

## CONTRIBUTIONS

## Lowland Tapirs in the Nhecolândia Region of the Brazilian Pantanal: Population Density, Habitat Use and Threats

Arnaud Leonard Jean Desbiez<sup>1,2</sup>

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<sup>1</sup> Royal Zoological Society of Scotland, Murrayfield, Edinburgh, EH12 6TS, Scotland  
<sup>2</sup> Associate Researcher, Embrapa Pantanal, Rua 21 de Setembro 1880, Bairro Nossa Senhora de Fátima, Caixa Postal 109, Corumbá 79320-900, Mato Grosso do Sul, Brasil  
 E-mail: adesbiez@hotmail.com or arnaud@cpap.embrapa.br

### Abstract

**The Pantanal is one of the world's largest freshwater wetlands. Most of the land is under private cattle ranching. Using line transect methods, lowland tapir (*Tapirus terrestris*) densities were estimated at 0.21 ind/km<sup>2</sup> in a 200 km<sup>2</sup> area which comprised different landscapes. Tapir density was highest in the forested landscape (0.40 ind/km<sup>2</sup>), and no tapirs were sighted in the floodplain landscape. Hunting was not found to be a major threat in the region. Currently, deforestation and intensification of ranching practices are thought to be the biggest threats to tapir populations in the region. Suggestions for further research on population estimates, impacts of cattle ranching, landscape connectivity and livestock disease transmission are made.**

**Keywords:** density, habitat use, hunting, Pantanal, *Tapirus terrestris*

### Introduction

The Pantanal is an immense floodplain located in the centre of the South American continent, spreading across three countries: 140 000 km<sup>2</sup> belong to Brazil, 15 000 km<sup>2</sup> to Bolivia and 5 000 km<sup>2</sup> to Paraguay. The wetlands consist of mosaics of seasonally inundated grasslands, river corridors, lakes, gallery forests, scrub and semi-deciduous forests which supports an abundance of wildlife including the lowland tapir (*Tapirus terrestris*). The Pantanal is subject to annual floods, but there is considerable variability in flooding intensity and climatic events which will strongly affect the development and dynamics of the fauna and flora (Hamilton *et al.* 1996; Junk & Da Silva, 1999; Nunes da Cunha & Junk, 2004).

Less than 5% of the Brazilian Pantanal is formally protected in national and state parks, or in private protected areas (Harris *et al.* 2005). Almost all the land is occupied by private cattle ranches. Until recently, the low human population density and traditional extensive cattle ranching practices were considered to have little impact on the ecosystem. However, during

the past few decades, economic and political changes have lead to an increase in habitat conversion to open pastures planted with exotic grasses. New technologies and alterations in exploitation practices are being introduced and are often accompanied by environmental degradation, deforestation, damage to watercourses and natural vegetation (Alho *et al.* 1988; Gottgens *et al.* 2001; Seidl *et al.* 2001; Santos & Costa, 2002; Padovani *et al.* 2004).

The Pantanal can be divided in sub-regions based on soil, vegetation and flooding characteristics (Hamilton *et al.* 1996). It is generally considered that lowland tapirs are present in all the sub-regions; however there is still very little information about the species in this biome. I present results on density, habitat use and potential threats to lowland tapirs from the Nhecolândia region Pantanal as well as a discussion of possible research opportunities.

## Methods

### Study Area

Field work took place in a 200 km<sup>2</sup> area, which included six traditionally managed cattle ranches in the Nhecolândia Region of the Brazilian Pantanal. Traditional management means that most of the ranch is comprised of native vegetation, cattle are managed extensively and human impact is generally considered low. The study area included three different landscapes characteristic of the region: 1.) Floodplains, dominated by seasonally flooded grasslands; 2.) Forests, characterised by strips and patches of semi-deciduous forest; and 3.) Cerrado, covered by scrub forest and open scrub grasslands.

