99 (3.82%) H y 53 (1.97%) M.

Defecar. Acción en la que el animal era observado dentro de la poza / arroyo, flexionando ligeramente los miembros posteriores y expulsando el excremento: 33 (1.27%) H y 41 (1.53%) M.

Orinar. Dentro de la poza o arroyo, así como en los alrededores del encierro, el animal realizaba el proceso de micción: 44 (1.70%) H y 46 (1.71%) M.

Inmóvil. El animal permanecía inmóvil, la mirada fija en un punto y apoyado en sus cuatro miembros, en esta situación el animal pasaba largos periodos de tiempo sin que mostrara interés por realizar alguna determinada actividad: 260 (10.05%) H y 334 (12.47%) M.

Rascar. Así se llamó cuando el animal pegaba su cuerpo contra alguna superficie y se frotaba, en algunas ocasiones se presentaba un rascado mutuo: 42 (1.62%) H y 41(1.53%) M.

Ramonear. Momento en que el animal tomaba o arrancaba con la boca y probosis hojas y tallos directamente de los árboles o arbustos localizados en la exhibición: 128 (4.94%) H y 137 (5.11%) M.

Asustarse. En ocasiones por algún estimulo externo; ya sea por factores ambientales, otros animales o producidos por la pareja, los animales desencadenaban una reacción de huída: 25 E (0.96%), 14 R (0.54%) H y 23 E (0.85%), 2 R (0.07%) M.

Marcar territorio. En lugares definidos, se observó a ambos expulsar orina en pocas cantidades y con gran presión, a diferencia de la orina normal esta se notaba por su olor y apariencia más concentrada: 22 (0.85%) H y 148 (5.52%) M.

Dormido. Generalmente ocurre cuando el animal está echado y desconectado de su entorno: 73 (2.82%) H y 70 (2.61) M.

Olfatear. Aspirar sobre un objeto o sitio determinado, en ocasiones esto se hacía al aire, se observaba una extensión del cuello y extensión o flexión de la probosis con insistencia: 380 E (14.69%), 17 R (0.65%) H y 376 E (14.04%), 14 R (0.52%) M.

Cabeceo. Momento en el que los animales movían la cabeza de un lado a otro con fuerza, en algunas ocasiones era agresión hacia el otro individuo o sólo mostraba excitación por parte del ejecutor: 94 E (3.63%), 27 R (1.04%) H y 72 E (2.68%), 26 R(0.97%%) M.

Bañarse. Acción que realizaban los animales al momento de introducirse en la poza, echarse o sentarse, permaneciendo en ella por tiempo indefinido: 45 (1.74%) H y 23 (0.85%) M.

Sentado. Posición en la que el individuo se encontraba apoyado sobre los cuartos traseros con los miembros posteriores flexionados y los anteriores extendidos, los cuales también utiliza para apoyarse: 55 (2.12%) H y 36 (1.34%) M.

b. Conductas Reproductivas (Fig. 2).

Monta. Este tipo de comportamiento se presentaba tanto en el macho como en la hembra. La hembra se encontraba receptiva y se aproxima al macho. Podía ser que el macho buscaba el contacto, realizando frotamientos, olfateos, mordiscos, tanto en las orejas como en las extremidades anteriores o posteriores de la hembra. La hembra se acomodaba de tal forma que el macho después de apoyar la mandíbula inferior sobre su dorso, la monta. En ocasiones la respuesta de la hembra era echarse o salir de la monta corriendo: 6 E (0.23%), 4 R (0.15%) H y 12 E (0.48%) M.

Olfateo de genitales. Era realizado tanto por la hembra como por el macho. El patrón motor consiste en que el animal se acercaba al otro por un costado o por la retaguardia, realizaba un despliegue exploratorio olfateando los genitales y hacía contacto con la nariz en la vagina o pené. La posible finalidad es detectar en que estado reproductivo se encuentren la hembra o estimulación en el caso del macho: 24 E (0.23%), 28 R (0.15%) H y 50 E (1.86%), 8 R (0.29%) M.

