

## LISTS OF SPECIES

### Herpetofauna, Ponte de Pedra Hydroelectric Power Plant, states of Mato Grosso and Mato Grosso do Sul, Brazil

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#### Abstract

This paper presents a check list of amphibians and reptiles of the area under influence of *Ponte de Pedra* hydroelectric power plant on Correntes River (municipality of Sonora), between the Brazilian states of Mato Grosso do Sul and Mato Grosso. The list was the result of collecting efforts of a Faunal Program (inventory, rescue, and monitoring) carried out between November 2003 and April 2005. The list comprises 2 orders (Gymnophiona and Anura), 7 families (Caeciliidae, Bufonidae, Cycloramphidae, Hylidae, Leiuperidae, and Leptodactylidae) 14 genera, and 33 species of amphibians and 3 orders (Testudines, Crocodylia, and Squamata), 20 families (Chelidae, Testudinidae, Alligatoridae, Amphisbaenidae, Anguinae, Gekkonidae, Phyllodactylidae, Gymnophthalmidae, Hoplocercidae, Polychrotidae, Scincidae, Teiidae, Tropiduridae, Anomalepididae, Leptotyphlopidae, Typhlopidae, Boidae, Colubridae, Elapidae, and Viperidae), 51 genera, and 72 species of reptiles.

#### Introduction

The knowledge of vertebrate species composition of a given area is an important factor in conservation projects. Accordingly, the identification of amphibians and reptiles and the study of their ecological characteristics are decisive for the success of actions directed to biodiversity conservation (Heyer et al. 1994). A considerable amount of data related to richness and composition of communities may be assembled through appropriate bibliography and field inventories. Herpetological inventories can offer a wider vision of distributional patterns of a large number of species which optimizes the comprehension efforts of species distribution related to different environmental variables.

A total of 825 species of amphibians (797 Anura, 27 Gymnophiona, and 1 Urodela) and 684 species

of reptiles (6 Crocodylia, 36 Chelonia, 61 Amphisbaenia, 228 Sauria, and 353 Serpentes) are described for Brazil (SBH 2008 a,b). The frequent description of new species suggests a much richer diversity. A significant part of this biodiversity is represented in regions under the influence of *Cerrado*, corresponding to 141 species of amphibians (42 endemic), 5 crocodylians, 10 chelonians, 16 amphisbaenians (8 endemic), 47 saurians (12 endemic), and 107 ophidians (11 endemic) (Colli et al. 2002, Souza 2005). The communities complexity and heterogeneity found in it various phytophysiognomies (Coutinho 1978, Eiten 1972), as well as the influence of adjacent biomes suggest the existence of species geographical distribution patterns linked to these formations (Brandão and Araújo 2001; Colli 2005).

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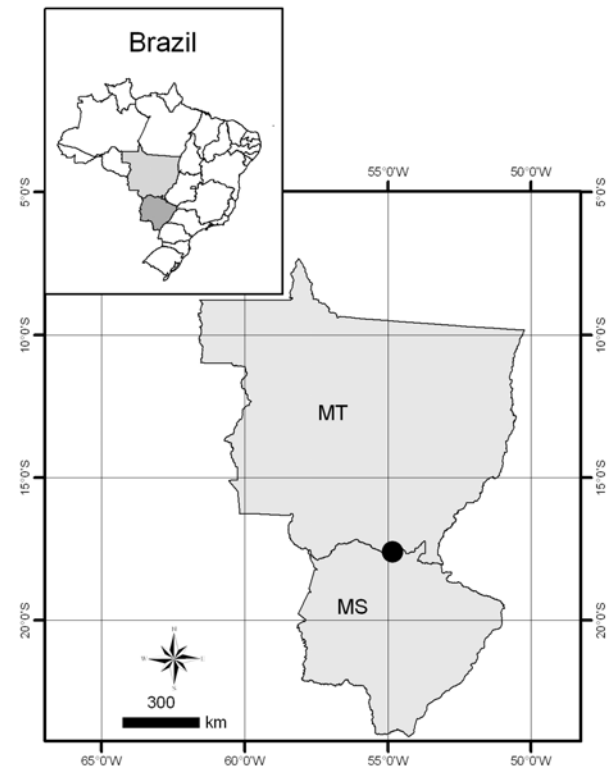
Nowadays the vegetation physiognomies originally found in the Brazilian states of Mato Grosso and Mato Grosso do Sul have suffered intense transformation due to anthropic actions, especially agriculture and pasture (cattle ranching). These environmental modifications implicated in a process of landscape degradation and fragmentation that resulted in the reduction of population sizes, with possible local extinctions (Primack 2002). The states of Mato Grosso and Mato Grosso do Sul possess areas with typical phytogeographies of *Pantanal*, *Cerrado*, and *Chaco* (Prado and Gibbs 1993; Spichiger et al. 2004; Morrone et al. 2004), forming environmental mosaics and ecotones extremely important to understand faunal relationships. Both state are located in a central area of a diagonal strip of open formations, extending from the *Caatinga* (on northeastern Brazil) until the *Chaco* (Argentina) with several contacts among *Pantanal*, *Chaco*, and *Cerrado*. This diagonal strip of open areas houses an enormous diversity of amphibians and reptiles, including endemic species (Bucher 1980; Vanzolini 1988; Cabrera 1995; Duellman 1999; Colli et al. 2002; Souza 2005). Despite the biological and biogeographical relevance this diagonal area has received little attention in studies of regional scope.

