

New Records of the White-lipped Peccary (*Tayassu pecari* Link, 1795) for Southern Brazil

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ABSTRACT – The White-lipped Peccary (*Tayassu pecari* Link, 1795) is a species of Tayassuidae family that occurs in neotropical region, living in large herds. The species is now considered Critically Endangered in the Atlantic Forest. Here, we present new records of *T. pecari* for southern Brazil, made at Pelotas River and Turvo State Park, where the species was thought to be extinct. The new records made at this park are probably due to a recolonization throughout the forests of Misiones (Argentina), but this connection has been threatened by the foreseen flood of Panambi's Hydroelectric project.

Keywords: Misiones green corridor; panambi's hydroelectric; pelotas river; tayassuidae; turvo state park.

Novos Registros do Queixada (*Tayassu pecari* Link, 1795) para o Sul do Brasil

RESUMO – O queixada (*Tayassu pecari* Link, 1795) é uma espécie da família Tayassuidae que ocorre na região neotropical, vivendo em grandes varas. A espécie agora é considerada criticamente ameaçada na Mata Atlântica. Neste trabalho, apresentamos novos registros de *T. pecari* para o sul do Brasil, feitos no rio Pelotas e no Parque Estadual do Turvo, onde a espécie era tida como extinta. Os novos registros feitos neste parque provavelmente se devem a uma recolonização a partir das florestas de Misiones (Argentina), mas essa conexão está ameaçada pela inundação prevista pelo projeto hidroelétrico Panambi.

Palavras-chave: Corredor verde de misiones; hidrelétrica panambi; parque estadual do turvo; rio pelotas; tayassuidae.

Nuevos Registros del Pecarí Labiado (*Tayassu pecari* Link, 1795) para el Sur de Brasil

RESUMEN – El Pecarí Labiado (*Tayassu pecari* Link, 1795) es una especie de la familia Tayassuidae que se encuentra en la región neotropical, viviendo en grandes manadas. La especie ahora se considera en peligro crítico en el Bosque Atlántico. En este trabajo presentamos nuevos registros de *T. pecari* para el sur de Brasil, hechos en el río Pelotas y en el Parque Estadual do Turvo, donde la especie se consideraba extinta. Los nuevos registros que se hacen en este parque probablemente se deben a una recolonización a partir de los bosques de Misiones (Argentina), pero esta conexión está amenazada por la inundación prevista por el proyecto hidroeléctrico Panambi.

Palabras clave: Corredor verde de misiones; hidroeléctrica panambi; parque estadual do turvo; río pelotas; tayassuidae.

Introduction

There are two species of peccaries in southern Brazil, the White-lipped Peccary (*Tayassu pecari* Link, 1795) and the Collared Peccary (*Pecari tajacu* Linnaeus, 1758) (Tomas *et al.* 2010). The White-lipped Peccary occurs in herds of up to 200 individuals, while the Collared Peccary's herds can reach up to 50, though they are usually seen in much smaller groups. Among their morphological differences, the White-lipped Peccary has a longer muzzle with a very conspicuous white mark along its inferior jaw, while the Collared Peccary presents a shorter muzzle and a white band that extends from the neck to the shoulder (Mayer & Wetzel 1987, Tomas *et al.* 2010, Duarte & Cerveira 2013). Currently, another suiform, the Wild Boar (*Sus scrofa* Linnaeus, 1758) also occurs as an invasive exotic species in most of southern Brazil (Debert & Scherer 2007).

Despite its wide distribution, the White-lipped Peccary is considered threatened by the International Union for Conservation of Nature (IUCN), classified as Vulnerable, due to population decreases, which are observed even in protected areas, such as the Iguaçu National Park, Paraná, Brazil, as well as in other massive forest formations (Keuroghlian *et al.* 2013). In Brazil, the species is also classified as Vulnerable, though its conservation status depends on the biome considered; for instance, they are placed in the Least Concern category in Amazonia, while being listed as Critically Endangered in the Atlantic Forest (Keuroghlian *et al.* 2012). In southern Brazil, the White-lipped Peccary used to have a wider distribution than it has now, with historical records reaching as far south as the city of Pelotas (Duarte & Cerveira 2013).

