



Supporting Online Material for

Comment on “Status and Trends of Amphibian Declines and Extinctions Worldwide”

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Supporting Online Material

Comment on "Status and Trends of Amphibian Declines and Extinctions Worldwide" by Pimenta *et al.*

1. The "2003 Official List of the Brazilian Fauna Threatened Species - Amphibians": methods and main results.

After several earlier meetings, that started in August 1999, to establish the methods for gathering data, the "2003 Official List of the Brazilian Fauna Threatened Species - Amphibians" was finally produced during a workshop in Belo Horizonte, state of Minas Gerais, Brazil, from 9 to 12 December, 2002. This list was produced by a group of invited researchers that attended the meeting (Table S1). This group analyzed the situation of all known Brazilian amphibians, as well as the suggestions made via Web by specialists interested in contributing to the preparation of the list. Prior to the meeting, any interested specialist could enter the web and suggest one or more species they considered to be threatened. Forty-eight species were suggested as threatened in this preliminary list according to the evaluation of 18 specialists (Table S2).

The IUCN Red List Categories and Criteria were tentatively used, but they showed no precision to categorize amphibians due to the extensive lack of information on distribution, taxonomy, and habits of most species. Knowledge on these issues is being improved every year, but is still far from good. The information gathered on the last six years (1999-2004) illustrates this situation very well: among the 98 species previously known only from their type-locality, 29 species had their distributions expanded on this period (Appendix S1). However, the description or revalidation of 86 species slightly increased the number of restricted species, which is currently 109 (Appendix S2). Additionally, a large number of species is known only from the type-specimens (Appendix S3), which does not provide data for evaluation of their status or population trends. For these reasons, a conservative approach was adopted, listing species as threatened only if evidence for this was available.

More than 700 amphibian species known for Brazil were analyzed. Ninety were considered as "Data Deficient" (DD). One species of anuran was considered as "Near Threatened" (NT), three species as "Vulnerable" (VU), three as "Endangered" (EN), nine as "Critically Endangered" (CR), and one as "Extinct" (EX) (Table S3, S1).

The high number of species considered as DD is a consequence of the extensive lack of information on distribution, taxonomy, and habits of most species. It is important to emphasize that several DD species may be in fact "least concern" (LC), NT, VU, EN, CR, or even EX. Therefore, a great effort is necessary in order to evaluate the real situation of the DD species in nature. Some CR species may be extinct, but intensive field work is necessary to confirm this supposition.

All amphibians considered as NT, VU, EN, CR, and EX belong to the order Anura (frogs). The family Leptodactylidae showed the highest number of threatened species (Table S4). Southeastern Brazil is the region with the greatest amount of species that deserve attention (Table S5).

All species considered as NT, VU, EN, CR, and EX, as well as the majority of the DD species belong to the Atlantic Forest formation. The explanation for this pattern is the

high species richness in the Atlantic Forest associated to the almost complete destruction of this ecosystem, promoted by men in the last century. It is almost certain that the destruction of this ecosystem is the main factor responsible for putative population declines, extinction threats, and extinction of many species. In addition, other human activities, like pollution, climatic changes, disease propagation, and others, are probably contributing to the elevation of the extinction risk of the amphibian species. Another explanation for this pattern could be that the Atlantic forest occurs in southeastern and southern Brazil, which are the best studied regions in the country as a consequence of the high concentration of Universities and research centers.

Since 1992, when the previous “Official List of the Brazilian Fauna Threatened Species” was prepared, our knowledge about amphibians has improved, which contributed to the refinement of the present list. However, it is important to emphasize that basic studies on taxonomy and geographic distribution of amphibians are still needed. Without a reasonable comprehension of taxonomy it is not possible to access the real diversity of organisms, which makes conservation efforts difficult or almost impossible. The lack of information on geographic distribution certainly inflates the DD list in detriment of all other categories.