Danzas. Eran realizadas por ambos animales, tanto dentro como fuera del agua. Se definió así a una pauta en la cual los animales se perseguían en círculos, al tiempo en que ambos intentaban morderse los miembros posteriores o bien el macho posaba su cabeza en la grupa de la hembra; este comportamiento se presentó principalmente antes y posterior al periodo de estro: 23 E (0.88%) H y 10 E (0.33%), 2 R (0.07%) M.

Mordidas. En ocasiones, durante la danza, ambos buscaban alcanzar con los dientes los miembros posteriores de la pareja sin llegar a lastimarse, brincando o corriendo, vocalizando, estando frente a frente o no: 68 E (2.62%), 59 R (2.28%) H y 49 E (1.82%), 51 R (1.90%) M.

Lengüetazos. Esta actividad era realizada por ambos animales, los contactos de la lengua eran con el cuerpo de la pareja, principalmente la cabeza y los órganos genitales externos: 7 E (0.27%), 10 R (0.38%) H y 5 E (0.18%) M.

Cópula. Si la hembra era receptiva en ese momento, el macho introducía el pené en la vagina iniciando la cópula. Una vez que el macho penetraba, inicia un movimiento de empuje durante un breve periodo hasta la eyaculación: 0 (0%) H y 0 (0%) M.

Silbar. Dentro de las pautas conductuales presentadas por los animales, existe una variada gama de vocalizaciones, durante nuestro estudio fue posible distinguir dos de ellas; el silbido: vocalización aguda, de mediana duración, origen gutural y emitida en diferentes situaciones como; cortejo, localización o llamado de uno a otro, se ha

escuchado también cuando la hembra llama a sus crías y en la huída: 43 E (1.66%) H y 21 E (0.78%) 5 R (0.18%) M.

Chasqueo. Otra de las vocalizaciones presentadas durante nuestro estudio fue un sonido similar al goteo en un charco o resoplido de corta duración e intermitente. Esta vocalización se escuchó principalmente cuando la hembra silbaba y el macho respondía con estos sonidos persiguiéndola, principalmente durante el cortejo y celo: 3 E (0.11%) H y 15 E (0.56%) M.

Fleeming. Acción del macho o la hembra que consiste en llevar a su órgano vomeronasal las feromonas encontradas en el ambiente, cuando esto ocurre, se observa una hiperextención de la probosis del macho o la hembra, dejando ver la cara interna del labio superior: 3 E (0.11%), 3 R (0.11%) H y 43 E (1.60%) M.

Erección del Pené. Distensión y endurecimiento de los cuerpos cavernosos y glande presentado por el macho durante la excitación: 21 (0.78%) M.

Discusión

Las condiciones que implican el cautiverio influyen de distintas maneras en los patrones de comportamiento en la pareja de tapires. La restricción del área de actividad, el suministro de alimento, manejo médico, la ausencia de depredadores y el hecho de mantener a una pareja junta todo el tiempo (siendo animales solitarios), así como la dependencia del humano, son factores que alteran y modifican el comportamiento de cualquier especie. No obstante, es por medio de las facilidades permitidas por el cautiverio que es posible realizar estudios de esta índole, puesto que en condiciones silvestres, resultaría muy difícil seguir la conducta individual y menos aún el cuantificar las frecuencias de despliegues durante tiempos prolongados.

Aunque varios autores han mencionado que el tapir centroamericano es una especie prácticamente solitaria, es factible registrar en vida silvestre hembras con crías, adultos con juveniles, y grupos alimentándose (Terwillinger 1978, Williams 1984). Posiblemente esto nos indique un cierto grado de tolerancia hacia individuos de su misma especie y sobre todo de diferente sexo y edad; aunque durante el trascurso de este estudio no se observó ningún registro de conducta antagonística, las observaciones personales de Cruz A. E. (1987) nos dan una idea de lo agresivo que puede ser esta especie sobre todo por la disputa de una hembra por dos animales del mismo sexo y emparentados, hasta llegar a provocarse la muerte.

