RICHNESS AND TEMPORAL DISTRIBUTION OF ANURANS AMPHIBIANS IN PIONEER FORMATION AREA IN SOUTHERN BRAZIL

Riqueza e distribuição temporal de anfíbios anuros em área de formação pioneira no sul do Brasil

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ABSTRACT: The lack of knowledge on the diversity, richness and composition of the assemblies, geographical distribution, ecological and evolutionary relationships of amphibian's native species, both in Rio Grande do Sul and in Brazil, is a limiting factor to the planning and decision making on conservation strategies of these animals. The present study aimed to survey anurans amphibian's in an area of pioneer plant formation with fluvial and/or lacustrine influence in São Lourenço do Sul, Rio Grande do Sul, Brazil. The monitoring of the anurans amphibian's fauna existing in the area was conducted through the methodology described by Heyer during twelve months when eighteen anurans species was sampled. Two belonging to the Bufunidae Family, seven to Hylidae, one to Odontophrynidae, three to Leiuperidae, four to Leptocadtylidae, and one, to Microhylidae. The eighteen species sampled in the study area represent an expressive portion of the Pampa biome fauna and becomes an important tool for the handling and conservation of these species.

Keywords: Anurans amphibians. Richness, and Spatial Distribution.

RESUMO: A falta de conhecimento sobre a diversidade, riqueza e composição das assembleias, distribuição geográfica, relações ecológicas e evolutivas das espécies nativas de anfíbios, tanto no Rio Grande do Sul quanto no Brasil, é um fator limitante para o planejamento e tomada de decisões sobre estratégias de conservação destes animais. O presente estudo teve como objetivo realizar o levantamento da riqueza de espécies de anfíbios anuros em uma área de

formação vegetal pioneira com influência fluvial e/ou lacustre no município de São Lourenço do Sul, Rio Grande do Sul, Brasil. O monitoramento da fauna de anfíbios anuros existente na área foi realizado através da metodologia descrita por Heyer. Foram registradas, durante o período de um ano, dezoito espécies de anfíbios. Duas pertencentes à Família Bufunidae, sete para Hylidae, uma para Odontophrynidae, três para Leiuperidae, quatro para Leptocadtylidae e uma para Microhylidae. As dezoito espécies amostradas correspondem a uma parcela expressiva da fauna do bioma Pampa e torna se um instrumento importante para o manejo e conservação dessas espécies.

Palavras-chave: Anfíbios anuros. Riqueza e Distribuição Espacial.

Introduction

Register taxonomic composition and distribution patterns of any group of organisms is one of the basic activities in the study of biodiversity of a given region.

913 species of anurans amphibians occurring are recognized in Brazil (SEGALLA et al., 2012). The lack of knowledge on the existing species is a major limiting in assessing the conservation status of anurans in the state. The studies with amphibians in Rio Grande do Sul are still far from being enough. Most of the work produced is strictly taxonomic, resulting in few biological and environmental data. More precise information on the actual diversity of species in the state is lacking, their biology, distribution, ecological and evolutionary relationships. This information is indispensable for understanding the biodiversity and for planning and making decisions on conservation strategies (GARCIA; VINCIPROVA, 2003).

The dynamics of anurans assemblages can be evaluated qualitatively through the description of the behavior of these animals in time and space. These observations patterns, mainly seasonal, can be explained by abiotic factors such as rainfall, air temperature, water temperature and water depth (FROST, 2007).

According to Toledo et al., (2003) the differential use of resources in anurans may be directly related to the climatic conditions of the region. The lack of knowledge on the diversity, richness, assemblies composition, geographical distribution, ecological and evolutionary relationships of native amphibians species, both in Rio Grande do Sul and in Brazil, is a limiting factor in planning and decision making on conservation strategies of these animals (GARCIA; VINCIPROVA 2003; SILVANO; SEGALA, 2005).

Besides the high diversity of plant and animal species, the southern grasslands ensure important environmental services such as: water conservation, pollinator availability and provision of genetic resources. This is the main forage source for livestock, besides the scenic beauty and as important tourism value (PILLAR et al., 2009). Considering the current degradation state of natural habitats, the importance and need of a greater understanding of the relationships of the characteristic fauna with the effects of anthropic action is verified. The perform of inventories is considered a priority in research with amphibians in Rio Grande do Sul, mainly in forests, natural fields and coastal plain areas (GARCIA; VINCIPROVA, 2003). The grasslands in the Coastal Plain are considered priorities for

conservation by the Ministry of Environment (2002), due to scarce natural areas and the soil fragility of these environments fields.