This study presents herpetological information of the *Cerrado-Pantanal* ecotones in the limits of the South American open areas between Mato Grosso do Sul and Mato Grosso states. The species list is based on specimens collected during the Program of Faunal Monitoring and Rescue of the *Ponte de Pedra* hydroelectric power plant located in the municipality of Itiquira, state of Mato Grosso.

### Materials and Methods

The *Ponte de Pedra* hydroelectric power plant (*UHE Ponte de Pedra*) is located on Correntes River, municipality of Itiquira, between Mato Grosso and Mato Grosso do Sul states (17°36'31" S and 54°49'40" W), with an estimated reservoir of 14.5 km<sup>2</sup> (Figure 1). The study area is in a shallow valley of granitic rocks with a vegetational mosaic of gallery forests, dense *Cerrado*, open *Cerrado*, with an important presence of *veredas* (swampy areas with unique vascular vegetation). On most of the surrounding areas the environment is fragmented with

agriculture practices (mostly sugar cane and soy bean), with the best preserved areas located adjacent to the power plant dam (downriver).



**Figure 1.** Location of *UHE Ponte de Pedra* on the border of Mato Grosso do Sul (MS) and Mato Grosso (MT) states

Field activities during the faunal inventory were carried out between 11 November 2003 and 10 January 2004, and the post filling faunal monitoring between 18 September 2004 and 10 April 2005. For monitoring we used pit-falls with 18L and 100L plastic buckets distributed in 20 collecting stations in 9 straight lines to a total of 180 traps per collecting station. Distance between buckets was 3 meters, and 4 meters between lines. Each collecting station was composed of 25 buckets of 100L and 155 buckets of 18L in an sampling area of 1,824m<sup>2</sup>. We used 4 collecting stations (totaling 720 numbered pit-falls) in different phytogeographies (open *cerrado*, dense *cerrado*, gallery forest). Traps were visited 4 times (at 8:00, 11:00, 14:00, and 17:00 hours) daily. Animals were transferred to plastic bags or vials with all pertinent collecting data (date, time, and number of pitfall trap).

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During the filling of the reservoir (1 April to 18 September 2004) we used three 6 meter aluminum boats equipped with 40 HP outboard engines with a crew of 1 biologist, 1 assistant, and 1 pilot each. All vegetated areas and land were searched every day, at least 4 times a day, including the reservoir margins. Animals were collected using herpetological hooks, nets, laces, and forceps, and then transferred to plastic vials (several sizes), plastic bags, and cloth bags until their final destination in the biological laboratory at the rescue base. The animals were then separated, identified and registered as to margin and location of collecting in the reservoir.

All collecting activities were legally permitted accordingly to IBAMA 02001.005547/99-49 process and permits IBAMA 0150/2003 and 065/2004-CGFAU/LIC. All collected specimens were deposited at the herpetological collection of the *Museu de Zoologia* of the *Universidade de São Paulo* (MZUSP).