2. The disagreement between Brazilian specialists and the GAA coordinating team

A few months after the workshop that yielded the Brazilian Official List, 27 Brazilian specialists (not 30 as published (S2): Célio F.B. Haddad, José P. Pombal Jr., and Ulisses Galatti could not participate) met again during one of the GAA workshops, and decided to adopt the same approach used in the Brazilian List to categorize species, exposing their reasons to the GAA coordinating team. Coordinators allowed specialists to categorize amphibian species according to the current knowledge, without strictly following Red List criteria. The results of these analyses were later evaluated, through a “consistency check”, by a team of non-specialists (S2). Brazilian specialists were told, prior to the publication of the GAA results, that this procedure would change the categorization of species where the evaluators found that the IUCN Red List criteria were not “consistently” applied. Brazilian specialists expressed their disagreement through a letter sent to the GAA Coordinating team by the Brazilian Society of Herpetology (SBH). The Coordinating team proposed the inclusion of a note for each species where IUCN Red List criteria were not rigorously applied, and again the SBH refused to accept their attempt to change the categorizations agreed at the GAA workshop. However, the GAA results were published with the addition of the notes (S3, S4). The GAA evaluators, a team of non-specialists, contested and changed the categorization of 114 species (Table S1) through these notes. Unfortunately, no Brazilian specialist was heard during the “consistency check”, since none of their names appear among the evaluation team. Notes were added only to Brazilian species (S3, S4), and published without any agreement having been reached. The 2004 IUCN Red List, conversely, respected the opinion of Brazilian specialists and published the results that were agreed to at the workshop (S5).

Table S1 - Invited researchers that attended to the “2003 Official List of the Brazilian Fauna Threatened Species - Amphibians”

Carlos A. G. Cruz - Museu Nacional/UFRJ, Rio de Janeiro, RJ
Célio F. B. Haddad (Coordinator) - Universidade Estadual Paulista, Rio Claro, SP
Débora Silvano - Ministério do Meio Ambiente, Brasília, DF
Diva Ma. Borges-Nojosa - Universidade Federal do Ceará, Fortaleza, CE
Jaime Bertoluci - Escola Superior de Agricultura Luiz de Queiroz, USP, Piracicaba, SP
José P. Pombal Jr. - Museu Nacional/UFRJ, Rio de Janeiro, RJ
Luciana Barreto Nascimento - Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, MG
Magno Segalla - Mater Natura – Instituto de Estudos Ambientais, Curitiba, PR
Paulo C. A. Garcia - Universidade de Mogi das Cruzes, Mogi das Cruzes, SP
Renato N. Feio - Universidade Federal de Viçosa, Viçosa, MG
Rogério P. Bastos - Universidade Federal de Goiás, Goiânia, GO

Table S2 - Specialists who contributed via Web indicating names of species to be evaluated as threatened.

Web Collaborator	Institution
Carlos Alberto Gonçalves da Cruz	Museu Nacional/UFRJ, Rio de Janeiro, RJ
Célio F. B. Haddad	Universidade Estadual Paulista, Rio Claro, SP
Cynthia Peralta de Almeida Prado	Universidade Estadual Paulista, Rio Claro, SP
Denise de C. Rossa-Feres	Universidade Estadual Paulista, São José do Rio Preto, SP
Débora Leite Silvano	Ministério do Meio Ambiente, Brasília, DF
Diva Maria Borges-Nojosa	Universidade Federal do Ceará, Fortaleza, CE
Eloisa M. Wistuba	Centro Universitário Campos de Andrade, Curitiba, PR
Itamar Alves Martins	Universidade de Taubaté, Taubaté, SP
Jaime Bertolucci	Escola Superior de Agricultura Luiz de Queiroz, USP, Piracicaba, SP
Luciana Barreto Nascimento	Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, MG
Luciano Mendes Castanho	Pontifícia Universidade Católica, Sorocaba, SP
Magno Vicente Segalla	Mater Natura-Instituto de Estudos Ambientais, Curitiba, PR
Marcelo Felgueiras Napoli	Universidade Federal da Bahia, Salvador, BA
Paulo C. A. Garcia	Universidade de Mogi das Cruzes, Mogi das Cruzes, SP
Renato Neves Feio	Universidade Federal de Viçosa, Viçosa, MG
Rodrigo Lingnau	Universidade Federal de Goiás, Goiânia, GO
Rogério Pereira Bastos	Universidade Federal de Goiás, Goiânia, GO
Ulisses Caramaschi	Museu Nacional/UFRJ, Rio de Janeiro, RJ

Table S3 - Near threatened (NT), threatened (VU, EN, and CR), and extinct (EX) species of the “2003 Official List of the Brazilian Fauna Threatened Species - Amphibians”

