

Effects of habitat fragmentation on the geographic distribution of *Chrysocyon brachyurus* Illiger, 1815 (Carnivora, Canidae) in the State of Minas Gerais

Efeitos da fragmentação de hábitat na distribuição geográfica de Chrysocyon brachyurus Illiger, 1815 (Carnivora, Canidae) no Estado de Minas Gerais

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RESUMO

Efeitos da fragmentação de hábitat na distribuição geográfica de *Chrysocyon brachyurus* Illiger, 1815 (Carnivora, Canidae) no Estado de Minas Gerais. A Mata Atlântica e o Cerrado, apesar da importância para a biodiversidade, sofrem com alterações em seus aspectos fitofisionômicos, em decorrência de ações antrópicas. *Chrysocyon brachyurus* Illiger, 1815, espécie endêmica do Cerrado, está sob ameaça de extinção, e registros deste animal fora de sua área de ocorrência natural, em domínios da Mata Atlântica, são frequentes. Desta forma, este estudo teve como objetivo relatar a ocorrência de indivíduos na região da Mata Atlântica Mineira, mapear os pontos de distribuição do animal no Estado de Minas Gerais, bem como discutir esta expansão geográfica. Registros em áreas de Mata Atlântica são amplos, e esta migração, ocorre, possivelmente, devido à alteração de paisagem neste domínio e, também, no Cerrado. O impacto advindo da exploração antrópica dos recursos naturais ameaça o lobo-guará, uma vez que a fragmentação pode causar descontinuidade nos padrões originais de fluxo gênico; o que é preocupante não somente para a espécie, mas, também, para os organismos que mantêm relações ecológicas com o animal. Medidas de conservação são necessárias para a preservação da espécie e dos biomas em questão.

Palavras-chave: Lobo-guará; Expansão Geográfica; Mata Atlântica.

ABSTRACT

The Atlantic Forest and the Cerrado, despite the importance to biodiversity, suffer from changes in their phytophysiological aspects, due to anthropogenic actions. *Chrysocyon brachyurus* Illiger, 1815, endemic species of the Cerrado, is under threat of extinction, and records of this animal outside its natural occurrence area, in areas of the Atlantic Forest, are frequent. Thus, this study had as objective to reports in the region of the Atlantic Forest of the Minas Gerais State, map the distribution points of the animal in the state, as well as discussing this geographical expansion.



Records in areas of Atlantic Forest are ample, and this migration occurs, mainly, due to the change of landscape in this area, and, also, in the Cerrado. The impact of anthropogenic exploitation of natural resources threatens the maned wolf to extinction since fragmentation may cause discontinuity in the original patterns of gene flow; which is of concern not only to species, but, also, for organisms that maintain ecological relations with the animal. Conservation measures are necessary for the preservation of the specie and biomes in question.

Key words: Maned wolf; Geographic Expansion; Atlantic Forest.

INTRODUCTION

About one-third of the Brazilian forests were converted to agricultural activities¹. This anthropic pressure exerted on the environment results in a process of fragmentation, isolating large areas of native vegetation and modifying the landscape^{2,3}. In this scenario, morphoclimate domains, as Cerrado and Atlantic Forest, are presented in mosaic form, with consequent loss of biodiversity⁴⁻⁷.

Chrysocyon brachyurus Illiger, 1815, maned wolf, is endemic to the Cerrado and key species of the biome in question, due to the ecological functions it performs⁸. Needs extensive and open areas for foraging^{9,10}, making it vulnerable to habitat loss and fragmentation¹¹. It has a wide geographic distribution⁷, and, in the last years, its occurrence was recorded in previously undeclared areas for the species, mainly in the Southeast region of Brazil, in areas under dominance the Atlantic Forest¹¹⁻¹⁴, having its expanded distribution, also, for coastal regions¹⁵.

Currently, the specie is, on the Livro Vermelho da Fauna Brasileira Ameaçada de Extinção – Livro Vermelho da Fauna Brasileira Ameaçada de Extinção¹⁶ as Vulnerable and, on a world scale, is considered almost in danger¹⁷. Seen this, the objective of this work was to discuss the causes and implications of current patterns of geographic expansion of the maned wolf. Also to map the records already obtained for the Atlantic Forest of the State of Minas Gerais available in the literature, considering that the state is under the dominance of the two biomes, which form regions of ecotone¹⁸; as well as submit four new records.

MATERIAL AND METHODS

The records of the present study has been through the meeting of three individuals victims of trampling. Two were registered between the municipalities of Carangola and Faria Lemos, in Minas Gerais, in the years of 2012 e 2014; and one between Carangola and Pedra Dourada, in 2016.

Two individuals were removed from the premises by specialized biologists, prepared as testimonies (skin, skull and genetic material for molecular study) and deposited in the Museu de Zoologia da Zona da Mata Mineira (MZZM), belonging to the Universidade do Estado de Minas Gerais Unidade Carangola (MZZM 267; 436). The animal for the last locality was not collected, since it was already at an advanced stage of decomposition. Your registration is only photographic. The fourth individual was recorded by photography on rural properties by rural dwellers.