### Results and Discussion

We registered 33 species of amphibians from 14 genera, 7 families, and 2 orders. The most representative families were Hylidae and Leptodactylidae with 45.5 % (N=15) and 24.3 % (N=8) of the total number of species, a normal pattern for the Neotropical region (Duellman & Trueb 1994), followed by Leiuperidae, with 18.2 % (N=6). The families Bufonidae, Cycloramphidae, Microhylidae, and Caeciliidae contributed to only one species (3.0 %) each (Table 1).

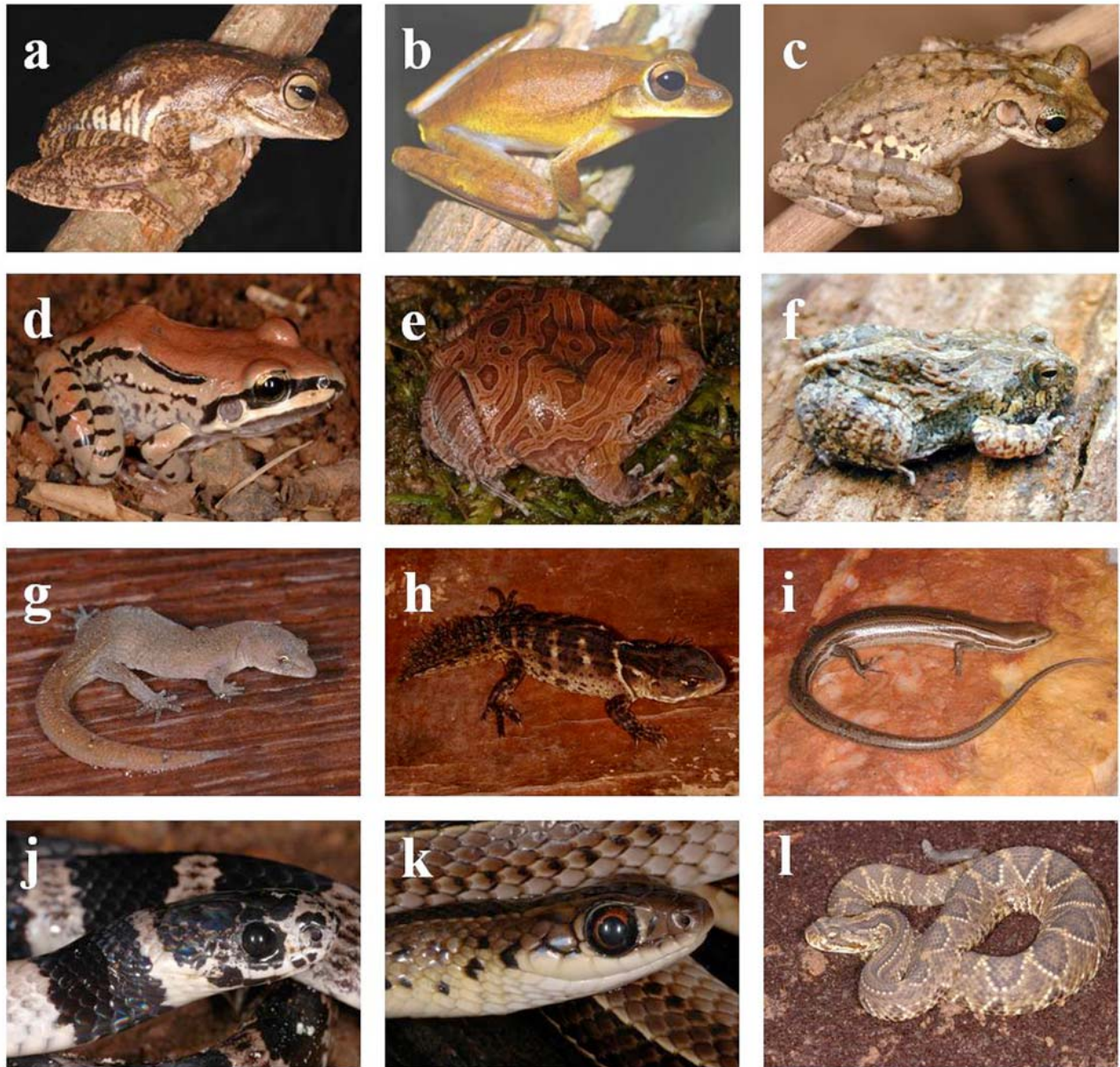
The reptiles were represented by 72 species from 51 genera, and 20 families of the orders Chelonia, Crocodylia, and Squamata. The order Squamata was the most representative, with 95.8 % (N=69) of the reptiles, followed by Chelonia with 2.8 % (N=2), and Crocodylia with 1.4 % (N=1). Amphisbaenians, lizards, and snakes (Squamata) are the categories with higher taxonomic diversity among reptiles. These forms occupy a great variety of habitats and during the filling of the reservoir they are represented with a very expressive number of individuals. Among Squamata the suborders were represented as follows: Amphisbaenia – 1 family, 3 genera and 8

species; Sauria – 9 families, 17 genera and 23 species; and Serpentes – 7 families, 28 genera and 39 species (Appendix 1).