The White-lipped Peccary is classified as Critically Endangered in the states of Rio Grande do Sul and Santa Catarina (CONSEMA 2011, Rio Grande do Sul 2014). Recent records for Rio Grande do Sul come mostly from Turvo State Park (Parque Estadual do Turvo – PET) and from Pelotas River basin (Wallauer & Albuquerque

1986, Duarte & Cerveira 2013, Kasper & Mazim 2014). Furthermore, species occurrence at PET was confirmed by Mähler (2000), but a few years later it was considered locally extinct by Kasper *et al.* (2007). The aim of this paper is to report new records of this threatened species for southern Brazil, including the rediscovery in an area where it was thought to be extinct.

Material and Methods

The observations were made in two different areas of southern Brazil: (1) PET and (2) Pelotas River Basin. PET is a protected area, with 17.500ha of Deciduous Seasonal Forest, continuous to the large forests of Misiones province, Argentina (Silva *et al.* 2005). The area in Pelotas River Basin is formed by open fields of highlands (known as “Campos de Cima da Serra”), a formation associated by Atlantic Forests in the slopes of Pelotas River and forest patches of *Araucaria angustifolia* (Bertol.) Kuntze (Marchiori 2002); in this region there are also many farms with large plantations of pine (Figure 1).

The records were obtained opportunistically, while other studies were realized on those areas and are detailed in the results. We observed the animals and took photography and camera trap records, depending on different situations. The photographs were made with DSLR and digital cameras of various models. The camera trap record was made with a Bushnell® Trophy Cam, installed in the road to Yucumã Falls (PET). The map was composed with software QGIS (v. [3.4.7]) (QGIS Development Team 2018).

For the correct identification of the White-lipped Peccary, we took into account the conspicuity of the species' coat pattern and elongated muzzle, which has a distinct white mark along the inferior jaw (Mayer & Wetzel 1987). The Collared Peccary, the only other species of peccary that occurs in southern Brazil, has a shorter muzzle and a white band from the neck to the shoulder (Tomas *et al.* 2010, Duarte & Cerveira 2013).

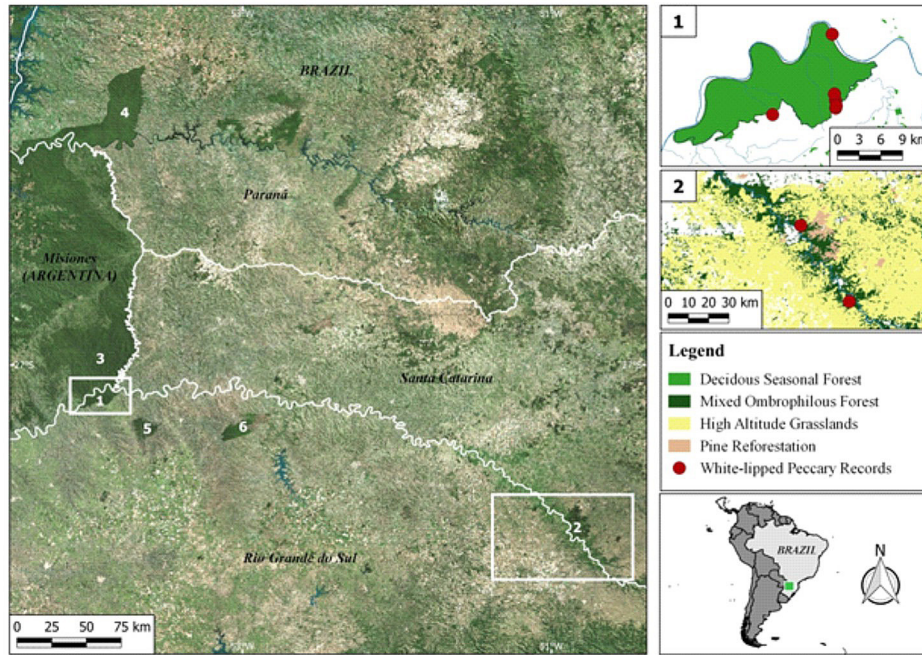


Figure 1 – New records of the White-lipped Peccary (*Tayassu pecari*) in Turvo State Park and Pelotas River, southern Brazil. (1) Turvo State Park, (2) Pelotas River forests, (3) Yabotí Biosphere Reserve, (4) Iguaçu National Park, (5) Guarita Indigenous Land and (6) Nonoai Indigenous Land.

Results

We describe here six new records for the White-lipped Peccary in PET, made from 2013

to 2017 (Table 1). The reports include also some observations about the behavior of the animals (Figure 2).