Los resultados revelan que ambos tapires presentaron patrones de comportamiento muy similar (Fig. 1), con variaciones en la frecuencia de ocurrencia, lográndose describir 27 pautas de comportamiento para la especie, dentro de las cuales 17 corresponden a conductas individuales y 10 a reproductivas. Cabe mencionar que algunos registros individuales pueden asociarse a actividades reproductivas de la especie como es el caso del marcaje de territorio; sin embargo, para este estudio, las pautas reproductivas fueron consideradas con la participación de ambos ejemplares.

Con base en los registros obtenidos, se puede apreciar que para el macho las siete pautas con mayor ocurrencia fueron la caminata, el olfateo, el mantenerse inmóvil, el estar echado, el estar comiendo, el marcaje de territorio y el ramoneo, mientras que las que tuvieron menor ocurrencia fue el estar sentado, asustarse e introducirse a la poza. Para el caso de la hembra, las pautas con mayor número de registros fueron el caminar, el olfateo, el mantenerse echada, el estar inmóvil, el estar comiendo y el ramoneo, mientras las que tuvieron menor registro fueron el asustarse y marcar territorio. Aunque los resultados obtenidos aquí solo reflejan patrones de actividad en cautiverio es de inferir que la especie en estado silvestre pasa la mayor parte del tiempo caminando, olfateando, comiendo, ramoneando y atenta a los posibles depredadores, así como descansando a diferentes intervalos del día como lo comentan los siguientes autores (Fig.1).

De acuerdo a los reportes de Terwillinger (1978) y Foerster (1998) sobre las observaciones de alimentación registrada en tapires centroamericanos; estudios

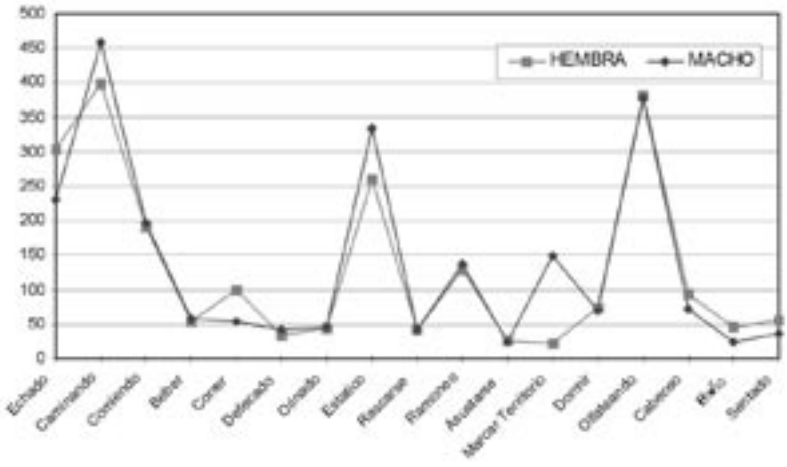

Figure 1. Resultado comparativo en las pautas conductuales individuales del macho y la hembra durante el periodo nov 98 a nov 99.

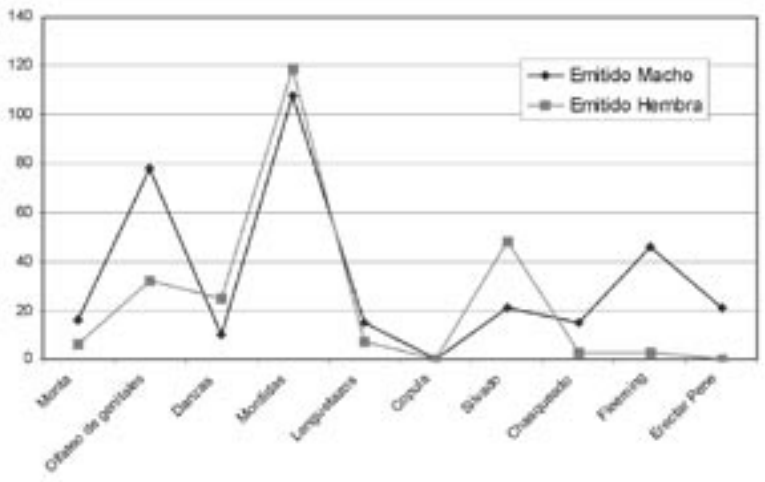

Figure 2. Resultado comparativo en las pautas conductuales reproductivas de la hembra y macho durante el periodo nov 98 a nov 99.

