

**THE ANURANS OF TERRA RONCA STATE PARK, MUNICIPALITY OF SÃO DOMINGOS,
STATE OF GOIÁS, CENTRAL BRAZIL**

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(The anurans of Terra Ronca State Park, municipality of São Domingos, state of Goiás, Central Brazil) – The Terra Ronca State Park is located in the Cerrado biome. Knowledge on the biology and diversity of Cerrado amphibian assemblages is still incipient. The aim of the present research is to subsidize further studies on anuran composition and conservation of the Brazilian savanna by means of a detailed inventory of anurans from the Terra Ronca State Park. Twenty two species in five families were collected: Bufonidae, Cycloramphidae, Hylidae, Leiuperidae and Leptodactylidae. The most abundant family was Hylidae, with 12 species. Compared to other areas of Cerrado, the region explored in this study showed a high rate in relation to the diversity of amphibians. The goal of this research is to improve the knowledge of the biodiversity of the Brazilian Cerrado in order to better preserve such species.

Key words: Herpetofauna, biodiversity, Cerrado.

(Anuros do Parque Estadual Terra Ronca, município de São Domingos, Estado de Goiás, Centro-Oeste, Brasil) – O Parque Estadual Terra Ronca está localizado no Bioma Cerrado. O conhecimento sobre a biologia e a diversidade de espécies de Cerrado ainda é muito escasso. Neste trabalho, nós realizamos um inventário dos anfíbios deste parque, onde foram encontradas e coletadas manualmente 22 espécies distribuídas em cinco famílias: Bufonidae, Cycloramphidae, Hylidae, Leiuperidae e Leptodactylidae. A família mais abundante foi Hylidae, com 12 espécies. Comparada com outras áreas de Cerrado, a região levantada neste trabalho apresentou uma taxa elevada em relação à diversidade de anfíbios. O objetivo desta investigação é o de prestar assistência na composição, compreensão e preservação da biodiversidade do Cerrado brasileiro.

Palavras-chave: Herpetofauna, biodiversidade, Cerrado.

INTRODUCTION

The great heterogeneity of the Cerrado has been used to explain the richness of the herpetofauna found in this biome. The presence of open or closed, humid or dry habitats, distributed side by side in the environment, creates a variety of resources conditions (BRANDÃO & ARAÚJO, 1998). One of the main challenges for the conservation of the Cerrado will be to show the importance of the biodiversity in the maintenance of the ecosystems, since this biome has already lost approximately half of its original formation. This area has been transformed into planted pastures, annual cultures, and in other kinds of antropized areas (KLINK & MACHADO, 2005). According to JUNCÁ (2001), we still face basic problems such as the simple fact that we do not have an effective conservation policy; this causes decline and extinction of populations of amphibians as well as other animals.

Around 6.184 amphibian species are currently known worldwide (FROST, 2007), and the higher richness is found in Neotropical regions (DUELLMAN, 1988). The Brazilian territory holds about 817 species of amphibians (SBH, 2007). This fact warns us about the importance in protect areas with peculiar characteristics. Despite Brazil

have a wide variety of amphibians, little is known about their natural history (HADDAD & SAZIMA, 1992).

The Terra Ronca State Park is located in the Environmental Protection Area of the Serra Geral mountain range. This park holds a large biological diversity, in which over 150 species of birds and nearly 50 species of mammals have been recorded, but so far, only a small work of survey of amphibians has been done in this area, where COSTA *et al.* (2004) found 26 species and published only as a summary of Congress. The vegetation is formed by cerrado, gallery forests, and buriti-palms (*Mauritia flexuosa*), which are excellent habitats for a huge number of animal species. During the rainy season this area comprises several flooded and swampy areas, which are utilized by amphibians as reproduction sites.

The objective of the present research was to carry out a survey of anurans in the Terra Ronca State Park, Municipality of São Domingos, State of Goiás, Brazil, in order to subsidize further studies on anuran composition and conservation of the Brazilian savanna.

MATERIALS AND METHODS

Research design and field methods

The Terra Ronca State Park is an Integral Protection Unit, located between the municipalities of Guarani de Goiás and São Domingos (13°44'06" S, 46°21'25" W), State of Goiás, Brazil, comprising an area of 50,000 ha (Fig. 1). The study area was divided into four sampling units looking cover the various environments in this area: Site I (temporary marsh on both sides of the road); Site II (flooded pasture); Site III (recently transformed into pasture area with small temporary puddles); and Site IV (borders of the road of land GO-536 road that crosses the Park). We sampled the area during the rainy season (October to February), from

2004 to 2006. We captured animals by active method at night, or in the twilight period. After being photographed and taxonomically identified, all collected animals were fixed with 10% formaldehyde, and preserved with 70% etanol. The specimens were deposited in the Coleção de Referência Herpetológica de Universidade de Brasília (CHUNB), Federal District, Brazil. Adult specimens were kept alive accordingly to animal rights procedures under the Instituto Brasileiro do Meio Ambiente e dos Recursos Renováveis (IBAMA) license and process number 240/2005 — CGFAU/LIC.