A bibliographical survey was carried out to map the occurrence areas of the maned wolf in the Atlantic Forest of the State of Minas Gerais, august 2017 through may 2018, using the databases of the Web of Science and Google Academic. Key words used (in english and portuguese) were applied in combination and/or separately, being these “*Chrysocyon brachyurus*”, “maned wolf”, “Atlantic Forest”, “Cerrado” and “Minas Gerais”.

RESULTS

The two specimens collected were deposited in the exposition collection, where they are used as material for environmental education practices. Figure 1 corresponds to the individual registered in rural properties in the municipality of Carangola.



Figure 1. *Chrysocyon brachyurus* records on rural property.

As for the records obtained in literature, it can be observed that there is a wide distribution of *C. brachyurus* in the State of Minas Gerais and by great extension of Atlantic Forest (Figura 2).

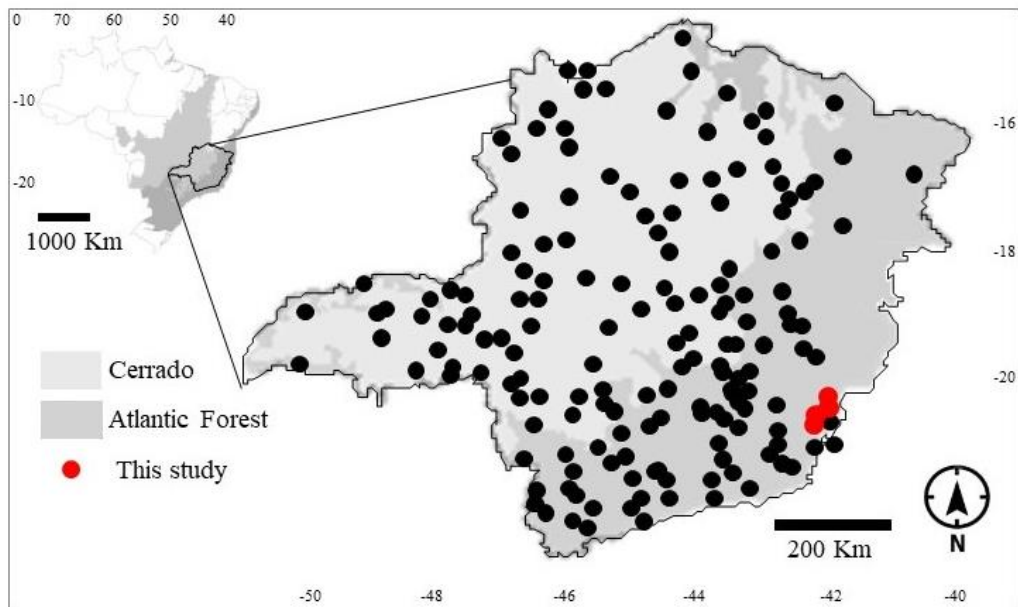


Figure 2. Present distribution of the maned wolf in the State of Minas Gerais, as indicated by the bibliographic data, in relation to the distribution limit of the Atlantic Forest and Cerrado. The points marked in black represent records raised by Quierolo et al., 2011¹² e Torres et al., 2012¹⁹.

DISCUSSION

It is known that the phyto-physiognomic patterns of the Atlantic Forest and the Cerrado are being altered by anthropic actions, factor that imposes different conditions on organisms adapted to them²⁰, and one of the consequences is the change in the pattern of species distribution, since the breakdown of geographical barriers can promote dispersion in new environments²¹.

The maned wolf originally inhabits regions of open forest formations, humid plains and transition zones between the Caatinga and pasture areas. Probably, due to human activities, which consumed much of the original Cerrado territory⁶, the animal was limited to small territorial extensions, which are not sufficient to carry out their ecological activities¹⁰.

A dispersion of the species into the Atlantic Forest is pointed out in several records^{12,22}, being these, mostly, in areas occupied by urban areas and by agricultural activities, reinforcing your preference through open areas and, also, that the increase of open areas in the Atlantic Forest favored the migration to the eastern portion of Brazil. The record presented in this study corroborates this statement.

Although the Atlantic Forest offers some of the food needed for the maned wolf diet, there are negative aspects to this migration. The colonization of the animal in the biome in question can cause harmful effects to the groups that compose the local fauna, affecting the balance of the biota (eg, food webs), besides the probability of introduction of diseases and competitions by resources²³. The reproductive aspects of the maned wolf are also compromised as the female needs a quiet environment to care for her offspring. Having some kind of persistent disturbance, she ends up abandoning or even attacking her offspring⁹, which would compromise the maturation of the new individuals and, consequently, the gene flow of the species.

Many fragments of the Atlantic Forest are surrounded by roads with intense traffic, leaving the species more susceptible, also, to trampling, as sampled in the

area of record of this work., which, moreover, is formed by long pastures of cattle with fragments of forests.

CONCLUSION

The consequences of migration of *Chrysocyon brachyurus* range from reduced food availability to loss of flow and genetic variability. Its occurrence in these new areas may even directly influence the biota balance, and there is still insufficient data to indicate whether this pattern of colonization is a temporary invasion or an adaptive question. These aspects highlight the need for additional conservation measures for the species and for the areas concerned.

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