The amphibians shows a highlighted place in these studies, considering their importance to the bioindicators quality, since this group relates intensely with other groups from the local fauna and has an aquatic larval stage. Therefore, the identification of amphibians' species and the study of their ecological peculiarities are decisive to the success of the actions that seek to conserve the biodiversity (HEYER et al., 1994). The present study aimed to evaluate richness and temporal distribution of amphibian's species in an area of pioneer plant formation with fluvial and/or lacustrine influence in São Lourenço do Sul, Rio Grande do Sul, Brazil.

Figure 1: Cordilheira Farm, area located in São Lourenço do Sul, Rio Grande do Sul, Brazil.

Methodology

Study area

The study area is included in the Inner Coastal Plain (Justus et al. 1986), Cordilheira's farm, in São Lourenço do Sul, Rio Grande do Sul (31º 20'36"S, 51°55'53"O). The climate according to the Köppen classification is humid subtropical (Cfa). Soils are the type Neossolos (STRECK, et al., 2008). The area is composed of vegetation interspersed with clumps of bush country sandbank. The site is classified as dry sandy field, depending on soils with physical characteristic as the high percentage of sand (BERTELS, 1957), which gives the substrate poverty in mineral nutrients (ARAÚJO, 1976) and high permeability (STRECK, et al., 2008).

Sampling method

This study was conducted during three consecutive nights monthly, from October 2012 to September 2013 covering all possible occurrence environments.

The monitoring of the anurans amphibian's fauna existent in the area was performed using two methodologies. During the day, the visual survey method was used, which consists of performing random displacements in the sampling points, recording all specimens seen (CRUMP; SCOTT, 1994). During the night, with the aid of a flashlight, the random visual survey method was used again with a hearing survey (AST – *audio strip transects*) (ZIMMERMAN, 1994). The bibliography used in the specimen's identification was: Di-Bernardo et al. (2004); Lema (2011).

Some individuals of species with taxonomic problems or that have not been recorded in the region yet were listed in the scientific collection of URI – Erechim Campus museum according IBAMA license n° 15224-2.

TABLE I: Amphibian species recorded in samples performed in São Lourenço do Sul, presented by Family/Species and Collection Months (2012-2013)/Species presense.

Family/Species	Collection Months (2012-2013)/Species Presence											
	Out	Nov	Dez	Jan	Fev	Mar	Abr	Mai	Jun	Jul	Ago	Set
BUFONIDAE												
Rhinella arenarum (Hensel, 1867)				X	X	X	X	X	X	X	X	X
Rhinella dorbignyi (Duméril and Bibron, 1841)			X		X	X		X	X			X
HYLIDAE												
Dendropsophus minutus (Peters, 1872)	X	X	X	X	X	X	X	X	X	X	X	X
Dendropsophus sanborni (Schmidt, 1944)	X	X	X	X	X	X	X	X	X	X		X
Hypsiboas pulchellus (Duméril and Bibron, 1841)	X	X	X	X	X	X	X	X	X	X	X	X
Pseudis minuta Günther, 1858	X	X	X	X	X	X	X	X	X	X	X	X
Scinax fuscovarius (Lutz, 1925)	X	X	X	X	X	X	X	X	X	X	X	X
Scinax granulatus (Peters, 1871)	X	X	X	X	X	X	X	X	X	X		X
Scinax squalirostris (Lutz, 1925)	X	X	X	X	X	X	X	X	X	X	X	X
ODONTOPHRYNIDAE												
Odontophrynus americanus (Duméril and Bibron, 1841)	X	X	X									X
LEIUPERIDAE												
Physalaemus biligonigerus (Cope, 1861)	X	X	X	X	X	X	X	X	X	X	X	X
Physalaemus gracilis (Boulenger, 1883)	X	X	X	X	X	X	X	X	X	X	X	X
Pseudopaludicola falcipes (Hensel, 1867)	X			X	X	X			X	X		X
LEPTOCADTYLIDAE												
Leptodactylus gracilis (Duméril and Bibron, 1840)	X	X	X	X	X	X	X	X	X	X	X	X
Leptodactylus latinasus Jiménez de la Espada, 1875	X	X	X	X	X	X	X	X	X	X	X	X
Leptodactylus latrans (Steffen, 1815)	X	X	X	X	X	X	X	X	X	X	X	X
Leptodactylus mystacinus (Burmeister, 1861)	X				X	X	X	X	X	X		X
MICROHYLIDAE												
Elachistocleis bicolor (Guérin-Méneville, 1838)	X	X	X	X	X	X						X

