

SHORT COMMUNICATION

# The use of highlands by the Lowland Tapir (*Tapirus terrestris*) in the southern Brazilian Atlantic Forest

## O uso de áreas de grande altitude por *Tapirus terrestris* (Mammalia: Perissodactyla) na floresta atlântica meridional, Paraná, Brasil

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### Abstract

The Lowland Tapir (*Tapirus terrestris*), out of the four living tapir species, has the broadest distribution. Although it naturally occurs in a variety of habitats in the Neotropics, including rainforest lowlands, gallery forests, dry chaco forests, and open grassy habitats it is currently classified as vulnerable to extinction. The Lowland Tapir is usually found near water, but there have been a few occurrence records in highland habitats. Here we report on seven records of the Lowland Tapir using highland habitats in four localities in the state of Paraná, southern Brazil. Records included tracks and feces in cloud forests (1,150-1,800 m a.s.l.) and tracks in grasslands ("campos de altitude"; 1,515-1,760 m a.s.l.). Six records were obtained between spring and summer, and one during winter. Although the use of high altitude locations by the Lowland Tapir offers an additional area for population maintenance, the occurrence of the species in these areas could have been driven by increased anthropic pressures in the Atlantic Forest lowlands.

**Key words:** Campos de altitude, cloud forest, conservation, Serra do Mar.

### Resumo

Dentre as quatro espécies atuais de antas, *Tapirus terrestris* tem a mais ampla distribuição. Embora ocorra em uma variedade de ambientes no neotrópico, incluindo florestas de baixada, florestas de galeria, florestas secas do Chaco e ambientes não florestais, é atualmente classificada como vulnerável à extinção. *Tapirus terrestris* é encontrado geralmente perto da água, mas há poucos registros em ambientes de montanha. No presente trabalho, relatamos sete registros da espécie utilizando ambientes de altitude em quatro localidades no Estado do Paraná, sul do Brasil. Os registros baseiam-se em pegadas e fezes na floresta altomontana (1150-1800 m s.n.m.) e em pegadas em campo de altitude (1515-1760 m s.n.m.). Seis registros foram obtidos entre a primavera e o verão, e um durante o inverno. Embora o uso de locais de grande altitude pela espécie ofereça uma área adicional para a manutenção de sua população regional, a sua ocorrência nestas áreas pode ter sido impulsionada pelo aumento de pressões antrópicas nas baixas altitudes da Floresta Atlântica.

**Palavras-chave:** Campos de altitude, floresta altomontana, conservação, Serra do Mar.

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Three out of four extant tapir species are restricted to the New World, with the remaining species found in Asia (Honacki *et al.*, 1982). In the Neotropics, the Lowland Tapir *Tapirus terrestris* (Linnaeus 1758) is the species with the broadest distribution, occurring from northern South America to northern Argentina, being the largest land mammal in this area (Eisenberg and Redford, 1999; Sekiama *et al.*, 2006). The Lowland Tapir is a browser and frugivore (Eisenberg and Redford, 1999) that inhabits rainforests, gallery forests, dry chaco forests, and open grassy habitats usually near water (Cabrera and Yepes, 1940; Bodmer and Brooks, 1997; Emmons, 1997; Vidolin *et al.*, 2009), being considered as “vulnerable” to extinction by the International Union for Conservation of Nature (IUCN) (Naveda *et al.*, 2008).

Although the Lowland Tapir is relatively common in low elevation areas, there are records at elevations as high as 2,000 m in Jujuy, northwestern Argentina (Olrog, 1979), with the highest record being at 2,200 m (Emmons, 1997). In Brazil, the species might also occur at higher altitudes, but the available records are still fragmentary. In southeastern Brazil, the species was recorded in highland forests in the state of Rio de Janeiro (Bergallo *et al.*, 2000), where “occasionally can be found at altitudes exceeding 1,700 m” (Bodmer and Brooks, 1997). The species is listed as occurring in the Itatiaia National Park (Ávila-Pires and Gouvêa, 1977; Geise *et al.*, 2004), at the border of the states of Rio de Janeiro and Minas Gerais, which comprises areas between 700 to 2,787 m a.s.l. (Pádua, 1983), but no further details are given by those authors. On the Serra do Caraça Private Natural Reserve, eastern Minas Gerais, the Lowland Tapir was recorded at 1,380 m and 2,000 m a.s.l. (Moraes *et al.*, 2003), but also no further details were given. In southern Brazil, the highest record known is 1,122 m a.s.l., obtained at the Serra do Ta-

buleiro State Park, eastern Santa Catarina, on Araucaria Forest (Bevilacqua *et al.*, 2002).