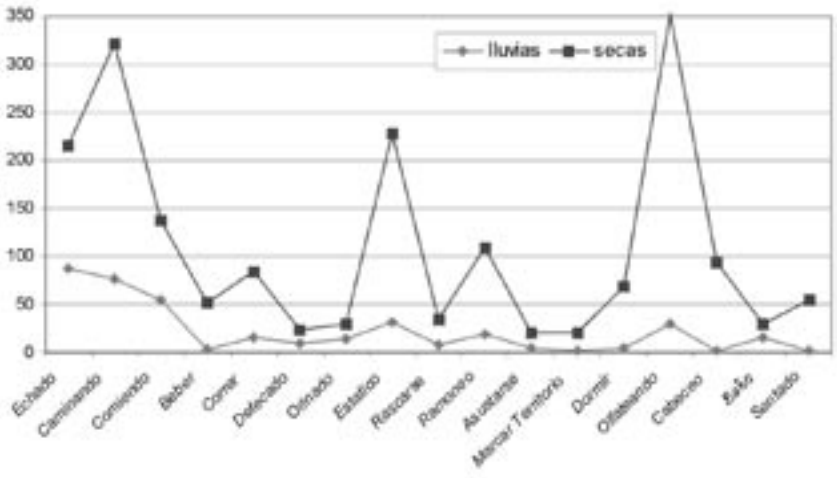

Figure 3. Resultado comparativo en las pautas conductuales individuales de la hembra durante la época de seca (nov-abril-nov) y lluvia (may-oct).

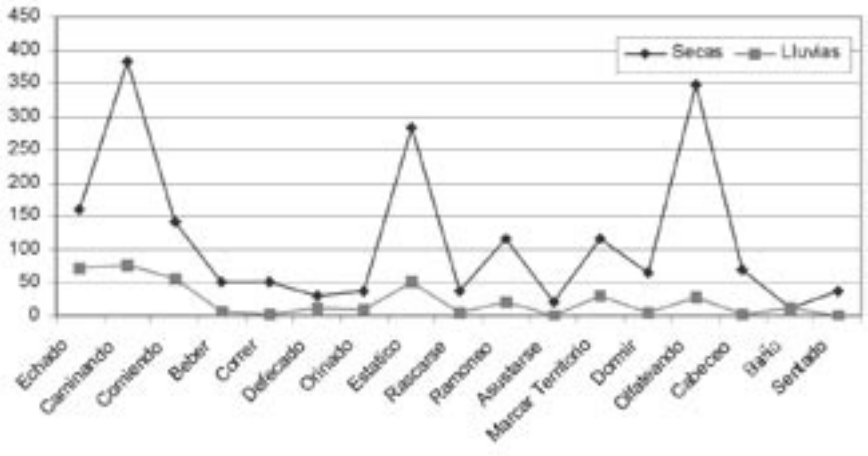

Figure 4. Resultado de las pautas conductuales individuales observadas en el macho durante la época de seca (nov-abril-nov) y lluvia (may-oct).

realizados en Barro Colorado Panamá y en la Reserva de Corcovado, Costa Rica, el primer autor reporta un 88% del tiempo observado a la especie dedicados a la alimentación, mientras que Foerster reporta 71% respectivamente. Aunque estos trabajos fueron realizados en condiciones silvestres, coinciden con las ocurrencias mencionadas anteriormente reportadas para ambos tapires del ZooMAT. Se pudo confirmar que además de la dieta proporcionada, muchos de estos despliegues fueron orientados hacia la búsqueda y consumo de plantas y frutas del encierro, tales como el chico zapote (*Achras zapota*), higo (*Ficus cookii* y *Ficus hemsleyana*) y ramón (*Brosimun aliscatrum*). Comparando los componentes vegetales y sus proporciones en las heces obtenidas del campo (Naranjo y Cruz 1998, Cruz 2001, Lira 2002) y las recolectadas en cautiverio, observamos que la dieta proporcionada en el zoológico es baja en contenido de fibra, esto nos indica que el comportamiento de los animales va enfocado a suplir estas deficiencias lo que a la larga, si no se atiende, puede acarrear serios problemas digestivos en los animales.