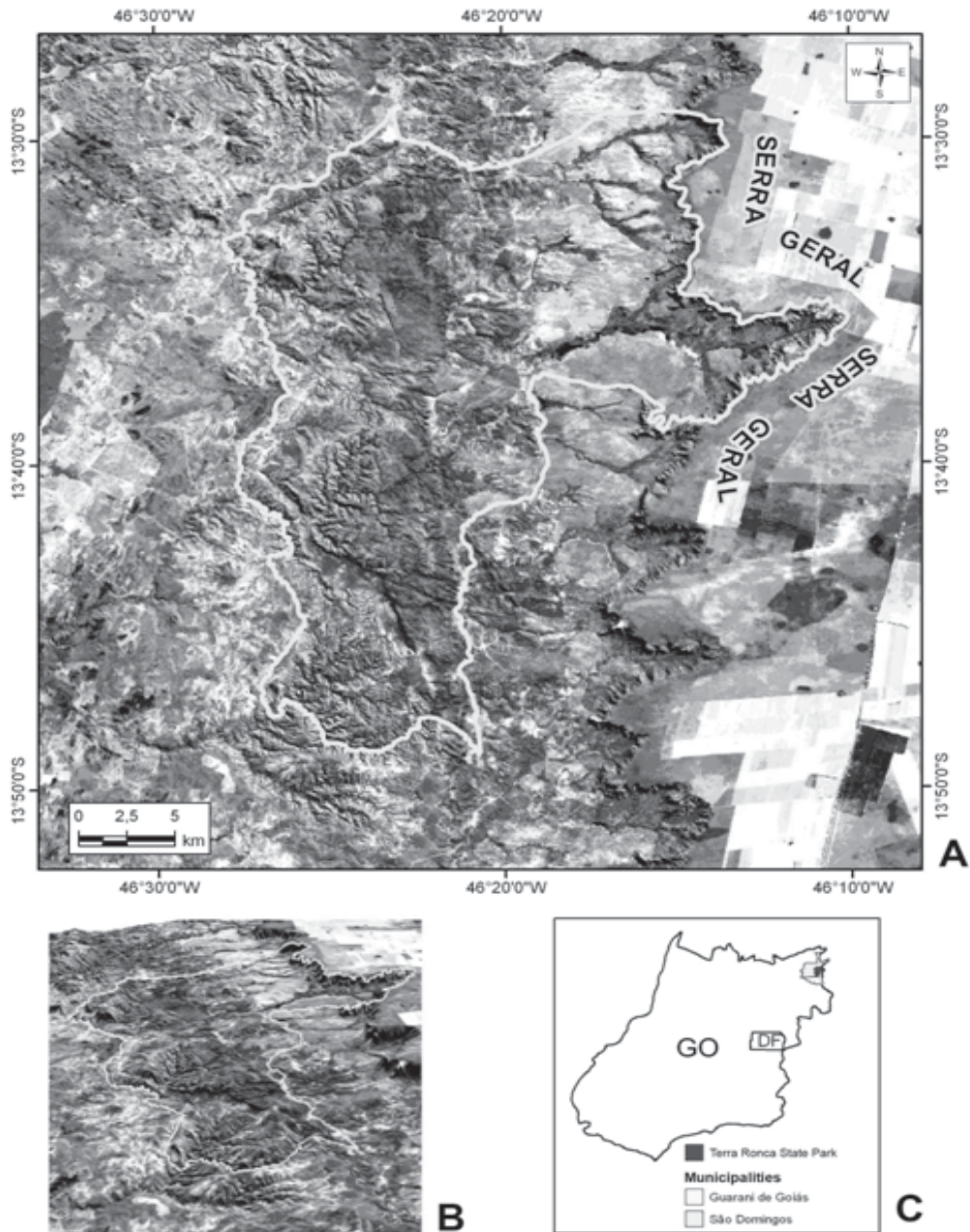


Fig. 1. (A) and (B) RGB images using infrared bands from the Landsat satellite's thematic mapper sensor of Terra Ronca Park. (C) Geographic localization of the Terra Ronca Park, São Domingos, state of Goiás.