Most of amphibian species is associated to open habitats (especially wetlands) and are generalists. The only species found exclusively in forested habitats was *Osteocephalus taurinus* (Figure 2). *Dendropsophus tritaeniatatus* is listed as endemic to Cerrado (Strüssmann 2000) with a suggested restricted distribution to SE Mato Grosso (Frost 2008). The species *Leptodactylus gracilis* and *Physalaemus bilingonigerus* are typical of Pantanal (Figure 2). These data are suggestive of the ecotone *Cerrado-Pantanal*.

The *Cerrado* reptile species are in most cases poorly represented in herpetological collections making it difficult to produce reliable distributional ranges. Several collected species (*Anolis meridionalis*, *Bachia bresslaui*, *Coleodactylus brachystoma*, and *Hoplocercus spinosus* – Figure 2) are related to this ecosystem (Colli et al. 2002). The remaining species present different distributional patterns: *Mabuya bistrriata* and *Tupinambis quadrilineatus* in the Amazon realm (Ávila-Pires 1995); *Tropidurus guarani*, *Mabuya guaporicola*, *Liophis frenatus*, *Lygophis meridionalis*, and *Philodryas mattogrossensis* are common in Cerrado and Chaco (Ceia 1993, Ávila-Pires 1995, Strüssmann 2000); *Cercosaura schreibersii* and *Mabuya dorsivittata* in Cerrado, Chaco and Pampas (Ávila-Pires 1995); *Mabuya frenata*, *Tropidurus torquatus* and *Sibynomorphus mikanii* (Figure 2) in Cerrado and Atlantic Forest; *Amphisbaena pretrei* e *Micrablepharus maximiliani* in Cerrado and Caatinga (Rodrigues 1996; Gans 1965); *Tupinambis merianae* and *Crotalus durissus* (Figure 2) in all formations south of the Amazon (Ávila-Pires 1995); *Ameiva ameiva* in all of South America (Vitt and Colli 1994); and the cosmopolitan *Hemidactylus mabouia*. However, the majority of species occur in the South American open areas diagonal (Caatinga-Cerrado-Chaco). Despite the results presented here there are several taxa that might represent range extensions or new forms yet to be described owing to complex taxonomic group.

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**Figure 2.** Representative species of amphibians and reptiles from the UHE Ponte de Pedra. a. *Hypsiboas lundii*; b. *Hypsiboas multifasciatus*; c. *Osteocephalus taurinus*; d. *Leptodactylus mystacinus*; e. *Eupemphix nattereri*; f. *Physalaemus biligonigerus*; g. *Coleodactylus brachystoma*; h. *Hoplocercus spinosus*; i. *Mabuya guaporicola*; j. *Sibynomorphus mikanii*; k. *Liophis meridionalis*; l. *Crotalus durissus*.

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**Acknowledgements**

We are grateful to the UHE Ponte de Pedra staff especially Ivan Flausino da Cunha, Veríssimo Alves Neto, and Diego Nicolas Seminara. We are deeply indebted to the field collecting crew of the faunal inventory and monitoring programs, and the faunal rescue operation (*Operação Tuiuiu*).

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Received August 2008

Accepted June 2009

Published online September 2009

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**Appendix 1.** Amphibians and reptiles recorded in the region affected by Ponte de Pedra hydroelectric power plant (municipality of Sonora, state of Mato Grosso do Sul, Brazil). Habits according to Strüssmann (2000): AB = arboreal species (species rarely seen on the ground); SAB = sub arboreal species (species inhabiting all vegetational levels and very often seen on the ground); CR = cryptozoic species (species that use habitats under rocks, fallen logs, or soil debris); TE = terrestrial (species that use habitats on the ground and occasionally on lower vegetational strata); FO = fossorial (species inhabiting higher soil strata); SFO = semi fossorial (species inhabiting higher soil strata but feed on the surface); SAQ = semi aquatic (species that feed primarily on the water but also use terrestrial habitats); PA = paludicola (species associated to lagoons and swampy areas = wetlands).

