

Field Report

First record of a maned wolf preying on greater rhea

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Abstract

The maned wolf *Chrysocyon brachyurus* is the largest canid in South America; however, its diet primarily consists of fruits, small vertebrates, and invertebrates. Despite extensive studies on its feeding ecology, reports of hunting larger prey are limited. Here, we present a field observation of predation by a male maned wolf on an adult greater rhea *Rhea americana* and the sharing of the carcass with its breeding pair. This event was recorded in the Cerrado biome of Central Brazil providing new insights into the hunting behaviour of maned wolves.

Introduction

The maned wolf *Chrysocyon brachyurus* is the largest representative of the Canidae family in South America, primarily found in the Cerrado biome (Brazilian savanna), a global conservation hotspot (Dietz 1984, Strassburg et al. 2017, Myers et al. 2000). This species is classified as Near Threatened by the IUCN Red List (Paula and DeMatteo 2015) and as Vulnerable in the Brazilian Red Book of Threatened Species (MMA 2022). Unlike their large-bodied canid relatives (>15kg) who often hunt cooperatively in packs to catch large prey, maned wolves are solitary foragers that primarily feed on small prey (Macdonald et al. 2004, Emmons et al. 2012). Additionally, a significant portion of maned wolf diet consists of fruit, especially the wolf fruit, *Solanum lycocarpum* (Dietz 1984, Motta-Junior et al. 2014). Thus, maned wolves are considered a generalist and omnivorous species, being an ecological outlier among large canids (de Arruda Bueno and Motta-Junior et al. 2009, Emmons et al. 2012).

Although detailed descriptions of maned wolf diet date back to the 1980s (Dietz 1984), uncertainties about its feeding ecology persist in the scientific literature. Scat analyses have revealed evidence of larger prey (>10kg) in the maned wolf's diet, including Pampas deer *Ozotoceros bezoarticus*, gray brocket *Mazama gouazoubira* (de Almeida Jácomo et al. 2004), collared peccary *Pecari tajacu* (Rodrigues 2007), giant anteater *Myrmecophaga tridactyla* (Dietz 1984), and greater rhea *Rhea americana* (de Almeida Jácomo et al. 2004). On the one hand, the presence of large animal remains in their faeces does not necessarily confirm that maned wolves actively prey on these adult animals, as they may scavenge carcasses or target only fawns (Dietz 1984). However, Bestelmeyer and Westbrook (1998) documented a

maned wolf chasing and capturing a pampas deer, demonstrating their potential to hunt larger prey. However, they did not observe the actual kill and suggested that this behaviour may be rare. Consequently, doubts remain about how maned wolves attack and kill large prey, as well as the significance and frequency of these events for this species.

Here, we present the first documented record of a maned wolf preying on an adult greater rhea, accompanied by detailed behavioural observations. The greater rhea is South America's largest bird, typically weighing an average of 23kg, but it can reach up to 40kg (Dunning 2007). This predation event was recorded in the central region of Brazil, within the Cerrado biome, by biologists who have been monitoring the local wildlife since August 2018, providing a comprehensive account of the wolves' behaviour during and after the incident. The unprecedented nature of this record, coupled with the ecological significance of the location, underscores the scientific value of long-term fauna monitoring.

Methods

Study area

The Trijunção Farm (4°49'10.11"S and 45°58'35.98"W) is a private estate encompassing approximately 330km², situated at the intersection of three Brazilian states: Minas Gerais (MG), Bahia (BA), and Goiás (GO; Figure 1). The climate is tropical sub-humid with distinct wet (November to March) and dry (May to October) seasons (IBAMA/FUNATURA 2003). The municipality of Jaborandi (BA), where Trijunção is located, ranks among the top five most deforested areas in the Cerrado over the past 23 years (Assis et al. 2019).

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The Cerrado is a biome originally characterised by a gradient of vegetation types, ranging from open formations (grasslands and savannas) to closed-canopy woodlands (Eiten 1972). The primary land cover types in the study area are open-canopy Cerrado “sensu stricto” (180km²; 55%), closed-canopy Cerradão (60km²; 20%), and pastures and agricultural land (30km²; 10%). Trijunção Farm overlaps approximately 120km² of the Grande Sertão Veredas National Park, spanning 2300km² and classified as an IUCN Category II Protected Area (Dudley et al. 2010), forming part of a local mosaic of protected areas.

Wildlife monitoring

Onçafari is an NGO with the aim of preserving Brazilian biodiversity. Maned wolves fitted with GPS/VHF collars (Telonics TGW-4477-4) have been monitored through direct observations almost daily, during two main periods from 05:00 to 08:30 and from 17:00 to 20:30. The GPS/VHF collars provide accurate location data via satellite triangulation (Morris 2003), delivering updates every two hours on the animals' locations. The team uses an antenna mounted on the roof of a car, connected to a receiver that beeps when it detects a VHF signal from one of the collars. When this occurs, the team begins searching for the animal using a directional antenna. Once located, the animal's behaviour and physical characteristics are recorded through photography and direct observation. If the animal shows signs of disturbance, the team withdraws and ends the observation. Generally, the animals are well habituated to human presence and can be closely monitored in the wild.

In addition to direct observations, there were also 34 camera traps (Bushnell, Overland Park, Kansas) placed in areas intensively used by these animals within the study site. They were typically positioned on tree trunks or wooden stakes approximately 40–60cm above the ground.