### Population Density and Habitat Use

Tapir population densities were estimated through 21 line transects ranging between 3.5 and 5 km that were randomly placed throughout the study area. Seven transects were opened in the forest landscape, six transects in the cerrado landscape, and eight in the floodplain landscape. Line transects were almost always walked alone by the same observer and census began at sunrise. No nocturnal surveys were conduc-

ted. Details of census methods are provided in Desbiez (2007). A total of 2,174 km of transects were walked between October 2002 and November 2004 during which I sighted tapirs 19 times. Distance sampling methods (Buckland *et al.* 2001) could not be applied due to the low number of sightings. Instead, strip transect methods were used. Strip transect counts presume a complete census of all animals within a fixed distance from the transect (Cochran 1977). A 35-meter width from the transect was used, as it was estimated that all tapirs 35 meters from the line transect were seen in all habitat types crossed by the line transects.

### Hunting Assessment

Between April 2004 and November 2005, hunting practices within the Nhecolândia Region of the Pantanal were investigated. A total of 97 semi-structured interviews were conducted in 71 cattle ranches distributed throughout the region. Hunting practices were further investigated through the use of hunting registers and by accompanying hunters in the field.

## Results

### Population Density and Habitat Use

Lowland tapirs were sighted 19 times from the trails. Two of these sightings included a pair (mother and calf and two adults). Sixteen of these sightings were made within a 35 m distance from the trail and were used to estimate densities. Almost half the sightings of tapirs were made in the semi-deciduous forest (46%), 25% were made in the scrub grasslands, 20% in the scrub forest, and 9% in the open grasslands. The overall density of tapirs was 0.21 ind/km<sup>2</sup>. The density of tapirs was highest in the forested landscape 0.40 ind/km<sup>2</sup>, with no tapirs sighted in the floodplain landscape.

### Hunting Assessment

The semi-structured interviews, hunting register and the hunting expeditions I participated in all showed that feral pigs are currently the main hunting target of people living in the Nhecolândia Region of the Pantanal (see Desbiez 2007 for details). Lowland tapirs, which are commonly hunted throughout their distribution, are

**Table 1. Density and sightings of lowland tapirs in the different landscapes of the study area.**

	Overall	Forest landscape	Cerrado landscape	Floodplain landscape
Number of sightings (N)	16	12	4	0
Density of lowland tapirs (ind/km <sup>2</sup> )	0.21	0.40	0.13	0.00

rarely targeted in the Nhecolândia Region. In addition, no human-wildlife conflict between local people and tapirs was reported. While many ranchers complained that collared peccary and deer raid the small crops near settlements, tapirs were never mentioned as a source of contention. Tapirs' well known use of artificial water holes or consumption of supplemental feed or salt and minerals left for cattle was never mentioned as a problem. During the interviews, when directing the conversation towards the use of wild animal hides and leather it was mentioned on several occasions that tapir hides provided one of the strongest leathers known. On two occasions, it was mentioned that tapirs had been kept as pets. In one occasion, an orphan tapir was "found". This tapir lived for many years in close vicinity of the ranch, one day it disappeared and was reported to have established itself near another ranch some 30km away. In another ranch, a baby tapir was captured to be deliberately kept as pet, but it disappeared after a few months.

## Discussion

In this study, walking diurnal line transects was not found to be an appropriate method to estimate tapir density. These results are most likely an under-estimated. When conducting field activities at night, tapirs were observed on a regular basis, whilst during the day they were sighted only 19 times after walking 2,174 km of transects. In the mornings fresh tapir tracks were frequently observed. Faecal deposits either single or in heaps were also regularly found, usually in forested areas (heaps) or at the edge of fresh water and alkaline ponds (single deposits). Other methods such as nocturnal census or camera trapping should be tested in the area to provide more reliable density estimates.

The density of tapirs estimated from this study was lower than estimates reported from two other field sites in the Pantanal. In the Acurizal ranch in the south-western part of the Pantanal, Schaller (1983) estimated a density of 0.64 tapirs/km<sup>2</sup>. However, the estimate is based on a best guess of number of tapir and then only the forested area of the acurizal ranch is considered. Therefore density estimates from Schaller (1983) should only be compared to the forest landscape density estimates from this study (0.40 tapirs/km<sup>2</sup>). In the north-eastern part of the Pantanal in the private reserve Estância Ecológica SESC Pantanal, Trolle *et al.* (2008) estimated a density of 0.55 tapirs/km<sup>2</sup> using diurnal line transects. Trolle *et al.* (2008) obtained 23 tapir sightings after walking only 692 km of transects. I sighted less tapirs after walking more than three times that distance. The higher densities in the SESC Pantanal may be due to the presence of a river and the associate gallery forest habitat. It is also possible that

the higher coverage of dense scrub, and thick forest undergrowth due to the removal of cattle from the area in 1998 favoured the tapir population.