Manipulations of data

We compared our data with other sampled areas from Cerrado and/or Tropical Atlantic Forest environments: Upper Tocantins River valley, Goiás State, Cerrado (SILVA *et al.*, 2005); Municipality of Ouro Preto, Minas Gerais State, Cerrado and Atlantic Forest (PEDRALLI *et al.*, 2004); Floresta Nacional de Silvânia, Goiás State, Cerrado (BASTOS *et al.*, 2003); northwestern State of São Paulo, patches of Cerrado remnants and Atlantic Forest (VASCONCELOS & ROSSA-FERES, 2005); Águas Emendadas Ecological Station, Brasília, Federal District, Cerrado (BRANDÃO & ARAÚJO, 1998).

We used the Coefficient of Biogeographic Resemblance—CSB (DUELLMAN, 1990) to compare the anuran composition of Terra Ronca with those from other localities. In order to summarize the relationships among groups of anuran compositions, we entered the resulted coefficients in a Cluster Analysis (UPGMA), using the NTSYS-PC 2.0 statistical software.

RESULTS AND DISCUSSION

We recorded 22 species belonging to 12 genera and five families (Table 1; Figs. 3 and 4). COSTA *et al.* (2004),

found 10 species that were not found by us: *Dendropsophus marmoratus*, *Dendropsophus melanargyreus*, *Hypsiboas lundii*, *Trachycephalus venulosus*, *Leptodactylus cf. andreae*, *Leptodactylus labyrinthicus*, *Leptodactylus mystacinus*, *Leptodactylus cf. podicipinus*, *Leptodactylus troglodytes* and *Elachistocleis bicolor*, and we found 8 species not found for them. This difference shows the importance of work to lift, where even with high-field efforts, the number of species may still be underestimated, as occurs with the majority of work of this genre. Only three species were not identified at the level of species by the team of this work, one belonging to the genus *Rhinella* (= *Rhinella* sp.), one belonging to the genus *Scinax* Wagler, 1930 (= *Scinax* sp.) and one belonging to the genus *Dendropsophus* (This included in the group of *D. microcephalus*) (Table 1). COSTA *et al.* (2004) also not identified a species belonging to the genus *Rhinella* (= *Rhinella* sp.), may or not be the same found by us, considered in this work as just a species for lack of information. Considering only our work, the family that showed most representative ness for this region was the family Hylidae (n=12), followed for the family Leiuperidae (n=4), and family Leptodactylidae, Bufonidae and Cycloramphidae (n=2).

Table 1. Physiognomies of occurrence and breeding site for each species recorded in Terra Ronca Park. Physiognomies: SA, swamp areas CC, campo cerrado; CL, campo limpo; CS, campo sujo; and GF, Gallery Forest. Breeding Sites: SW, swamps; TP, temporary pond; PP, permanent pond; P, puddles; and S, stream. *Mainly in edge gallery forest.

Family/Species	Physiognomy	Breeding Site
Bufonidae		
<i>Rhinella schneideri</i> (Werner, 1894)	CS,CL,SA	-
<i>Rhinella</i> sp. 1	CS,CL,SA	-
Hylidae		
<i>Dendropsophus</i> gr. <i>microcephalus</i> Cope, 1886	CS	SW,PP,
<i>Dendropsophus minutus</i> (Peters, 1872)	SA,CL	SW,PP,TP
<i>Dendropsophus nanus</i> (Boulenger, 1889)	SA,CL	SW,PP
<i>Dendropsophus rubicundulus</i> (Reinhardt & Lütken, 1862"1861)	CS,GF	SW,PP
<i>Hypsiboas albopunctatus</i> (Spix, 1824)	GF*	PP,SW
<i>Hypsiboas crepitans</i> (Wied-Newiwied, 1824)	GF*	PP,SW
<i>Hypsiboas raniceps</i> Cope, 1862	GF*,SA	PP,SW
<i>Phyllomedusa azurea</i> Cope, 1862	GF	S,TP
<i>Scinax fuscomarginatus</i> (A. Lutz, 1925)	CC,CS,CL	SW,PP,TP
<i>Scinax fuscovarius</i> (A. Lutz, 1925)	CC,CS,CL	SW,TP,PP,P
<i>Scinax ruber</i> (Laurenti, 1768)	CC,CS,CL	SW,TP,PP,P
<i>Scinax</i> sp.	CC,CS,CL	SW,TP,PP,P
Leptodactylidae		
<i>Leptodactylus fuscus</i> (Schneider, 1799)	SA,CS,CC	TP,SW
<i>Leptodactylus ocellatus</i> (Linnaeus, 1758)	CS,CL,SA	TP,PP
Leiuperidae		
<i>Eupemphix nattereri</i> Steindachner, 1863	CL	TP,P
<i>Physalaemus centralis</i> Bokermann, 1962	CS,CL,CC	TP,P JUNCÁ
<i>Physalaemus cuvieri</i> Fitzinger, 1826	CC,CS,CL	TP,PP
<i>Pseudopaludicola saltica</i> (Cope, 1887)	CC,SA	TP
Cycloramphidae		
<i>Odontophrynus cultripes</i> Reinhardt & Lütken, 1861"1862"	CS	S
<i>Proceratophrys cf. goyana</i> (Miranda-Ribeiro, 1937)	CS	-



Fig. 3. A – *Leptodactylus ocellatus*, B – *Leptodactylus fuscus*, C – *Pseudopaulidula saltica*, D – *Rhinella schneideri*, E – *Eupemphix nattereri*, F – *Physalaemus centralis*, G – *Physalaemus cuvieri*, H – *Proceratophrys cf. goyana* and I – *Odontophrynus cultripes* (Photos: José Roberto S. A. Leite).

