

Batrachochytrium dendrobatidis [简体中文](#)

System: Undefined

[正體中文](#)

Kingdom	Phylum	Class	Order	Family
Fungi	Chytridiomycota	Chytridiomycetes	Chytridiales	

Common name chytrid frog fungi (English), Chytrid-Pilz (German), chytridiomycosis (English), frog chytrid fungus (English)

Synonym

Similar species

Summary

Batrachochytrium dendrobatidis is a non-hyphal parasitic chytrid fungus that has been associated with population declines in endemic amphibian species in upland montane rain forests in Australia and Panama. It causes cutaneous mycosis (fungal infection of the skin), or more specifically chytridiomycosis, in wild and captive amphibians. First described in 1998, the fungus is the only chytrid known to parasitise vertebrates. *B. dendrobatidis* can remain viable in the environment (especially aquatic environments) for weeks on its own, and may persist in latent infections.



[view this species on IUCN Red List](#)

Species Description

Fungal Morphology: *Batrachochytrium dendrobatidis* is a zoosporic chytrid fungus that causes chytridiomycosis (a fungal infection of the skin) in amphibians and grows solely within keratinised cells. Diagnosis is by identification of characteristic intracellular flask-shaped sporangia (spore containing bodies) and septate thalli. The fungus grows in the superficial keratinised layers of the epidermis (known as the stratum corneum and stratum granulosum). The normal thickness of the stratum corneum is between 2µm to 5µm, but a heavy infection by the chytrid parasite may cause it to thicken to up to 60 µm. The fungus also infects the mouthparts of tadpoles (which are keratinised) but does not infect the epidermis of tadpoles (which lacks keratin). The fungus produces inoperculate, smooth-walled zoosporangia (zoospore containing bodies), which are spherical to subspherical in shape. Each zoosporangium (10µm to 40µm in diameter) produces a single discharge tube, which penetrates (and protrudes out of) the skin. Eventually the plug that blocks the release of immature zoospores is shed and the mature zoospores are released. The zoospores (0.7µm to 6µm in diameter) are elongate to ovoid in shape. Each possesses a single posterior flagellum, rendering it motile in water (Mazzoni *et al.* 2003; Daszak *et al.* 1999; Berger, *et al.* 1998; Berger *et al.* 1998, Berger, Speare and Hyatt, 2000, in Daszak *et al.* 1999; Speare *et al.* 2001; Weldon *et al.* 2003).

To view a scanning electron micrograph of infected skin of a wild frog (*Litoria lesueuri*) please see: [\n\nDaszak *et al.* 1999. Emerging Infectious Diseases and Amphibian Population Declines.](#)

To view histological sections of infected skin of *Bufo haematiticus* and *Atelopus varius* (showing the sporangia and discharge tubes of the fungus) please see: [Daszak *et al.* 1999. Emerging Infectious Diseases and Amphibian Population Declines.](#)

To view a histological section of severely infected skin of a wild frog (*Litoria caerulea*) please see: [\n\nBerger *et al.* 1998. Chytridiomycosis causes amphibian mortality.](#)

\n\nClick here to see information about [Symptoms of the disease caused by *Batrachochytrium dendrobatidis*.](#)

Pathogenesis of chytridiomycosis: Authors of a recent study, Voyles *et al.* (2009) have found that *B. dendrobatidis*, causes such severe electrolyte imbalances that the frog's heart stops. The skin of amphibians maintain proper osmotic balance inside the animal and regulate respiration. The authors found that the skin of infected frogs was less adept at transporting sodium and chloride ions. Sodium and potassium concentrations in the blood of infected frogs dropped, more so as the infection intensified and the animals' hearts began to beat irregularly and ultimately stopped.

Notes

Salamanders can act as host reservoirs of chytrid infection in frogs, and vice versa (Davidson *et al.* 2003).