En la Figura 1 se agrupan y comparan los resultados obtenidos para ambos animales en las pautas individuales, cabe destacar que gráficamente existe una similitud aparente en ambos comportamientos, pero hay una marcada diferencia en la pauta correspondiente al marcaje de territorio. Como se aprecia en la gráfica, el macho presentó una frecuencia de ocurrencia superior a lo observado en la hembra, comentando además que este marcaje lo repetía en los mismos puntos dentro del encierro. Esta conducta refleja posiblemente el territorialismo de los machos, lo que asegura suficiente alimento en épocas críticas, así como pareja y espacio en condiciones silvestres. Este tipo de marcaje se ha observado en diferentes localidades de campo, sin embargo, no podemos asegurar que las marcas sean de machos. Otro punto importante fue el introducirse a la poza o arroyos con la finalidad de defecar y orinar. El agua ejerce algún tipo de estímulo que les lleva a desencadenar esta acción, sin embargo, no siempre en el caso

de la micción para este estudio, como la defecación para estudios de campo (Cruz 2001, Lira 2002) era llevada a cabo dentro del agua.

Se determinó, con base en la comparación de las pautas reproductivas de la hembra y macho durante el periodo de estudio (Fig. 2), que ambos animales presentan diferencias en cuanto al despliegue de este tipo de conductas, así como también la participación activa de ambos en el proceso de cortejo. Mientras que el macho presenta mayor actividad en pautas como la monta, el olfateo de genitales, los lengüetazos, chasqueo, el fleeming y la erección del pené, la hembra es muy activa en pautas como la monta, danza, mordidas y el silbido. Con el despliegue de estas pautas posiblemente ambos busquen la estimulación visual, auditiva y táctil del otro para prepararlo en el proceso de apareamiento. Se infiere que estos mismos desplantes conductuales son llevados a cabo en vida silvestre, desafortunadamente la dificultad de trabajar en los trópicos dificultan poder confirmar estas observaciones. Aunque durante los tiempos de observación no se registro la cópula, es importante mencionar que este evento sí se llevo a cabo, pudiendo observarla, documentarla y filmarla hasta en cuatro ocasiones, en diferentes intervalos durante un mismo día, la duración máxima de la cópula fue de 4 min. Ambos animales fueron sumamente activos este día, tanto dentro de la poza, como fuera de ella, un sin número de pautas se desplegaron: correr, danzar, mordidas, silbidos, chasquidos, montas, etc.

Por otro lado, se ha observado que existe una diferencia marcada en cuanto a las vocalizaciones realizadas por ambos animales. Mientras que en la hembra se apreció un sin numero de silbidos; que para este estudio no se diferenciaron las distintas frecuencias, con el macho el mayor repertorio de vocalizaciones eran chasquidos largos y cortos. Es importante mencionar que sí se observó que el macho ejecutara alguna vocalización similar al silbido pero en menor grado. Estudios previos en cuanto a vocalizaciones que se han realizado con tapires sudamericanos (*Tapirus terrestris*) en el Zoológico de

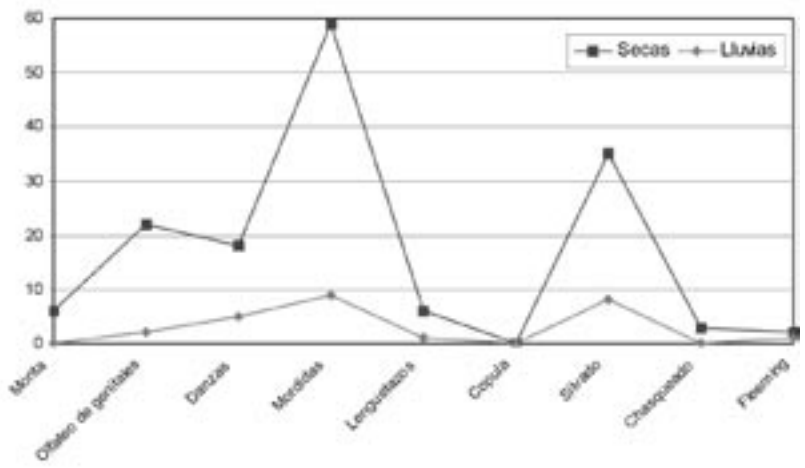

Figure 5. Resultado de las pautas conductuales reproductivas observadas en la hembra durante la época de seca (nov-abril-nov) y lluvia (may-oct).