Table 1 – New records of the White-lipped Peccary (*Tayassu pecari*) in Turvo State Park (PET), Rio Grande do Sul, Brazil.

Date	Observer(s)	Nº of individuals	Location	Coordinates	Observations
April 2013	Direct observation by DA Meller and ME Elsenbach	70	Park's surroundings	27°14'29"S, 53°55'47"W	Eating fruits of <i>Hovenia dulcis</i> ; after the animals were sighted, they fled into the park (Fig. 2A)
March 2016	Video made by FC Carlim and V Grützmann (pers. comm.)	1	Uruguay River	27°08'29"S, 53°51'20"W	One White-lipped Peccary was crossing the Uruguay River, from Yabotí Biosphere Reserve, Argentina, to PET, Brazil (Fig. 2B)
May 2016	Direct observation by DA Meller and JVP Andriola	3	Road to Salto do Yucumã	27°13'27"S, 53°51'06"W	Three animals crossing the road during the day (Fig. 2C)
October 2016	Camera trap installed by DA Meller and V Klein	3	Road to Salto do Yucumã	27°12'57"S, 53°51'10"W	Three animals crossing the road in the early morning (Fig. 2D)
January 2017	Direct observation by I dos Santos and photograph by M Rodrigues (pers. comm.)	50	Edge of the Park, close to Visitors Center	27°14'00"S, 53°51'05"W	Animals were feeding at a remaining corn (Fig. 2E)
May 2017	Photograph by B Nilsen (pers. comm.)	1	Close to a clearing in the Road to Salto do Yucumã	27°13'50"S, 53°51'02"W	(Fig. 2F)



Figure 2 – Records of the White-lipped Peccary (*Tayassu pecari*) in Turvo State Park (PET), Rio Grande do Sul, Brazil. The species was recorded twice in the surroundings of the PET, where it was feeding under *Hovenia dulcis* trees and at corn remains (A and E), it was also recorded once crossing the Uruguay River, from Misiones (Argentina) to PET (B), and it was recorded three times inside the PET, in the road that leads to Yucumã Falls (C, D and F). Photos: A. DA Meller. B. FC Carlim, C. JVP Andriola. D. DA Meller & V Klein. E. M Rodrigues. F. B Nilsen.

We also describe here two new records for the border of the states of Rio Grande do Sul and

Santa Catarina, in the bank of Pelotas River, in 2006 and 2007 (Table 2, Figure 3).

Table 2 – Records of White-lipped Peccary (*Tayassu pecari*) made at the border of the states of Rio Grande do Sul and Santa Catarina, Brazil.

Date	Observer(s)	Nº of individuals	Location	Coordinates	Observations
November 2006	Direct observation by CB Kasper and other researchers	48	Close to the margins of Pelotas River at Bom Jesus municipality, Rio Grande do Sul	28°17'55"S 50°42'25"W	The same group of 48 White-lipped Peccaries was observed in two occasions in this period (Fig. 3A)
2007	Direct observation by CB Kasper and other researchers	Recurrent observations of small herds (10 to 15) along the year	Reforestation of pine (<i>Pinus</i> sp.) at Gateados Farm, Campo Belo do Sul, Santa Catarina	27°57'36"S 50°55'20"W	Native forest and Pine forest (Fig. 3B)



Figure 3 – Records of the White-lipped Peccary (*Tayassu pecari*) in Bom Jesus, Rio Grande do Sul state (A) and in Campo Belo do Sul, Santa Catarina state (B). Photos: CB Kasper.

Discussion

The record of animals crossing the Uruguay River can explain the reappearance of the species after Kasper *et al.* (2007) had considered it locally extinct in PET. We discard the possibility of recolonization throughout the riparian forests of Uruguay and Pelotas Rivers, as these forests are mostly degraded between these two blocks where the White-lipped Peccary were recorded, making recolonization through this pathway very unlikely. Therefore, the record of a specimen crossing the Uruguay River indicates that the recolonization probably happened through the Misiones forests (Argentina) and sets it as a fundamental feature for the survival of the species in PET in a long term. Indeed, the conservation of medium and large mammals in this park is deeply associated with the protection of the “Misiones Green Corridor”, which is assumed to represent a source area not only for the White-lipped Peccary, but for many other species as well (Fontana *et al.* 2003, Silva *et al.* 2005, Paviolo *et al.* 2006, Kasper *et al.* 2007, Meller & Guadagnim 2016). A similar situation happened in Iguaçu National Park, where, after 20 years without records of White-lipped Peccary, the species was rediscovered; the authors also concluded that immigration was the main reason for the population recovery (Brocardo *et al.* 2017).