TAXON	SPECIES	MICROHABITAT
<b>AMPHIBIA</b>		
<b>GYMNOPHIONA</b>		
<b>Caeciliidae</b>	<i>Siphonops paulensis</i> Boettger, 1892	FO
<b>ANURA</b>		
<b>Bufonidae</b>	<i>Rhinella schneideri</i> (Werner, 1894)	TE
<b>Cycloramphidae</b>	<i>Proceratophrys</i> sp.	CR
<b>Hylidae</b>	<i>Dendropsophus minutus</i> (Peters, 1872)	SAB
	<i>Dendropsophus nanus</i> (Boulenger, 1889)	SAB
	<i>Dendropsophus rubicundulus</i> (Reinhardt & Lütken, 1862)	SAB
	<i>Dendropsophus tritaeniatus</i> (Bokermann, 1965)	SAB
	<i>Hypsiboas albopunctatus</i> (Spix, 1824)	SAB
	<i>Hypsiboas lundii</i> (Burmeister, 1856)	AB
	<i>Hypsiboas multifasciatus</i> (Günther, 1859 "1858")	SAB
	<i>Hypsiboas punctatus</i> (Schneider, 1799)	AB
	<i>Hypsiboas raniceps</i> Cope, 1862	AB
	<i>Hypsiboas</i> sp.	AB
	<i>Osteocephalus taurinus</i> Steindachner, 1862	AB
	<i>Pseudis limellum</i> (Cope, 1862)	SAQ
	<i>Scinax fuscomarginatus</i> (A. Lutz, 1925)	SAB
	<i>Scinax fuscovarius</i> (A. Lutz, 1925)	SAB
	<i>Trachycephalus venulosus</i> (Laurenti, 1768)	AB
<b>Leiuperidae</b>	<i>Eupemphix nattereri</i> Steindachner, 1863	CR
	<i>Physalaemus biligonigerus</i> (Cope, 1861 "1860")	CR
	<i>Physalaemus cuvieri</i> Fitzinger, 1826	TE
	<i>Pseudopaludicola falcipes</i> (Hensel, 1867)	PA
	<i>Pseudopaludicola mystacalis</i> (Cope, 1887)	PA
	<i>Pseudopaludicola saltica</i> (Cope, 1887)	PA
<b>Leptodactylidae</b>	<i>Leptodactylus furnarius</i> Sazima & Bokermann, 1978	TE
	<i>Leptodactylus fuscus</i> (Schneider, 1799)	TE
	<i>Leptodactylus gracilis</i> (Duméril & Bibron, 1841)	TE
	<i>Leptodactylus labyrinthicus</i> (Spix, 1824)	TE
	<i>Leptodactylus martinezi</i> (Bokermann, 1956)	TE
	<i>Leptodactylus mystacinus</i> (Burmeister, 1861)	TE
	<i>Leptodactylus ocellatus</i> (Linnaeus, 1758)	TE
	<i>Leptodactylus podicipinus</i> (Cope, 1862)	TE
<b>Microhylidae</b>	<i>Elachistocleis ovalis</i> (Schneider, 1799)	CR
<b>REPTILIA</b>		
<b>TESTUDINES</b>		
<b>Chelidae</b>	<i>Phrynops Geoffroyanus</i> (Schweigger, 1812)	SAQ
<b>Testudinidae</b>	<i>Chelonoidis carbonaria</i> (Spix, 1824)	TE