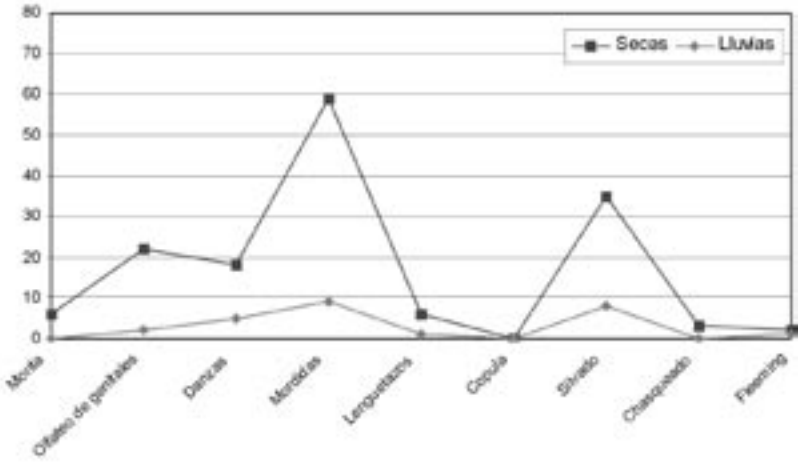

Figure 6. Resultado de las pautas conductuales reproductivas observadas en el macho durante la época de seca (nov-abril-nov) y lluvia (may-oct).

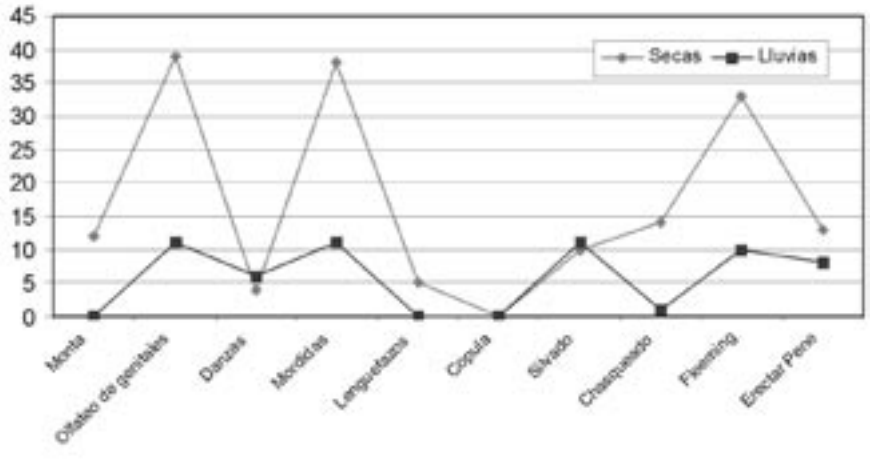

Figure 7. Resultado comparativo de la preferencia de horario observadas en la hembra durante el periodo de nov 98 a nov 99.

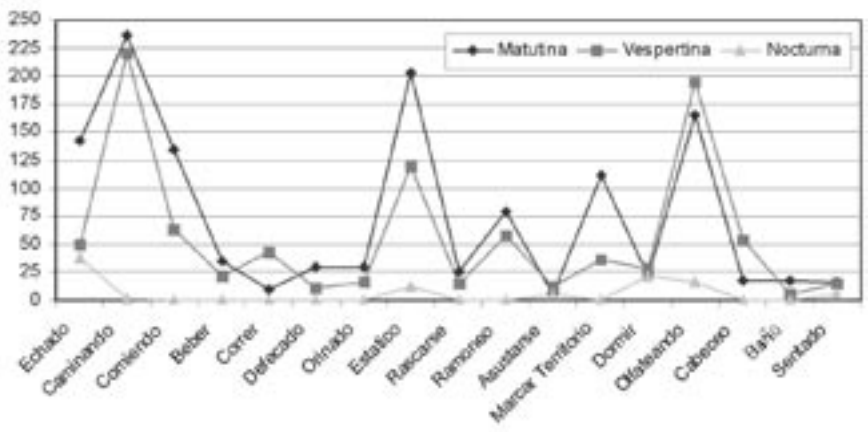

Figure 8. Resultado comparativo de la preferencia de horario observadas en el macho durante el periodo de nov 98 a nov 99.