It could be speculated that by decreasing the amount of vegetation coverage cattle may be degrading the habitat for tapirs. Vegetation cover is important for tapirs and in this study, no tapirs and few tapir tracks were observed within the open grasslands of the flood-plain landscape. Overall, cover in this landscape is very low and cattle tend to trample the undergrowth on the small forest islands within this landscape. Cattle regularly enter forested areas to forage or take refuge from wind (Santos 2001), they trample the undergrowth preventing forest regeneration (Johnson *et al.* 1997). This may have an adverse effect on tapir habitat. On the other hand, tapirs were sighted in the cerrado landscape at the height of the dry season where no water besides artificial water points was available. It could therefore also be speculated that traditional cattle ranching may favour tapirs by providing them with a constant supply of water.

During the study, hunting was not found to be a threat in the Nhecolândia region. Overall traditional ranching practices are considered to have contributed to the maintenance of biodiversity and tapir populations in the Pantanal (Seidl *et al.* 2001). However, current changes in ranching practices may impact lowland tapir populations in the near future. Since the early 1970s, ranchers have been clearing land and planting pastures of exotic grasses to increase the carrying capacity for livestock. Ranchers tend to plant pastures on the highest grounds available on their ranch since these are not subject to regular flooding. However, these areas are usually forested (Comastri Filho and Pott, 1996; Seidl *et al.* 2001) and these were the habitats found to have the highest densities of tapirs in this study. In the year 2000, deforested areas in the Pantanal were quantified and mapped, and the largest deforested area detected was for the sub-region of Nhecolândia of which 10% or 2,676 km<sup>2</sup> of the area had been altered for cattle ranching (Padovani *et al.*, 2004). Currently, deforestation and intensification of ranching practices is thought to be the biggest threat to tapir populations in the region.

Tapir habitat connectivity may also be affected by the increase in fences and fencing practices. Traditional fencing in the Pantanal was done with four strands of stretched wire. Larger native mammals such as tapirs crossed them easily. Unfortunately, as properties are being sold, new owners unfamiliar with the region are placing fences with five to six strands that may prevent or at least impede tapirs from crossing these barriers (Comastri Filho and Santos, 2004). Habitat use and connectivity may be affected by these changes, and the impact of these new fences on tapirs needs to be evaluated.

Understanding tapir habitat connectivity throughout the Pantanal needs to be fully appreciated before anthropogenic impacts alter landscapes and tapir habitats. Rivers, marsh areas or large tracks of open seasonally flooded grasslands may act as natural barriers to tapir dispersal. Understanding the permeability of the landscape and identifying what constitutes natural barriers to tapirs within the landscape are important to understand for tapir conservation purposes.

Finally during the lowland tapir PHVA the importance of epidemiological studies on tapirs was highlighted (Medici *et al.* 2007). In the Pantanal, tapirs are in constant contact with livestock. In other regions, disease transmission between native wildlife and livestock has been widely documented (Hudson *et al.*, 2002; Brook and McLachlan, 2006; Morgan *et al.*, 2006; Gortazar *et al.*, 2007). Tapir tracks near salt and mineral licks, cattle food supplements or artificial water points during the dry season have been regularly observed. The opportunity for disease exchange is very high. In addition, the anthropogenic changes in the landscape may affect tapir health. There is evidence that habitat alteration and destruction can disrupt natural epidemiological cycles, leading to an increase or triggering the emergence of infectious diseases and other etiological agents in wild mammals (Daszk *et al.*, 2001). For example, loss of marsh area and habitat shrinkage were blamed for higher tick infestation levels in marsh deer (Szabo *et al.*, 2003). Ticks are well known vectors for disease. The current changes in the landscape as well as tapirs' constant contact with livestock may increase the incidence and prevalence of diseases in the tapir population.

The Pantanal is an exciting place for tapir research. Understanding the ecology of this species in the naturally fragmented, seasonal and diverse landscape of the Pantanal will certainly provide new insights about the species. As for conservation purposes in the region, understanding the ecology of a species that has such a significant impact on shaping and maintaining the diversity of the plant community is very important, particularly as habitat alteration and anthropogenic impacts modify the landscape.

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