

New distribution records of *Blastocerus dichotomus* Illiger, 1815 (Mammalia: Cervidae) in Minas Gerais, Brazil

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ABSTRACT: Herein we present new distribution records of *Blastocerus dichotomus* in the State of Minas Gerais. Previously, this species had only been recorded inside the Grande Sertão Veredas National Park, in the state of Minas Gerais. Our new record is 110 km southeast of Grande Sertão Veredas NP. Given its “Vulnerable” IUCN status and this new record, it is important to reinforce the need for new surveys and ecological studies that assess its current geographic distribution, and ecological responses to habitat loss, fragmentation and degradation; factors considered main threats to these animals. Doing so will allow for more informed conservation priorities to be determined.

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The Neotropics are a hotspot for cervid conservation. Brazil alone hosts eight species of cervid (Duarte and Merino 1997), two of which are considered threatened with extinction: *Blastocerus dichotomus* and *Mazama nana* (Machado *et al.* 2008). The marsh deer (*Blastocerus dichotomus* Illiger, 1815) is the largest Latin American species of deer, weighing up to 150 kg (Pinder 1996; Duarte and Merino 1997), and measuring up to 1.2 m at the shoulder (Pinder and Grosse 1991; Salazar-Bravo *et al.* 2003). It is one of the few species of deer known to be restricted to wetlands (Schaller and Hamer 1978), and it possesses morphological adaptations such as interdigital membranes, elongated hooves and relatively long limbs that enable it to move through these marshy and flooded environments (Tomas *et al.* 1997).

Originally, marsh deer occurred in several types of wetland throughout Argentina, Bolivia, Brazil, Paraguay, Peru and Uruguay, however today their distribution has been reduced by up to 65% (Pinder and Grosse 1991; Tomas *et al.* 1997; Weber and González 2003 – Figure 1). In Brazil their range is now restricted to northern, western, and southeastern regions of the country, and continues to diminish due to pressures such as habitat loss and fragmentation, and hunting (Dias 1990; Andriolo *et al.* 2005). In addition, the transformation of savanna and riverine habitats into cultivated land and particularly, the construction of hydropower dams, have resulted in the flooding of critical marsh deer habitat (Gribel 1993; Pinder 1994). Combined, these forces have contributed to the dramatic decrease in survival rates of *B. dichotomus* (Wemmer 1998).

Herein, we present novel data on the geographical distribution of *B. dichotomus* in the State of Minas Gerais. The recorded individual was detected during faunal

inventories conducted in the Area of Environmental Preservation Veredas de São Romão (Área de Preservação Ambiental Veredas de São Romão) in Minas Gerais (Figure 1).

This is the first documented record of *B. dichotomus* outside Minas Gerais’ Grande Sertão Veredas National Park, and is approximately 110 km southeast from the closest previously known location. The specimen was detected on December 04, 2011, at APA Veredas de São Romão (45°12’43” W, 16°25’25” S; 45°07’40” W, 16°22’58” S), nearly 20 km to the east of the county of São Romão de Minas, during a field inventory that used both camera traps (Tigrinus) and periods of direct observation. The vegetation type in this location is typically savannah that is directly influenced by flood plains. This habitat is unique in being characterized by flat floodplains where *Buriti* palm trees (*Mauritia vinifera*) and other riparian vegetation grow in abundance. The riparian forests are home to half of all endemic species that occur in the Cerrado ecoregion, and thus comprise an important ecological resource and biological refuge for many faunal species of conservation concern, including the marsh deer (*Blastocerus dichotomus*).

Camera trap efforts totaled 432 hours (72 hours per camera, with six cameras), but the animal was only ever directly observed. The first time the animal was detected, it was in a pasture, eating salt in the lame cows (Figure 2). The second detection was inside a little dam, where farm dogs had driven it (Figure 3). We believe both observations to be of the same individual, as the distance between the detections points was only of 10 km and the time between these detections was only two days.

Several small residual populations of marsh deer are known to persist along rivers of the south of Amazon Basin,

and in wet areas of the Brazilian Cerrado watersheds. However, most of the marsh deer populations are found in floodplains of large rivers, such as the Paraguay, Guaporé, Araguaia and Paraná rivers, and their tributaries (Tomas *et al.* 1997). Pinder (1994) estimated the Brazilian population of marsh deer to be approximately 50,950 animals, with only 1,300 of these occurring in protected areas, and the largest concentration being in the Brazilian Pantanal (States of Mato Grosso and Mato Grosso do Sul). In Minas Gerais, this species had only previously been detected inside the Grande Sertão Veredas National Park (Tomas *et al.* 1997).

The marsh deer is one of the most endangered species in Brazil (Machado *et al.* 2008) and is classified as Vulnerable according to the World Conservation Union (IUCN 2012)

and Appendix I from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It is also one of the least known cervid species (Schaller and Vasconcelos 1978). Large data gaps exist on its biology and distribution (Tomas *et al.* 1997), limiting our ability to classify its continent-wide conservation status (Wemmer 1998). Within the state of Minas Gerais, marsh deer are classified as “critically endangered” (Machado *et al.* 1998; Drummond *et al.* 2008), begetting the need for effective conservation programs (Mourão *et al.* 2000).