A type of vegetation known as cloud or elfin forest is found in highly humid regions between 1,000 to 2,500 m a.s.l. (Walter, 1977). In these formations, trees are approximately 1.5 to 8 m tall and display deformed moss-covered trunks (Hueck, 1972; Klein, 1978; Sehnem, 1979; Maack, 1981; Roderjan *et al.*, 1990; Struminski, 1997). In the state of Paraná, southern Brazil, these forests occur from 900 m (Struminski, 1997) to about 1,850 m a.s.l. (MRB pers. obs.), and are characterized by simplified tree associations (Roderjan *et al.*, 1990). Vegetation above the tree line through humid tropics can form “páramos” (Walter, 1977), which include the Brazilian highland grasslands (Safford, 1999a, b, 2007). From northeastern to southeastern Brazil, the “páramos” are found in the Cadeia do Espinhaço, Serra da Mantiqueira, and Serra do Mar mountains ranges (Vasconcelos, 2011), where they are composed of two distinct formations, namely “campos rupestres” (on the Cadeia do Espinhaço) and “campos de altitude” (on the Serras; Vasconcelos, 2011). In Paraná, the “campos de altitude” occurs generally above 1,200–1,300 m a.s.l. (Roderjan *et al.*, 1990), but at times only above 1,700 m (MRB personal obs.).

We conducted 27 one-day expeditions to areas above 1,000 m a.s.l. in the Serra do Mar mountain range of the state of Paraná (reaching up to 1,800 m a.s.l.) and state of Santa Catarina (reaching up to 1,400 m a.s.l.), southern Brazil, between January 2010 and March 2012. Twenty-one expeditions were made during the spring and summer seasons (13 from January 2010 to March 2011 and eight from October 2011 to March 2012), and six expeditions were carried out during the fall and winter seasons. Phytophysiognomies were identified according to Veloso *et al.* (1991) and IBGE (1992). We recorded tracks and feces of the Lowland Tapir at altitudes above

1,000 m a.s.l. on seven occasions at four localities in eastern Paraná (Table 1, Figure 1). These records were within the following vegetation types: cloud forest (“Floresta Ombrófila Densa Alto-montana”; 1,150–1,800 m a.s.l.; n = 7), montane forest (“Floresta Ombrófila Densa Montana”; < 1,150 m a.s.l.; n = 3), and “campos de altitude” (“Refúgio Vegetacional”; 1,515–1,760 m a.s.l.; n = 2).

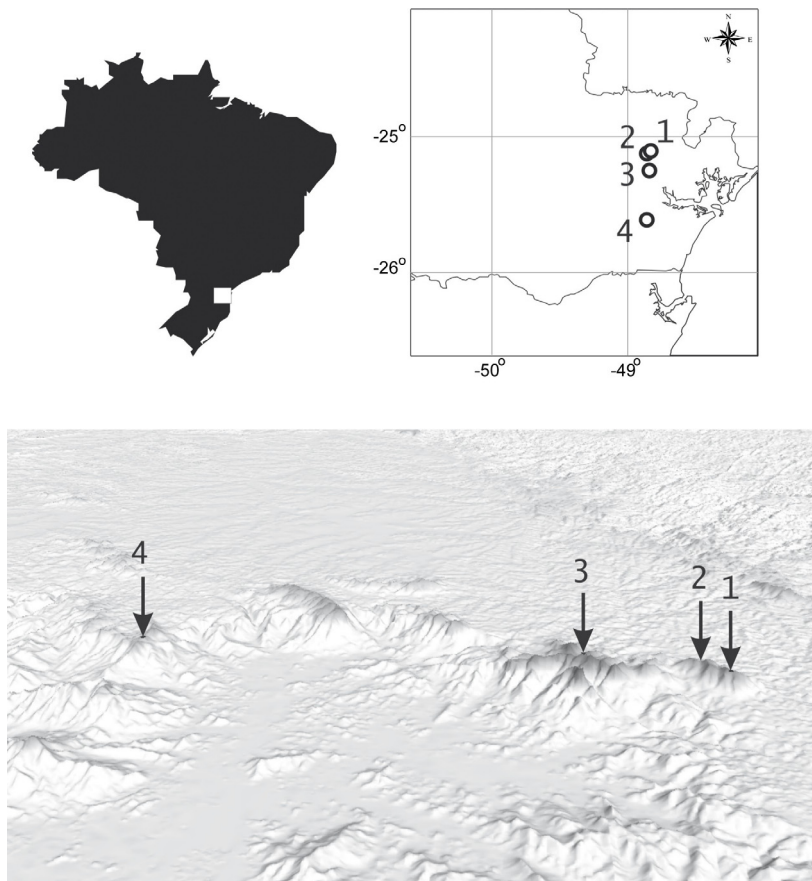
The presence of a large mammal (up to 300 kg; Sekiama *et al.*, 2006) on small patches of “campos de altitude” and in southern Brazilian cloud forests (not much taller than the Lowland Tapir itself) is unexpected, given the lack of available water (see Langone *et al.*, 2008). Most of the records occurred between spring and summer. In the case of Morro dos Padres, the species used cloud forests during these seasons in two consecutive years. In Capivari Grande, the species used cloud forests during both winter and summer. Unfortunately, the lack of details about the records of the Lowland Tapir in highlands of the states of Rio de Janeiro and Minas Gerais prevent us from making direct comparisons with our data.