Results and discussion

For the areas sampled in Cordilheira farm (Figure 1), during the period of one year, eighteen (18) amphibian's species were recorded (Table 1); two (2), belonging to the Bufonidae family, seven (7) to Hylidae, one (1) to Odontophrynidae, three (3) to Leiuperidae, four (4) to Leptodactylidae, and one (1) to Microhylidae.

The individuals with higher occurance were: *Dendropsophus minutus*, *Hypsiboas pulchellus*, *Pseudis minuta*, *Scinax fuscovarius*, *Scinax squalirostris*, *Physalaemus biligonigerus*, *Physalaemus gracilis*, *Leptodactylus gracilis*, *Leptodactylus latinasus*, and *Leptodactylus latrans* present in 100% of the samplings followed by: *Dendropsophus sanborni* and *Scinax granulatus* (91,7%), *Rhinella arenarum* (75%), *Leptodactylus mystacinus* (66,7%), *Pseudopaludicola falcipes*, and *Elachistocleis bicolor* (58,3%), *Rhinella dorbignyi* (50%) and *Odontophrynus americanus* (33,3%).

The work performed in Santa Flora farm, São Lourenço do Sul, RS, Brazil by MOREIRA (2010) obtained in his survey seven species (Leiuperidae Family: *Physalaemus biligonigerus*, *Pseudopaludicola falcipes*, and *Physalaemus gracilis*, Leptodactylidae Family: *Leptodactylus latinasus* and *Leptodactylus latrans*, Odontophrynidae Family: *Odontophrynus americanus*, and Microhylidae Family: *Elachistocleis bicolor*. This possibly happened due to the work that Moreira (2010) had been performed in only two samplings, one in winter time and the other in summer time, and also due to the use of pitfall traps and their use only at the beach. Importantly, the method is inefficient for most Hylids because they are able to escape from the traps climbing vertical surfaces (CECHIN; MARTINS, 2000).

The work performed in Parque Nacional da Lagoa do Peixe (PNLP), located in Coastal Plain, comprehending the cities Tavares, Mostardas, and São José do Norte, RS Brazil, by Moreira (2009), in which tadpoles were sampled during day period, recorded ten species divided into five Families: Bufonidae: *Rhinella arenarum* and *Rhinella dorbignyi*, Odontophrynidae: *Odontophrynus maisuma* Rosset (2008) Hylidae: *Hypsiboas pulchellus*, *Pseudis minuta*, Leiuperidae: *Physalaemus biligonigerus*, *Physalaemus gracilis* and *Pseudopaludicola falcipes*, and Leptodactylidae *Leptodactylus gracilis*, *Leptodactylus latrans*, eight species less and with the record of one species not verified in this work: *Odontophrynus maisuma.* Machado et al. (2012) observed in an area located in the buffer zone of Lagoa do Peixe National Park a total of 13 species of adult anurans distributed in four families, 13 species in natural ponds and 11 species in pine ponds. Moreira and Maltchik (2012) identified 17 anuran species in the Lagoa do Peixe National Park.

Final considerations

The present study presented higher species richness of anurans amphibians in the area with pioneer formation compared to pioneer formation area with marine influence (MOREIRA, 2009) in latitudinal relation.

Six species found in this study - Hylidae: *Dendropsophus minutus, Dendropsophus minutus, Dendropsophus sanborni, Scinax fuscovarius, Scinax granulatus, Scinax squalirostris*, and one belonging to the Leptodactylidae Family: *Leptodactylus mystacinus* - were not recorded in the works by Moreira (2009) and Moreira (2010).

None of the species observed in this study is in any list of endangered species, however, the close relationship of these organisms to the ecosystem and their physiognomic fea-

tures, makes the preservation of these formations of internal coastal plain fundamental to the maintenance of communities with such expressive richness as the observed in this study.

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