

## Biological Survey of Cave Invertebrates in the Project: “Cavernas de Mambaí” - Mambaí, Posse, Buritinópolis and Damianópolis, Goiás State, Brazil<sup>1</sup>

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### Abstract

Species richness of cave invertebrate communities was analyzed in five caves located in the Mambaí-Buritinópolis-Damianópolis-Posse Karstic complex, northeastern Goiás state, Brazil. The geological and trophic descriptions of each cave are also presented. At least 81 morpho-species belonging to 65 families of Acarina, Araneida, Opiliona, Palpigradi, Pseudoscorpionida, Scorpionida, Isopoda, Symphyla, Scutigera, Polydesmida, Spirostreptida, Coleoptera, Collembola, Diptera, Dictyoptera, Ephemeroptera, Ensifera, Heteroptera, Hymenoptera, Isoptera, Lepidoptera, Megaloptera, Plecoptera, Psocoptera, Thysanoptera, Trichoptera, Zygentoma and Tricladida were collected. The caves usually possess high resource availability (since they are hydrologically active). The caves of the area are considerably preserved, with invertebrate communities in varied complexity states. The communities of these caves undoubtedly deserve care, since the area is extremely important in the Brazilian biospeleological context.

### Introduction

Although detaining an immense potential of cave occurrence in its territory, the speleological surveys in the State of Goiás are partially implemented. Inserted in the carbonatic region of Bambuí group and located in the northeast extremity of the state, the Terra Ronca State Park is where most of the biospeleological researches of the State are concentrated, conducted by researchers like DESSEN et al, 1980; TRAJANO, 1987; TRAJANO & GNASPINI-NETTO, 1990; TRAJANO, 1992; GNASPINI & TRAJANO, 1994; HORTA & MOURA, 1995. The project “Cavernas de Mambaí” (4)<sup>1</sup> begun in 1997 and it had as initial objective to make a speleological survey of the cave occurrence in the counties of Mambaí, Posse, Damianópolis and Buritinópolis. Because of the high number of caves found in the first years of the project, from the beginning of 2001, the project was completely reformulated having as main objective the creation of a Conservation Unit of sustainable use. So, the project area was reviewed and extended, passing from 60,000 to 175,000 ha. The project is inserted in the poorest region of Goiás State, where the inhabitants do not possess alternatives of jobs, living basically of the subsistence agriculture. So, the tourism appears as a promising alternative for the inhabitants of the area, since in Brazil the natural attractive consists in an excellent ecotourism opportunity (MARRA, 2000). Ecotourism can be officially defined (by EMBRATUR) as being the path of the touristic activity that uses, in a sustainable form, the natural and cultural inheritance, stimulating its conservation and searching the formation of a conservation conscience through the interpretation of the environment. It is, therefore, in this context that the present biospeleological survey is inserted, and it intends to give support to the elaboration of a managing plan for the correct use of the speleological inheritance that exists in the area.

### Study Area

The study area is located approximately 200 km from the Terra Ronca State Park. The project area belongs to the Speleological District of São Domingos (KARMANN & SÁNCHEZ, 1979). The cities included in the project are Mambaí, Posse, Damianópolis and Buritinópolis. Until now, a total of 105 caves were discovered

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in the area. Their linear development varies from some meters until some kilometers of extension as is the case of Tarimba cave, still not totally explored, that presents until the moment about 7 km of linear development.

### Explored caves

**Fazenda da Extrema I Cave** - Coordinates UTM Lat. 374873? Long. 8404776. Cave crossed by the Extrema stream that presents only one conduit, with two development levels. The first one, fossil, is exempt from periodic floods but the second level, located about 4 meters below, is hydrologically active, possessing a stream. In the rainy periods, its main conduct is subjected to overflows due to a strangulation existent in its median portion. The cave possesses nearly 300 meters of linear development, of rectilinear aspect, with about 4 meters width by 7 meters height. In the strangulation the gallery possesses dimensions of 1 by 1 meter. In this point there is an accumulation of argillaceous sediments and vegetal debris carried by the stream. The cave is an oligo- to mesotrophic system, possessing oligotrophic upper galleries and mesotrophic lower galleries, that receive resources continuously.

**Ribeirão dos Porcos Cave** - Coordinates UTM Lat.374938? Long. 8400284. The two galleries of this cave have rectilinear horizontal morphology. The conduits have lenticular horizontal sections and ceiling with near 4 meters high. The stream conduct is predominantly horizontal, developing toward the draining of the Vermelho River. The cave possesses two distinct systems: the superior galleries are permanently dry, but the basal level, located few meters below, is hydrologically active, possessing a stream. The stream conduct is near 250 meters long. This cave, as the previously cited, is also oligo- to mesotrophic, possessing oligotrophic upper galleries and mesotrophic lower galleries, that receive resources continuously.

**Borá IV Cave** - Coordinates UTM Lat. 380315 Long. 8393999. Cave with 1010 meters of horizontal projection. Its rectilinear galleries present horizontal elliptical morphology that, in some points, become irregular. The cave has two entrances, one by the Rio das Pedras and other by the Borá Stream. In the stretch formed by the Borá stream the cave presents ornamented ceilings (3 meters high) and accumulations of sandy sediments in the margins of the stream.