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TAXON	SPECIES	MICROHABITAT
<b>CROCODYLIA</b>		
<b>Alligatoridae</b>	<i>Paleosuchus palpebrosus</i> (Cuvier, 1807)	SAQ
<b>SQUAMATA</b>		
<b>Amphisbaenidae</b>	<i>Amphisbaena alba</i> Linnaeus, 1758	FO
	<i>Amphisbaena anaemariae</i> Vanzolini, 1997	FO
	<i>Amphisbaena leseri</i> Gans, 1964	FO
	<i>Amphisbaena mertensii</i> Strauch, 1881	FO
	<i>Amphisbaena pretrei</i> Duméril & Bibron, 1839	FO
	<i>Amphisbaena vermicularis</i> Wagler, 1824	FO
	<i>Cercolophia roberti</i> (Gans, 1964)	FO
	<i>Leposternon infraorbitale</i> (Bertold, 1859)	FO
<b>Anguidae</b>	<i>Ophiodes</i> sp.	TE
	<i>Ophiodes striatus</i> (Spix, 1824)	TE
<b>Phyllodactylidae</b>	<i>Phyllopezus pollicaris</i> (Spix, 1825)	AB
<b>Sphaerodactylidae</b>	<i>Coleodactylus brachystoma</i> (Amaral, 1935)	SAB
<b>Gymnophthalmidae</b>	<i>Bachia bresslaui</i> (Amaral, 1935)	CR
	<i>Cercosaura ocellata</i> Wagler, 1830	TE
	<i>Cercosaura schreibersii</i> Wiegmann, 1834	TE
	<i>Colobosaura modesta</i> (Reinhardt & Lütken, 1862)	CR
	<i>Micrablepharus maximiliani</i> (Reinhardt & Lütken, 1862)	TE
	<i>Vanzosaura rubricauda</i> (Boulenger, 1902)	TE
<b>Hoplocercidae</b>	<i>Hoplocercus spinosus</i> Fitzinger, 1843	TE
<b>Polychrotidae</b>	<i>Anolis meridionalis</i> Boettger, 1885	SAB
	<i>Polychrus acutirostris</i> Spix, 1825	AB
<b>Scincidae</b>	<i>Mabuya bistriata</i> (Spix, 1825)	SAB/TE
	<i>Mabuya dorsivittata</i> Cope, 1862	SAB/TE
	<i>Mabuya frenata</i> (Cope, 1862)	SAB/TE
<b>Teiidae</b>	<i>Ameiva ameiva</i> (Linnaeus, 1758)	TE
	<i>Cnemidophorus ocellifer</i> (Spix, 1825)	TE
	<i>Tupinambis meriana</i> (Duméril & Bibron, 1839)	TE
	<i>Tupinambis quadrilineatus</i> Manzani & Abe, 1997	TE
<b>Tropiduridae</b>	<i>Stenocercus caducus</i> (Cope, 1862)	SAB
	<i>Tropidurus guarani</i> (Cope, 1862)	AB
	<i>Tropidurus torquatus</i> (Wied, 1820)	SAB/TE
<b>Anomalepididae</b>	<i>Liotyphlops beui</i> (Amaral, 1924)	SFO
<b>Leptotyphlopidae</b>	<i>Leptotyphlops koppesi</i> Amaral, 1955	SFO
	<i>Leptotyphlops septemstriatus</i> (Schneider, 1801)	SFO
<b>Typhlopidae</b>	<i>Typhlops brongersmianus</i> Vanzolini, 1976	SFO
<b>Boidae</b>	<i>Boa constrictor</i> Linnaeus, 1758	TE
	<i>Epicrates cenchria</i> (Linnaeus, 1758)	TE
	<i>Eunectes murinus</i> (Linnaeus, 1758)	SAQ
<b>Colubridae</b>	<i>Apostolepis assimilis</i> (Reinhardt, 1861)	SFO
	<i>Atractus albuquerquei</i> Cunha & Nascimento, 1983	SFO
	<i>Chironius exoletus</i> (Linnaeus, 1758)	SAB
	<i>Chironius flavolineatus</i> (Boettger, 1885)	SAB
	<i>Clelia clelia</i> (Daudin, 1803)	TE
	<i>Echianthera occipitalis</i> (Jan, 1863)	TE
	<i>Erythrolamprus aesculapii</i> (Linnaeus, 1766)	TE
	<i>Gomesophis brasiliensis</i> (Gomes, 1918)	SAQ

