

BIODIVERSITY LOSS IN THE CERRADO BIOME: EFFECTS OF ENVIRONMENTAL CHANGES ON NATIVE HERPETOFAUNA.

Ana Clara Poloniatto Silva¹
Vivian da Silva Braz²

Universidade Evangélica de Goiás – UniEVANGÉLICA¹²³

ABSTRACT

The Cerrado biome, recognized as the largest tropical savanna in the world, faces an alarming loss of biodiversity, driven mainly by the expansion of agricultural and livestock activities and the conversion of natural habitats into cropland. Between 2010 and 2020, about 6 million hectares of native vegetation were destroyed, resulting in local extinctions and significant population declines. This study aims to examine, through a literature review, the consequences of this degradation on the native herpetofauna of the Cerrado, compiling an inventory of species present in the state of Goiás and highlighting the importance of herpetofauna in natural communities. In addition to identifying the main threats—such as habitat fragmentation and climate change—this work proposes conservation measures, including continuous biodiversity monitoring, restoration of degraded habitats, and the promotion of environmental education. The sustainable management of agricultural activities is emphasized as a crucial strategy to balance agricultural production with biodiversity preservation. The study concludes that effective actions are necessary to mitigate anthropogenic impacts and ensure the sustainability of Cerrado ecosystems.

Keywords: Cerrado; herpetofauna; conservation; biodiversity.

INTRODUCTION

Herpetofauna, consisting of reptiles and amphibians, plays essential roles in ecosystems by influencing food chains, regulating populations of other organisms, and contributing to ecological balance. These animals are fundamental to biodiversity conservation, serving as indicators of ecosystem health and underscoring the importance of environmental preservation. Research on herpetofauna is crucial to understanding ecosystem complexity and fostering awareness of the need to protect these unique species, which are vital to environmental sustainability.

Eleven of the thirteen states comprising the Cerrado biome have suffered significant losses of native vegetation, with 98.8% of this area converted for agricultural use (IPAM, 2021). Currently, livestock and farming activities cover 44.2% of the Cerrado (IPAM Amazônia, 2021).

In the Cerrado, approximately 180 reptile species have been recorded, of which 22 are listed as threatened with extinction. Amphibians in the biome comprise about 150 species, 16 of which are also on the threatened species list.

Biodiversity loss in the Cerrado is a concerning phenomenon, primarily driven by the expansion of agricultural activities, which transform natural habitats into pastures and cropland. This conversion results in the removal of native vegetation and environmental degradation, leading to local extinctions and population declines. Habitat fragmentation also plays a critical role, creating barriers that hinder species dispersal and result in the loss of microhabitats and food sources, thereby increasing predation and competition. Furthermore, the annual conversion of approximately 2 million hectares in the Cerrado severely compromises the survival of many species. Climate change, pollution, overexploitation of natural resources, and the introduction of invasive species also contribute to the decline of these vertebrate populations.

The combination of these factors triggers a severe and accelerating biodiversity crisis, with increased extinction rates and loss of functional diversity, ultimately compromising the resilience of Cerrado ecosystems. Effective conservation and sustainable management measures are therefore urgently needed to reverse this scenario and ensure the preservation of this morphoclimatic domain.

METHODOLOGY

This study was conducted as a literature review (systematic review) of threatened species in the Brazilian Cerrado biome, following the standards and criteria of the IUCN Red List of Threatened Species. Search engines used included SciELO, the CAPES Journal Portal, and especially the *Red Book of Brazilian Fauna Threatened with Extinction* (ICMBio, 2018).

RESULTS

Data show that approximately 180 reptile species have been recorded in Goiás within the Brazilian Cerrado, of which 17 are listed as threatened with extinction. Regarding amphibians, the biome harbors about 150 species, 11 of which are on the threatened species list in Goiás. These species face similar challenges, such as habitat loss,

hunting, and climate change, which compromise their survival and Cerrado biodiversity.

Based on information from the International Union for Conservation of Nature (IUCN) and the *Red Book of Brazilian Fauna Threatened with Extinction* (ICMBio, 2018), several amphibian species were identified as threatened to varying degrees. These include *Allobates brunneus*, *Bokermannohyla napolii*, *Julianus pinimus*, *Boana buriti*, *Boana ericae*, *Scinax rogerioi*, *Ischnocnema karst*, *Rhinella sebbei*, *Crossodactylus franciscanus*, *Adenomera cotuba*, *Leptodactylus tapiti*, and *Proceratophrys rotundipalpebra*. These species face significant threats to survival, underscoring the importance of conservation efforts.

Similarly, reptile species identified as threatened include *Ameiva parecis*, *Kentropyx vanzoi*, *Ditaxodon taeniatus*, *Heterodactylus lundii*, *Bachia didactyla*, *Placosoma cipoense*, *Philodryas lívida*, *Amphisbaena uroxena*, *Apostolepis serrana*, *Apostolepis striata*, *Hydrodynastes melanogigas*, *Philodryas lívida*, and *Bachia psamófila*. These species face challenges that endanger their survival, requiring conservation actions to protect these vulnerable reptiles.

Given the high rates of natural habitat conversion in the Cerrado due to human activity, analyzing the impact of landscape changes on biological diversity is essential. Conservation strategies to protect the native fauna of the Cerrado are fundamental to ensuring species survival and ecosystem integrity.

Key recommendations include the creation and expansion of Protected Areas, since only 6% of the biome's original area is currently protected. Increasing this coverage is crucial to safeguard critical habitats and threatened species. Monitoring and research are also essential, involving continuous studies of biodiversity and the establishment of databases to record species occurrence and population trends. Restoration of degraded habitats is another priority, with recovery programs promoting connectivity among habitat fragments.

Moreover, education and awareness are essential to engage local communities regarding the importance of biodiversity and the impacts of human activities. Sustainable management of agricultural activities must also be encouraged to

minimize environmental degradation and promote coexistence between agricultural production and biodiversity conservation.

Globally, the decline in biological diversity is one of the major environmental challenges caused by human activity. In recent years, habitat destruction, species introduction, overexploitation, pollution, and climate change—along with their interrelations—have resulted in drastic reductions in both population size and distribution of vertebrate species (Ceballos, 2002). This crisis is reflected not only in species loss but also in reductions in distribution ranges and population declines (Ceballos et al., 2017).

CONCLUSION

In summary, the alarming biodiversity loss in the Cerrado biome, primarily due to the expansion of agricultural activities, demands an immediate and effective response. This study highlights that environmental degradation, habitat fragmentation, and climate change are critical factors threatening native herpetofauna and, consequently, the health of Cerrado ecosystems. To mitigate these impacts, it is essential to implement sustainable management of agricultural activities, which not only reduces habitat degradation but also promotes connectivity among fragments, ensuring species survival.

Additionally, educating local communities on the importance of biodiversity and adopting responsible agricultural practices are fundamental. The combination of sustainable techniques and continuous monitoring can balance agricultural production with environmental conservation, promoting soil health, reducing erosion, and increasing biodiversity. These practices minimize the use of chemical inputs, contributing to the preservation of water and soil quality. Thus, effective actions are necessary to preserve Cerrado biodiversity, ensuring ecosystem resilience and a sustainable future for upcoming generations.

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