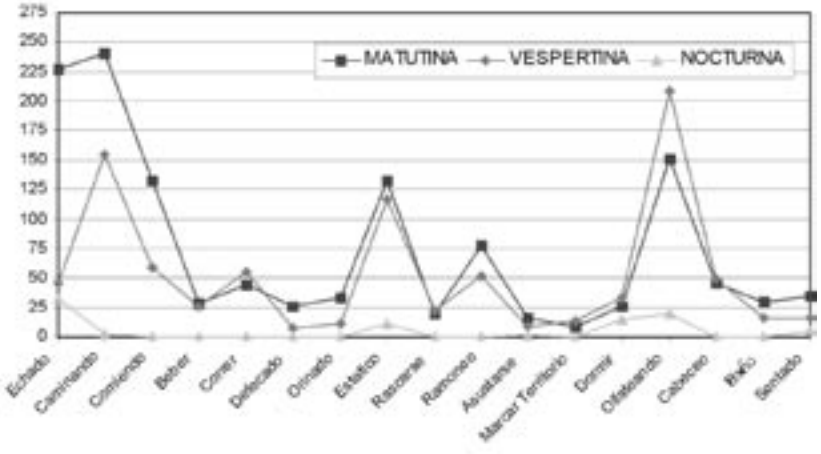

Figure 9. Resultado comparativo de la preferencia de horario obtenidos en las pautas reproductivas de la hembra durante el periodo de nov 98 a nov 99.

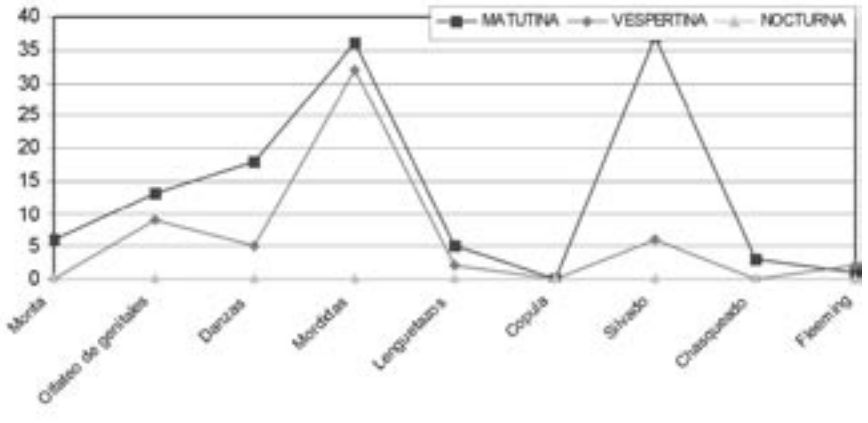

Figure 10. Resultado comparativo de la preferencia de horario obtenidos en las pautas reproductivas del macho durante el periodo de nov 98 a nov 99.

San Diego, se han observado cuatro tipo de vocalizaciones distintas: 1) un chillido agudo fluctuante fue registrado durante distintas respuestas de dolor y miedo por los animales; 2) durante el comportamiento exploratorio presentado por la especie se presentaba un chillido resbaloso de duración y frecuencia más baja y corta, la función de este llamado parece ser hacia mantener a los miembros de la población en contacto uno con otros; 3) un ruido que hacía clic producido por la lengüeta y paladar, utilizado para identificar característica en otro individuo; 4) un resoplido, observado como sonido de amenaza en comportamiento antagonístico durante el encuentro con otro animal (Hunsaker 1965).