Species	Category	Brazilian states where it occurs
<i>Adelophryne baturitensis</i>	VU	CE
<i>Adelophryne maranguapensis</i>	EN	CE
<i>Bokermannohyla izecksohni</i>	CR	SP
<i>Holoaden bradei</i>	CR	MG, RJ
<i>Hylomantis granulosa</i>	CR	PE
<i>Hypsiboas cymbalum</i>	CR	SP
<i>Melanophryniscus dorsalis</i>	VU	RS, SC
<i>Melanophryniscus macrogranulosus</i>	CR	RS
<i>Odontophrynus moratoi</i>	CR	SP
<i>Paratelmatobius lutzii</i>	CR	MG
<i>Phrynomedusa fimbriata</i>	EX	SP
<i>Phyllomedusa ayeaye</i>	CR	MG
<i>Physalaemus soaresi</i>	EN	RJ
<i>Scinax alcatraz</i>	CR	SP
<i>Thoropa lutzii</i>	VU	ES, MG, RJ
<i>Thoropa petropolitana</i>	EN	ES, RJ
<i>Thoropa saxatilis</i>	NT	RS, SC

Table S4. Number of anuran species considered as NT, Threatened (VU, EN, and CR), and EX by the “2003 Official List of the Brazilian Fauna Threatened Species - Amphibians”.

Families	NT	Threatened	EX
Bufonidae	0	2	0
Hylidae	0	5	1
Leptodactylidae	1	8	0
Totals	1	15	1

Table S5. Number of anuran species considered as NT, Threatened (VU, EN, and CR), and EX, distributed in the five Brazilian regions. Extracted from the results of the “2003 Official List of the Brazilian Fauna Threatened Species - Amphibians”.

Regions	NT	Threatened	EX
North	0	0	0
Northeastern	0	3	0
Central Brazil	0	0	0
Southeastern	0	10	1
South	1	2	0
Totals	1	15	1

Appendix S1 - Species whose distribution ranges were expanded in the last six years (1999-2004):

Aparasphenodon bokermanni (S6), *Aplastodiscus ehrhardti* (S7), *Aplastodiscus weygoldti* (S8), *Bokermannohyla carvalhoi* (S9), *Bokermannohyla ibitipoca* (S10), *Cycloramphus migueli* (S11), *Dendropsophus nahdereri* (S12), *Eleutherodactylus bilineatus* (S13), *Holoaden bradei* (S14), *Hylodes heyeri* (S15, S16), *Hylodes sazimai* (S17), *Hylomantis aspera* (S18), *Hylomantis granulosa* (S19), *Hyophryne histrio* (S20), *Hypsiboas atlanticus* (S21), *Leptodactylus viridis* (S22), *Paratelmatobius gaigeae* (S23), *Phasmahyla exilis* (S24), *Phasmahyla jandaia* (S25), *Phyllodytes acuminatus* (S26), *Phyllodytes kautskyi* (S27), *Phyllodytes melanomystax* (S28), *Physalaemus aguirrei* (S29), *Proceratophrys schirchi* (S30), *Rhampophryne proboscidea* (S31), *Scinax agilis* (S32), *Scinax canastrensis* (S33), *Sphaenorhynchus palustris* (S34), and *Sphaenorhynchus prasinus* (S35).

Appendix S2 - Species currently known only from the type-locality:

Aplastodiscus musicus, *Aplastodiscus flumineus*, *Bokermannohyla ahenea*, *Bokermannohyla clepsydra*, *Bokermannohyla feioi*, *Bokermannohyla gouveai*, *Bokermannohyla izecksohni*, *Bokermannohyla lucianae*, *Bokermannohyla ravida*, *Brachycephalus brunneus*, *Brachycephalus hermogenesi*, *Brachycephalus izecksohni*, *Brachycephalus pernix*, *Bufo scitulus*, *Chiasmocleis cordeiroi*, *Chiasmocleis crucis*, *Chiasmocleis gnoma*, *Chiasmocleis jimi*, *Chthonerpeton noctinectes*, *Colostethus caeruleodactylus*, *Colostethus nidicola*, *Crossodactylodes bokermanni*, *Crossodactylodes izecksohni*, *Crossodactylus aeneus*, *Crossodactylus bokermanni*, *Crossodactylus dantei*, *Crossodactylus grandis*, *Crossodactylus lutzorum*, *Cycloramphus bandeirensis*, *Cycloramphus carvalhoi*, *Cycloramphus catarinensis*, *Cycloramphus cedrensis*, *Cycloramphus duseni*, *Cycloramphus jordanensis*, *Cycloramphus juimirim*, *Cycloramphus ohausi*, *Cycloramphus stejnegeri*, *Dendropsophus cachimbo*, *Dendropsophus jimi*, *Dendropsophus limai*, *Dendropsophus rhea*, *Dendropsophus ruschii*, *Dendropsophus studerae*, *Eleutherodactylus epipedus*, *Eleutherodactylus erythromerus*, *Eleutherodactylus gualteri*, *Eleutherodactylus hoehnei*, *Eleutherodactylus nigriventris*, *Eleutherodactylus octavioi*, *Eleutherodactylus oeus*, *Eleutherodactylus paranaensis*, *Eleutherodactylus pusillus*, *Eleutherodactylus randorum*, *Eleutherodactylus sambaqui*, *Eleutherodactylus spanios*, *Gastrotheca albolineata*, *Hylodes amnicola*, *Hylodes glaber*, *Hylodes magalhaesi*, *Hylodes ornatus*, *Hylodes otavioi*, *Hylodes perplicatus*, *Hylodes regius*, *Hylodes vanzolinii*, *Hypsiboas beckeri*, *Hypsiboas buriti*, *Hypsiboas cymbalum*, *Hypsiboas ericae*, *Hypsiboas freicanecae*, *Hypsiboas phaeopleura*, *Hypsiboas secedens*, *Hypsiboas stenocephala*, *Leptodactylus hylodes*, *Megaelosia apuana*, *Melanophryniscus cambaraensis*, *Melanophryniscus macrogranulosus*, *Melanophryniscus moreirae*, *Melanophryniscus simplex*, *Melanophryniscus spectabilis*, *Odontophrynus moratoi*, *Paratelmatobius lutzii*, *Phrynomedusa marginata*, *Phyllodytes brevirostris*, *Phyllodytes punctatus*, *Phyllodytes tuberculosus*, *Phyllomedusa ayeaye*, *Physalaemus barrioi*, *Physalaemus bokermanni*, *Physalaemus deimaticus*, *Physalaemus erythros*, *Physalaemus maximus*, *Physalaemus obtectus*, *Physalaemus rupestris*, *Physalaemus soaresi*, *Proceratophrys concavitympanum*, *Proceratophrys cururu*, *Proceratophrys palustris*, *Proceratophrys phyllostomus*, *Proceratophrys subguttata*, *Pseudopaludicola canga*, *Scinax ariadne*, *Scinax heyeri*, *Scinax*

jureia, *Scinax meloi*, *Sphaenorynchus bromelicola*, *Sphaenorynchus pauloalvini*, *Thoropa lutzi*, *Trachycephalus lepidus*, and *Zachaenus carvalhoi*.

Appendix S3 - Species currently known only from type-specimen(s):

Aplastodiscus flumineus, *Bokermannohyla ahenea*, *Bokermannohyla feioi*,
Bokermannohyla lucianae, *Bufo scitulus*, *Chiasmocleis cordeiroi*, *Chiasmocleis crucis*,
Chiasmocleis gnoma, *Chiasmocleis jimi*, *Chthonerperton exile*, *Chthonerperton perissodus*,
Chthonerperton noctinectes, *Crossodactylus dantei*, *Crossodactylus lutzorum*,
Cycloramphus bandeirensis, *Cycloramphus carvalhoi*, *Cycloramphus catarinensis*,
Cycloramphus cedrensis, *Cycloramphus jordanensis*, *Cycloramphus valae*, *Dendropsophus*
cachimbo, *Dendropsophus limai*, *Eleutherodactylus epipedus*, *Eleutherodactylus*
erythromerus, *Eleutherodactylus paranaensis*, *Eleutherodactylus pusillus*,
Eleutherodactylus randorum, *Eleutherodactylus sambaqui*, *Eleutherodactylus spanios*,
Hylodes amnicola, *Hylodes babax*, *Hylodes glaber*, *Hylodes regius*, *Hylodes vanzolinii*,
Hypsiboas beckeri, *Hypsiboas buriti*, *Hypsiboas freicanecae*, *Leptodactylus hylodes*,
Megaelosia apuana, *Megaelosia bocainensis*, *Melanophryniscus simplex*,
Melanophryniscus spectabilis, *Melanophryniscus pachyrhynchus*, *Microcaecilia*
supernumeraria, *Mimosiphonops reinhardti*, *Oscaecilia hypereumeces*, *Phrynomedusa*
bokermanni, *Phyllodytes punctatus*, *Physalaemus erythros*, *Proceratophrys phyllostomus*,
Scinax heyeri, *Scinax jureia*, *Siphonops leucoderus*, *Trachycephalus lepidus*, and
Zachaenus carvalhoi.

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