It is beyond the scope of this study to determine whether the individual detected is a male that has dispersed from Grande Sertão Veredas National Park, however it is worth noting that the 110 km distance between the detection point and the National Park is more distant than previous work

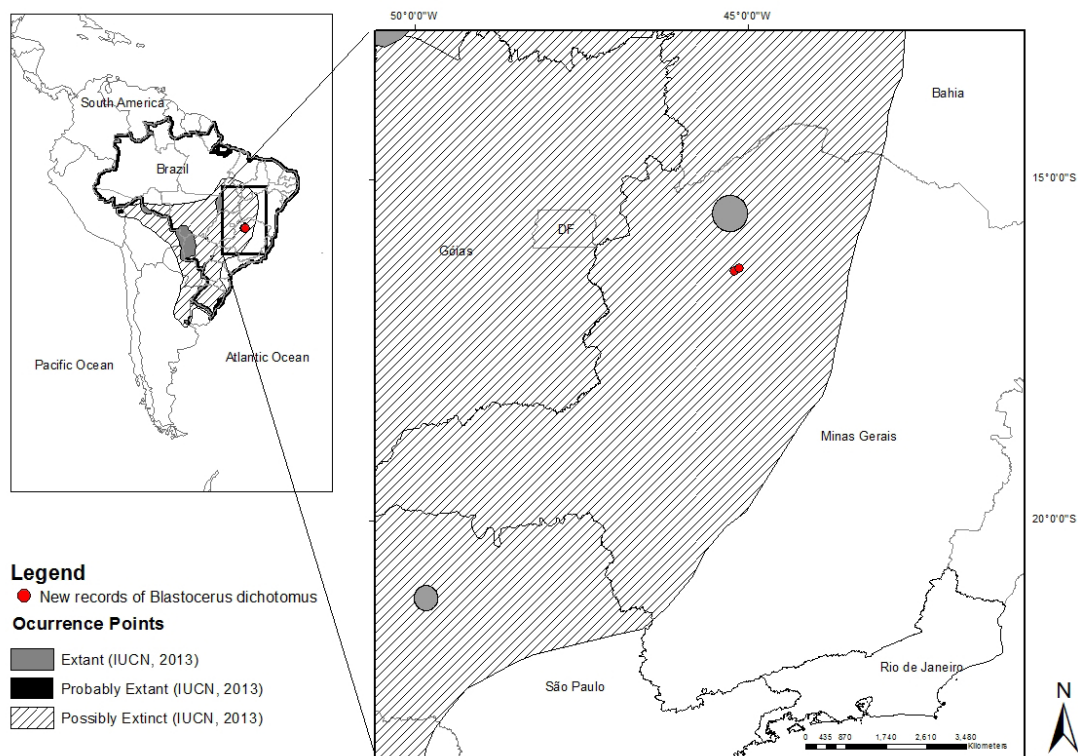


FIGURE 1. Map showing the distribution of *Blastocerus dichotomus* from Brazil, according to IUCN (2013), with the areas where the species is possibly extinct in black stripes, the areas with extant (residents) in dark grey, the areas where the species is probably extant in dark, and with the new record for the state of Minas Gerais in red circle.



FIGURE 2. *Blastocerus dichotomus* detected through direct observation in the county of São Romão (16°25'21.697" S, 45°12'42.986" W) in 4th December 2011, Minas Gerais, Brazil.

has suggested marsh deer home ranges to be. Schaller and Vasconcelos (1978) found that marsh deer populations of the northern Pantanal could move approximately 50 km in response to the advancing and receding of seasonal floods, and a study by Piovezan *et al.* (2010) observed that the home range of a male marsh deer could span 4.839 ± 73 ha. Consequently, our results indicate that the individual detected may have dispersed from Grande Sertão Veredas and has established a new territory in this area, or that it is currently dispersing and in search of new territory.

We emphasize the need for further study of marsh deer dispersal behavior and local surveys to determine whether other individuals, especially females, are present in this area. Studies concerning daily and seasonal migrations of marsh deer are scarce and were not found at all in our bibliographical survey. In addition, the majority of studies using data on distribution used dry and flooding

season data to extrapolate seasonal movements (Schaller and Vasconcelos 1978; Tomas 1986; Mourão *et al.* 2000).

Our results suggest that the Grande Sertão Veredas National Park population of marsh deer is extending its range beyond the park and is establishing territories in areas, such as APA Veredas de São Romão. As a result, new conservation strategies for areas beyond the park boundaries should be addressed. As these areas consist primarily of farmland, educating and informing farmers and local people about marsh deer conservation should be a key priority.

Protection of this species in Brazilian National Parks and Reserves is reportedly poor (Jungius 1976; Schaller and Vasconcelos 1978; Tomas *et al.* 1997); a scenario that has not changed over the last few decades. Although efforts to preserve marsh deer are ongoing, further understanding of its behavior and ecology is needed for effective conservation efforts. This new distribution record reinforces the need for new studies and surveys to acquire a more comprehensive understanding of marsh deer current distribution and the threats facing existing populations. Addressing these knowledge gaps will help inform the development of new policies and identification of priority areas for conservation.

The presence of a marsh deer population in new areas is of considerable importance, because the main known refuge of the marsh deer, the Brazilian Pantanal, is threatened by large-scale deforestation and human alterations of the flood pulse (Rios-Uzeda and Mourão 2012). It is estimated that approximately 40% of the forest and savannah habitats of the Pantanal have been altered due to the introduction of exotic grasses used for cattle ranching (Harris *et al.* 2005), and the construction of over 100 small hydroelectric dams (Rios-Uzeda and Mourão 2012). Given that these land use pressures are expected to continue, establishing conservation areas is a matter of urgency.



FIGURE 3. *Blastocerus dichotomus* detected through direct observation in a wet area in the county of São Romão (16°22'58.732" S, 45°7'46.138" W) in 6th December 2011, Minas Gerais, Brazil.

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