Because of habitat fragmentation and other human pressures on the Lowland Tapir in southern Atlantic Forest, it has been restricted to forest remnants with large areas (see Mähler Jr. and Schneider, 2003; Margarido and Braga, 2004), as in the case of the forest corridor in mountains in eastern Paraná. This region is home to long-term populations of the species, with abundant records in locations around 800–900 m a.s.l. (MRB and RB-L personal obs.), and there have been rare or occasional recent records in lowlands (see Mazzolli and Hammer, 2008). However, in previous extensive works in the Serra do Mar mountain range in Paraná state, done by MRB during 1988 to 1990 and 2004 to 2005, tapir signs had never been recorded above 1,000 m a.s.l. Therefore, it is possible that the species began using the highland areas recently, perhaps because an increase

**Table 1.** Occurrence records of the Lowland Tapir (*Tapirus terrestris*) at high altitudes in the Serra do Mar mountain range of the state of Paraná, southern Brazilian Atlantic Forest.

Locality	Geographical coordinates <sup>1</sup>	Municipality	Altitudinal range (m) <sup>2</sup>		Vegetation type	Type of record <sup>3</sup>	Date of record (individuals) <sup>4</sup>
			Sampled	Records			
Capivari Grande, Serra do Capivari	25°08'05"S, 48°49'15"W	Antonina	1,300-1,640	1,540-1,570	cloud forest (4.5 m tall)	feces, tracks	February 16, 2010 (1); June 24, 2011 (1)
Capivari Mirim, Serra do Capivari	25°08'59"S, 48°50'17"W	Campina Grande do Sul	1,000-1,560	1,505-1,515	cloud forest (6 m tall) and "campos de altitude" (0.3 m tall)	feces, tracks	October 24, 2011 (1)
Itaipiroca, Serra dos Órgãos	25°14'47"S, 48°50'08"W	Campina Grande do Sul	950-1,800	1,555-1,800	cloud forest (1-6 m tall) and "campos de altitude" (0.5 m tall)	tracks	January 07, 2011 (1)
Morro dos Padres, Serra da Igreja	25°36'36"S, 48°51'19"W	Morretes	550-1,325	835-1,325	montane forest and cloud forest (2-4 m tall)	feces, tracks	November 02 (2) and December 09 (2), 2010; September 03, 2011 (1)

Notes: (1) Taken by a GPS device on the highest point of record. Datum: WGS84. (2) Taken using Google Earth 6.0 software. (3) Documented by photographs, except for Capivari Mirim. (4) Minimum numbers of recognized individuals (Serra da Igreja records only included individuals in cloud forests).



**Figure 1.** Geographical location of the highest occurrence records of the Lowland Tapir (*Tapirus terrestris*) in the state of Paraná, southern Brazil. 1 = Capivari Grande; 2 = Capivari Mirim; 3 = Itaipiroca; and 4 = Morro dos Padres. Elevation map was produced using the software GenGIS (Parks *et al.*, 2009). Shaded areas represent locations above 1,000 m a.s.l.

in the pressures at the Atlantic Forest lowlands (e.g. human occupation, disturbance by domestic dogs, and/or hunting, see Andriguetto-Filho *et al.*, 1998). Hunting is scarce at these elevations, as common game animals (e.g. deer and armadillos) are rare. Although the usage of high altitude habitats by Lowland Tapir could extend the habitat of small populations of the southern Atlantic Forest, the presence of the species in atypical habitats could also be seen as an alert to intensify the conservation efforts at the lowlands.

### Acknowledgements

MRB were funded by grants from REUNI and CAPES, RB-L by grants from CAPES and CNPq/MCT (132893/2009-6 and 141823/2011-9), MRP by a CNPq/MCT grant (571334/2008-3), LKJ by grants from REUNI and PROF/CAPES, and NCC by a CNPq/MCT grant (202267/2011-3). Field work on October, 2011, with D. Baldo, was funded by Fundação Grupo O Boticário de Proteção à Natureza (through the project 0895\_20111). This paper was improved with comments provided by two anonymous reviewers.

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Submitted on July 1, 2012

Accepted on September 13, 2012