Some of the records of the White-lipped Peccaries made in PET are remarkable, revealing large herds living in the area. But these records also raise questions regarding the influence of the surrounding area on the peccaries' population. Their consumption of *Hovenia dulcis* fruits is noteworthy, once this is an exotic invasive plant

species, usually considered a threat to native biodiversity (Clavero & García-Berthou 2005). As peccaries are using these fruits as a food resource, as also occurs with other native species (Rocha *et al.* 2008), we suggest that research efforts to understand the importance of *H. dulcis* to their diet should be increased, in order to reevaluate its eradication program proposed by the park's management plan (Silva *et al.* 2005).

White-lipped Peccaries were also recorded consuming corn outside the limits of PET. This is problematic for conservation purposes, as it can cause conflicts with the neighboring farmers. Indeed, this behavior had already been described by Mähler (2000) in areas surrounding the park, suggesting that past conflicts with farmers could have led to a population decrease of the White-lipped Peccary. Nowadays, some farmers have implemented strategies to prevent damage to their crops, especially by the use of electric fences (DAM, pers. obs.). However, the efficiency of such measures still lacks proper testing and, as some species may have become used to feeding on crops, especially those of corn, a sudden obstruction could have negative consequences to the White-lipped Peccary, as to other animals' populations as well. In addition to the White-lipped Peccary, in those kind of crops we also found tracks of *Tapirus terrestris* (Linnaeus, 1758), *Pecari tajacu* and *Mazama americana* (Erxleben, 1777), species which are all classified as threatened in southern Brazil. Incursions outside the park can expose the animals not only to retaliation, but also to preventive slaughter and hunting, another serious threat to the survival of the White-lipped Peccary in PET (Silva *et al.* 2005, Mähler & Schneider 2003).

Unlike the White-lipped Peccaries of PET and Misiones adjacent territory, the population found in Pelotas River is not living in protected areas. Besides that, the groups recorded at Gateados Farm, in Campo Belo do Sul, are under relative protection, since hunting is forbidden inside this private property. Monitored actions of illegal hunting in this farm, however, are scarce. In Bom Jesus, the species is totally unprotected, making it difficult to predict the long term maintenance of the White-lipped Peccary's population in that area.

Additionally, both areas at Pelotas River count with the conspicuously presence of Wild Boars. On the other hand, Wild Boars have not yet been found inside PET, so the native peccaries are exempt of this potential competitor there. Although little is known about the impacts of exotic Wild Boars on other mammals, as an invasive species with similar ecology, they are likely to compete with native peccaries by the overlap of niche. On the other hand, a study in Pantanal showed no impacts in the populations of native peccaries by feral pigs, concluding the exotic species is a threat to wildlife in other ways, such as predators of eggs, destructors of vegetation and reservoirs of diseases (Desbiez *et al.* 2009).

Besides PET and Pelotas River, information based on interviews with the indigenous people indicates that the species used to occur in the Guarita Indigenous Land in the past; however, the species seems to be extinct there since the 70's (Fialho 2007). The White-lipped Peccary has also been recorded in the Nonoai Indigenous Land (Mähler & Schneider 2003), but it has likely disappeared from there too, especially because of the area's isolation in relation to other forest remnants. This local extinction had also been reported for PET (Kasper *et al.* 2007), and could have become permanent if there were no connection with the forests of Misiones (Argentina), represented by the Yabotí Biosphere Reserve. This connectivity, however, has been threatened by the predicted flooding by the Panambi hydroelectric power plant, which can be considered a major risk to the occurrence of the White-lipped Peccary and many other species in the future. These new records, though, keep the park as one of the last refuges of the White-lipped Peccary in Rio Grande do Sul state, where the protection of its populations is listed as one of its specific goals (Silva *et al.* 2005).

Hunting, deforestation, *habitat* degradation and the construction of hydroelectric power plants, which implies in the inevitable modification of the river characteristics, are currently the major threats to the White-lipped Peccary in the southern limit of its distribution. We recommend monitoring through educational activities in the surrounding areas where the White-lipped Peccary has been recorded, to keep up with its situation, inform about its ecological importance and help prevent slaughter of herds.

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