**Rio das Pedras I Cave** - Coordinates UTM Lat. 14°31'54 Long. 46°06'18.2'. Cave with rectilinear morphology, crossed by the Rio das Pedras river in all its horizontal projection. Its only entrance is by the resurgence of this river in an aperture of 13 meters wide by 4 meters high. The cave is predominantly rectilinear horizontal possessing galleries with horizontal elliptical format (transversal sections) with average dimensions of 5 m by 2.50 m high.

**Sumidouro Cave** - Coordinates UTM Lat. 14°19'10. Long.46°14'39.3"? Cave with extension of 2,000 m. This cave presents almost the main conduct following a small stream placed in the basal level. The cave has two entrances, placed diametrically opposite. These entrances have modest dimensions (3 m wide by 1.90 m high). The conduct in downstream direction has a regular morphology, presenting 4 meters width in average. In its laterals some deposits of argillaceous sediment can be observed. The cave, in the medium portion, suffered a great collapse from the ceiling, which divided it in two distinct paths. Upstream the gallery has a horizontal rectilinear morphology, with accumulation of argillaceous sediments. Downstream, the gallery becomes meandrous, more voluminous, more ornamented, divided in three levels. Near the resurgence, we observed some small lateral conduits filled with speleothems.

### Methods

From April to June of 2001 the caves: Ribeirão dos Porcos, Rio das Pedras I, Sumidouro, Fazenda Extrema I had their arthropod fauna collected. The biological survey was made in all potential biotopes such as plant debris and guano piles, and streams and water collections in travertines. The invertebrates were collected with the aid of forceps, brushes, and magnifying glasses, and fixed in 70% etanol. We also used light traps and pitfall traps with liver baits. The individuals were identified until the possible taxonomic level and separated into morpho-species. Voucher specimens are deposited in the laboratory of Ecology and Behavior of Insects (Department of General Biology, Univerdidade Federal de Minas Gerais).

## Results

Taxon	Rio das pedras Cave	Borá IV Cave	Ribeirão dos Porcos Cave	Sumidouro Cave	Faz. Extrema I Cave
ARACHNIDA					
Acarina	XX	XX	XX		
Araneae				XX	XX
Araneidae				XX	
Pholcidae	XX	XX	XX		
Segestriidae			XX		
Sicariidae	XX				
Theridiosomatidae	XX			XX	
Theridiidae	XX		XX	XX	XX
Theraphosidae ( <i>Lastodora</i> sp.)		XX			
Trechaleidae			XX		XX
Ctenidae		XX	XX	XX	XX
Corinidae		XX			
Sicariidae			XX		
Caponidae			XX		
Opiliona				XX	XX
Gonyleptidae	XX				
Not Identified		XX			
Palpigradi					
Eukoniidae (?)	XX				
Pseudoscorpionida				XX	
Scorpionida					
Buthidae ( <i>Tytius</i> sp.)				XX	
MYRIAPODA					
Diplopoda					
Polydesmida					
Chelodesmidae				XX	
Pyrgodesmidae	XX				
Spirostreptida					
Pseudonannolenidae	XX				XX
Scutigeromorpha	XX				
Symphyla	XX				
INSECTA					
Coleoptera					
Carabidae	XX	XX		XX	XX
Curculionidae			XX		
Dermestidae			XX		
Dryopidae				XX	XX
Elmidae	XX	XX	XX		XX
Hydrophilidae	XX				
Pselaphidae	XX				XX
Staphylinidae	XX	XX	XX	XX	XX
Collembola	XX				
Entomobryiidae					XX
Diptera					
Chironomidae	XX				
Culicidae					
Dolichopodidae				XX	XX
Drosophilidae				XX	
Milichiidae				XX	
Mycetophilidae				XX	
Phoridae				XX	
Tipulidae					
Dictyoptera	XX			XX	XX
Ensifera					XX
Grillotalpidae	XX				
Phalangopsidae ( <i>Endecous</i> sp.)	XX			XX	XX

Taxon	Rio das pedras Cave	Borá IV Cave	Ribeirão dos Porcos Cave	Sumidouro Cave	Faz. Extrema I Cave
Ephemeroptera	XX			XX	XX
Heteroptera					
Belostomatidae		XX		XX	
Reduviidae ( <i>Zelurus</i> sp.)	XX		XX	XX	
Ploiariidae				XX	XX
Veliidae					XX
Hymenoptera					
Formicidae	XX		XX	XX	
Formicidae ( <i>Sacryptocerus</i> sp.)		XX			
Evaniidae		XX			
Isoptera			XX		
Nasutitermitidae	XX		XX		
Lepidoptera				XX	
Geometridae	XX				
Noctuidae	XX		XX	XX	
Tineidae	XX		XX		XX
Psocoptera			XX		XX
Liposcelidae			XX		
Psyllipsocidae	XX				
Pseudocaeciliidae			XX		
Megaloptera					
Corydalidae ( <i>Corydalis</i> sp.)		XX			
Trichoptera	XX			XX	XX
Hydropsichyidae			XX		
Plecoptera			XX		
Thysanoptera					XX
Zygentoma					
Nicoletiidae	XX				
Homoptera					
Cixidae		XX			
CRUSTACEA					
Isopoda					
Plathyartryidae ( <i>Trichorhina</i> sp.)		XX		XX	
TREMATODA					
Tricladida				XX	

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