Considering the work of COSTA *et al.* (2004), this species richness (n=32) is similar to that found in other Cerrado areas, as in the upper Tocantins river valley, Goiás State (n=43), Ouro Preto, Minas Gerais State (n=32), Silvânia National Forest, Goiás State (n=29), northwestern São Paulo State (n=27), and Águas Emendadas Ecological Station, Brasília, Federal District (n=26). In all of them, the Family Hylidae obtained the largest species richness. According to Duellman (1988), the families Hylidae and Leptodactylidae comprise the largest number of species in the Neotropical region. However, after the recent fragmentation of Leptodactylidae, the Hylidae Family currently predominates, a fact observed in the present paper for a Cerrado environment, as well as for other environment types (e.g. HADDAD & SAZIMA, 1992; KWET & DI-BERNARDO, 1999; BRANDÃO, 2002; FEIO & CARAMASCHI, 2002; CONTE & MACHADO, 2005).

We observed that the number of sub-arboreal species was the same for terrestrial species (n=10). Only one species was arboreal (*Phyllomedusa azurea*). The Site 4 (borders of the road of land GO-536 road that crosses the Park) obtained the largest species richness (n = 12). This fact could be explained by the migration of anurans to

eventual reproductive sites, or simply because, as an open area, it makes easier to an observer with visual orientation to find and capture anurans.

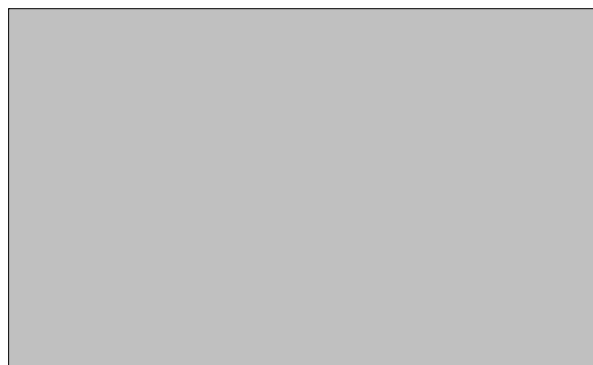


Fig. 2. Cluster analysis (UPGMA) derived from of the groupings carried through on matrix of the Coefficient of Biogeographic Similarity (CSB) for common species. The Cophenetic Correlation Coefficient for the phenogram is 0.91. TR - Terra Ronca/ NSP - northwestern São Paulo / AE - Estação Ecológica Águas Emendadas/ VTO - upper Tocantins river valley / FS - Floresta Nacional de Silvânia / OP - Ouro Preto.



Fig. 4. A – *Hypsiboas albopunctatus*, B – *Hypsiboas creptans*, C – *Hypsiboas raniceps*, D – *Scinax* sp., E – *Scinax fuscovarius*, F – *Scinax fuscomarginatus*, G – *Dendropsophus rubicundulus*, H – *Dendropsophus minutus*, I – *Dendropsophus nanus*, J – *Dendropsophus* gr. *microcephalus*, K – *Scinax ruber*, L – *Phyllomedusa azurea* (Photos: José Roberto S. A. Leite).

The cluster analysis (Fig. 2) showed that anuran compositions of Terra Ronca State Park (present study) and northwestern São Paulo State were most similar, and that from Ouro Preto (Minas Gerais State) the most different. The region of Ouro Preto is composed by a mix of Atlantic Forest and Cerrado, which could lead to the presence of

species from forest formations. However, the northwestern São Paulo State also presents forest formations typical of the Atlantic Forest biome. As stated by VASCONCELOS & ROSSA-FERES (2005), that area is under strong effects of adulteration caused by human, as agriculture, leaving only fragments of Atlantic forest in this area. This fact may cause

the disappearance of amphibians that preferentially inhabit areas of Atlantic Forest in favor of those that survive in more open environments, such as the Cerrado, which could explain the similarity between Terra Ronca State Park and northwestern São Paulo State. With this inventory, we hope to be helping and serving as a guide for future management plans that may preserve this natural heritage as rich as the Cerrado.

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