Otras pautas que son importante para considerar debido a las diferencias marcadas en los animales son el olfateo de genitales y el fleeming, en ambos casos es el macho quien con mayor insistencia los ejecutó y posiblemente esto tenga la finalidad de detectar en qué estado reproductivo se encontraba la hembra, también se observó que ambos animales se localizaban uno a otro mediante procesos olfativos cuando estaban cerca y a la distancia mediante silbidos agudos (Fig. 2).

En lo que respecta al comportamiento individual desarrollado por época del año (Secas y Lluvias), existen similitudes en cuanto a los resultados obtenidos. Como se puede observar en las Figuras 3 y 4, ambos animales son mucho más activos en el periodo de secas, los meses que más actividad presentaron fueron de Nov-98 a Abril-99. Esto también se ve reflejado en el despliegue de las pautas reproductivas presentadas por los animales (Fig. 5 y 6).

Su actividad se ve disminuida con la llegada de las primera lluvias, donde los animales permanecían más tiempo echados y estáticos llevando a cabo alguna otra actividad, esto se desarrolló entre los meses de May-99 a Oct-99. Por último, con respecto a la preferencia de horario; tanto en el despliegue de conductas individuales y reproductivas, se apreció que ambos animales son muy activos entre las 8:00-11:30 AM y 17:00-19:00 PM, bajando su actividad

en la noche. Esto claramente se ve influenciado por las actividades de manutención por parte del personal del Zoológico, ya que a los animales se les alimentaba dos veces en el trascursos del día (Fig. 7, 8, 9, 10).

Los estudios de conducta no sólo nos permiten profundizar en la biología, ecología y evolución de los animales, sino que dentro de la medicina veterinaria, los podemos usar como una herramienta mas que nos permita anticiparnos a eventos que no concuerdan con los patrones fisiológicos aparentemente normales en ellos. En México y Mesoamérica la información sobre conducta del tapir centroamericano (*Tapirus bairdii*) mantenido en cautiverio es escasa, por lo que los resultados de este estudio son pioneros para México y contribuyen al conocimiento de la biología y ecología de este importante mamífero, permitiéndonos abrir una nueva puerta hacia la implementación de medidas eficaces para su manejo y conservación.

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Notes for Contributors

Scope
This newsletter aims to provide information regarding all aspects of tapir natural history. Items of news, recent events, recent publications, thesis abstracts, workshop proceedings etc concerning tapirs are welcome. Manuscripts should be submitted in MS Word.

Deadlines
There are two deadlines per year. They are 31 March for publication in June and 30 September for publication in December.

Please include the full name and address of the authors underneath the title of the article and specify who is the corresponding author.

Full length articles on any aspect of tapir natural history should not be more than 15 pages in length (including references). An abstract is required and British English spelling is requested.

Figures and Maps
Articles etc can include black and white photographs, high quality figures and high quality maps and tables.

References
Please refer to these examples when listing references:

Journal Article
Herrera, J.C., Taber, A., Wallace, R.B. & Painter, L. 1999. Lowland tapir (Tapirus terrestris) behavioural ecology in a southern Amazonian tropical forest. Vida Silv. Tropicale 8: 31-37.

Chapter in Book
Janssen, D.L., Rideout, B.A. & Edwards, M.S. 1999. Tapir Medicine. In: M.E. Fowler & R. E. Miller (eds.) Zoo and Wild Animal Medicine, pp.562-568. W.B. Saunders Co., Philadelphia, USA.

Book
Brooks, D.M., Bodmer, R.E. & Matola, S. 1997. Tapirs: Status, Survey and Conservation Action Plan. IUCN, Gland, Switzerland.

Thesis/Dissertation
Foerster. C.R. 1998. Ambito de Hogar, Patron de Movimentso y Dieta de la Danta Centroamericana (Tapirus bairdii) en el Parque Nacional Corcovado, Costa Rica. M.S. thesis. Universidad Nacional, Heredia, Costa Rica.

Report
Santiapilli, C. & Ramono, W.S. 1989. The Status and Conservation of the Malayan tapir (Tapirus indicus) in Sumatra, Indonesia. Unpublished Report, Worldwide Fund for Nature, Bogor, Indonesia.

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