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	<i>Helicops angulatus</i> (Linnaeus, 1758)	SAQ
	<i>Helicops modestus</i> Günther, 1861	SAQ
	<i>Leptophis ahaetulla</i> (Linnaeus, 1758)	AB
	<i>Liophis frenatus</i> (Werner, 1909)	TE
	<i>Liophis poecilogyrus</i> (Wied, 1825)	TE
	<i>Liophis reginae</i> (Linnaeus, 1758)	TE
	<i>Lygophis meridionalis</i> (Schenkel, 1901)	TE
	<i>Mastigodryas bifossatus</i> (Raddi, 1820)	TE
	<i>Oxyrhopus trigeminus</i> Duméril, Bibron & Duméril, 1854	TE
	<i>Phalotris nasutus</i> (Gomes, 1915)	TE
	<i>Philodryas mattogrossensis</i> Koslowsky, 1898	TE
	<i>Philodryas nattereri</i> Steindachner, 1870	TE
	<i>Philodryas olfersii</i> (Lichtenstein, 1823)	TE
	<i>Philodryas patagoniensis</i> (Girard, 1858)	TE
	<i>Pseudoboa nigra</i> (Duméril, Bibron & Duméril, 1854)	TE
	<i>Sibynomorphus mikanii</i> (Schlegel, 1837)	TE
	<i>Spilotes pullatus</i> (Linnaeus, 1758)	SAB
	<i>Thamnodynastes pallidus</i> (Linnaeus, 1758)	TE
	<i>Thamnodynastes rutilus</i> (Prado, 1942)	TE
	<i>Thamnodynastes strigatus</i> (Günther, 1858)	TE
	<i>Xenodon merremii</i> (Wagler, 1824)	TE
<b>Elapidae</b>	<i>Micrurus lemniscatus</i> (Linnaeus, 1758)	SFO
<b>Viperidae</b>	<i>Bothrops moojeni</i> Hoge, 1966	TE
	<i>Bothrops neuwiedi</i> Wagler, 1824	TE
	<i>Crotalus durissus</i> Linnaeus, 1758	TE

**Appendix 2:** Voucher specimens.

**Amphibia:** *Dendropsophus nanus* (MZUSP 140442–51); *D. rubicundulus* (MZUSP 140433); *D. tritaeniatus* (MZUSP 140434); *Eupemphix nattereri* (MZUSP 140487); *Hypsiboas albopunctatus* (MZUSP 140475–86); *H. punctatus* (MZUSP 140452–6); *H. raniceps* (MZUSP 140525–37); *Hypsiboas* sp. (MZUSP 140467); *Leptodactylus furnarius* (MZUSP 140488–89, 140436–7); *L. martinezi* (MZUSP 140438–39, 140465–66, 140440–41); *L. podicipinus* (MZUSP 140493–10); *Pseudis limellum* (MZUSP 140512–24); *Osteocephalus taurinus* (MZUSP 140490–92); *Physalaemus cuvieri* (MZUSP 140435); *Pseudopaludicola falcipes* (MZUSP 140511); *Rhinella schneideri* (MZUSP 140457–82); *Scinax fuscovarius* (MZUSP 140468–74); *Trachycephalus venulosus* (MZUSP 140538–52). **Reptilia:** *Ameiva ameiva* (MZUSP 98636, 98746–51); *Anolis meridionalis* (MZUSP 98633–35); *Atractus albuquerquei* (MZUSP 17569–71); *Bachia bresslaui* (MZUSP 98769); *Bothrops moojeni* (MZUSP 17530–31, 17540–43, 17563–68, 17588–95); *B. neuwiedi* (MZUSP 17544–45); *Cercosaura ocellata* (MZUSP 98638–78); *Clelia clelia* (MZUSP 17533); *Erythrolamprus aesculapii* (MZUSP 17534–35); *Eunectes murinus* (MZUSP 17547); *Hoplocercus spinosus* (MZUSP 98761–65); *Liophis reginae* (MZUSP 17572–73); *Mabuya bistrata* (MZUSP 98681–84); *M. dorsivittata* (MZUSP 98752–59); *M. frenata* (MZUSP 98685–95); *Oxyrhopus trigeminus* (MZUSP 17536–38); *Philodryas nattereri* (MZUSP 17553); *P. olfersii* (MZUSP 17548–52); *Polychrus acutirostris* (MZUSP 98703–45); *Thamnodynastes rutilus* (MZUSP 17514–29, 17532, 17554–62, 17574–80, 17596–17613); *Tropidurus guarani* (MZUSP 98696–98702); *Tupinambis merianae* (MZUSP 98680); *Vanzosaura rubricauda* (MZUSP 98637); *Waglerophis merremii* (MZUSP 17539, 17546).