Results

A male maned wolf was recorded preying on an adult rhea at 19:00 on 20 September 2022, while the Onçafari team was tracking the region's dominant maned wolf pair using radio telemetry. The VHF collar indicated that the wolf being tracked was nearby. The team did not see either the wolf or the rhea until the wolf swiftly leapt, landing its front legs on the rhea and bringing it down. Next, the wolf dragged the rhea's body by its neck towards a depression on the ground, pausing frequently to rest and eat the animal (Figure 2a). Although the depression appeared to be man-made, it had already been covered by native vegetation. The female wolf stood nearby barking insistently and did not participate in the attack or carry the prey. After the male rested beside the carcass for around 40 minutes, the observation was concluded at 20:30. The Onçafari team returned at approximately 21:00 and observed an unidentified maned wolf at the site, consuming the rhea.

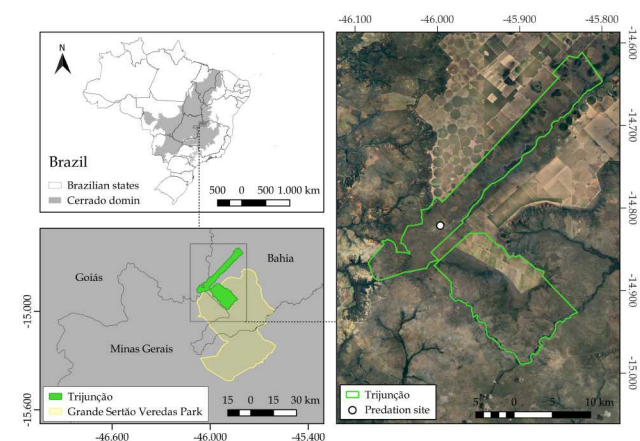


Figure 1. Site of predation of a rhea by a maned wolf, at Fazenda Trijunção, central Brazil.

From the GPS data, there was evidence that the dominant pair returned to the carcass multiple times throughout the night and the following morning (Figure 1b). According to the GPS data there is evidence that the pair was

at the carcass during at least three recorded timepoints between 00:00 and 06:00. Additionally, the male left the carcass at least twice, as indicated by the GPS collar data and confirmed by field team observations. The wolf pair involved in this predation event had four pups at the time, approximately fifteen weeks old, and living approximately 3km from the predation site. From the GPS data, the male movement following the predation event would suggest they might have been feeding the pups at the den with meat from the rhea.

The following morning, a camera trap was set up facing the carcass. On this day at 05:45, the team observed the male wolf returning to the carcass and feeding for 15mins. By 6:40 the wolves had consumed most of the carcass, leaving behind only bones, gizzard, feathers, and legs (Figure 2c). At 21:00, the male returned to the carcass, nuzzled it without consuming any food, and then left. The female appeared at approximately 21:20, sniffed the carcass, and left. She revisited the carcass again on 26 September at 05:00, defecated on it, and then left (Figure 2d).



Figure 2. Predation event of a male maned wolf on an adult rhea: (a) male wolf holding the rhea by its neck, moments after killing it [photo by Sjaack Klaassen], (b) rhea carcass the following morning [photo by Onçafari], (c) male revisiting and feeding on the carcass, (d) female defecating on the carcass.

Discussion

We present the first recorded instance of a maned wolf preying upon an adult rhea, contributing to the current understanding of this canid's behavioural ecology, which previously included only one documented case of predation on large prey (Bestelmeyer and Westbrook 1998). Due to the lack of *in situ* records, it is challenging to ascertain whether hunting large prey is an occasional behaviour or a common practice for this species. Therefore, further evidence is necessary to determine the frequency and influencing factors of this feeding behaviour.

While Bestelmeyer and Westbrook (1998) documented a solitary female maned wolf chasing and preying on a pampa's deer, the swift and silent nature of the predation event we describe here suggests a different strategy: an ambush. The maned wolf's weight (20–33 kg; Paula et al. 2013) is often similar to that of larger prey, which may pose a challenge for predation—particularly given that maned wolves are generally solitary hunters, unlike other social canids. However, our observation demonstrates that maned wolves are capable of overcoming these constraints. In addition to their well-documented strategies for capturing small prey—such as pursuit, pouncing, digging, and aerial leaps (Rodden et al. 2004)—this event suggests that they may also employ chase and ambush tactics to prey upon larger animals.

The predation event occurred in September during the dry season, a period when maned wolves typically consume more small mammals and birds compared to the wet season, when the consumption of various fruits is higher (Dietz 1984, Queirolo and Motta-Junior 2007, de Arruda Bueno and Motta-Junior et al. 2009). This pattern may reflect seasonal opportunism,

influenced by variations in food availability due to natural cycles of abundance, such as fluctuations in fruit production (Rodrigues et al. 2007, Motta-Junior et al. 2014). We raise the possibility that predation on large animals—an event that may generally entails greater energetic costs compared to fruit acquisition—could be associated with a potential scarcity of alternative plant-based food sources.

Considering the availability of food resources, this predation event could also be related to the local abundance of rheas, suggesting that a higher availability of this prey could facilitate their predation by maned wolves. Rhea populations tend to occur at higher density in grasslands than in agricultural areas (Giordano et al. 2008), and the protected grasslands of Cerrado at Trijunção may support an abundant population of these birds.

An alternative hypothesis is that the predation of large prey by maned wolves might be related to their reproductive demands, as these canids raise their offspring during the dry season (Rodden et al. 2004), providing food for them up to seven months after birth (Brady and Ditton 1979). Indeed, in the record of deer predation, the female regurgitated meat for the pups. On this occasion, it is possible that the parents fed the pups with rhea meat, as suggested by the male's movement between the carcass and the direction of the den. Notably, the male shared the carcass with the female, indicating a collaborative effort in providing food for her (De Melo et al. 2009, Emmons et al. 2012). We, therefore, suggest that the energy and protein derived from occasional large prey may be relevant for pups and lactating females.

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Once a year, some animals are captured to fit or replace the collars, following established safety protocols and the environmental licences required by Brazilian authorities (SISBIO - 65035-9).

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Biographical sketches

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