Lifecycle Stages

Batrachochytrium dendrobatidis has two life stages: a spherical reproductive sessile zoosporangium and a motile zoospore. The motile zoospore directs itself and attaches to the keratinised outer layers of its host. It then absorbs its tail and buries itself below the surface of the skin. It matures into a zoosporangia with rhizoids within about four days and produces and releases up to 300 zoospores into the external environment (via a discharge tube). The cycle is initiated again once a suitable substrate (in the same or a different host) is found. The presence of the fungus in the keratinised mouthparts of frog tadpoles (without actually killing them) supports the role of larvae as reservoirs for the pathogen. (The larvae of amphibian species may survive for as long as 3 years before metamorphosing.) Syntopic salamanders and frogs may also act as reciprocal pathogen reservoirs for chytrid infections. It has been suggested that *B. dendrobatidis* may not be an obligate amphibian parasite, possibly living in other non-amphibian hosts or even saprophytically (off dead tissue) (Michigan Frog Survey, 2003; Speare *et al.* 2001; Daszak *et al.* 1999; Davidson *et al.* 2003).

As of yet, no resting structures (either asexual or sexual) have been identified for *B. dendrobatidis*. The fact that sexual reproduction in chytrid fungi has been associated with the production of resistant, thick-walled resting spores has led to the hypothesis that the production of airborne spores explains the widespread distribution of *B. dendrobatidis* in relatively pristine areas. However recent research has found evidence that shows that the population structure of *B. dendrobatidis* is largely clonal, supporting the hypothesis that the fungus lacks a sexual stage (as is the case for many chytrid fungi). This suggests that dispersal by human (or perhaps other long distance travellers, such as birds), rather than natural causes, are more likely to be the cause of the pathogen's entry into pristine areas (Morehouse *et al.* 2003; Berger *et al.* 1999, Daszak *et al.* 1999, in Morehouse *et al.* 2003).

Habitat Description

Chytridiomycosis has now been reported from 38 amphibian species in 12 families, including ranid and hylid frogs, bufonid toads, and plethodontid salamanders. Although chytridiomycosis is found in a range of species and habitats (including African frogs in lowland regions in Africa) it has caused population declines of amphibians species confined to montane rain forests (Weldon *et al.* 2004; Daszak *et al.* 1999). The fungus prefers lower temperatures which may explain the high prevalence of the fungus in high elevations in the tropics. In culture conditions optimum growth occurred at 23°C, with slower growth occurring at 28°C and (reversible) cessation of growth occurring at 29°C (Longcore, Pessier, Nichols, 1999, in Daszak *et al.* 1999).

Reproduction

Batrachochytrium dendrobatidis is diploid and primarily reproduces asexually (and clonally) by producing aquatic unflagellated zoospores in a zoosporangium (Johnson and Speare, 2003).

Nutrition

Its occurrence solely in keratinised tissues suggests that it uses amphibian keratin as a nutrient. *Batrachochytrium dendrobatidis* will grow for at least one generation on cleaned epidermal keratin or on amphibians that have died of the infection. The fungus may also be cultured *in vitro* on tryptone agar without the addition of keratin or its derivatives (Daszak *et al.* 1999; Longcore, Pessier and Nichols, 1999, Pessier *et al.* 1999, in Daszak *et al.* 1999).

General Impacts

Batrachochytrium dendrobatidis has been found to affect at least 93 amphibian species from the orders Anura (frogs and toads) and Caudata (salamanders) in all the continents except Asia. It is thought to be one of the main causes of the global decline in frog populations since the 1960s, and the dramatic population crashes from the 1970s onwards (Parris and Beaudoin, 2004). The chytrid fungus kills frogs within 10 to 18 days (Michigan Frog Survey, 2003), although it is not known how. It may be physical, affecting respiration by altering the frog's skin, or the fungus may give off a toxin (Michigan Frog Survey, 2003). Tadpoles are not affected, although the fungus may infect the keratinised mouthparts (Berger *et al.* 1999).

For a summary on the impacts of *B. dendrobatidis* please follow this link [impacts](#).

Key findings of the [The Global Amphibian Assessment](#) has revealed that one-third (32%) of the world's amphibian species are threatened, representing 1,896 species. Threats include viral diseases, habitat loss, drought, pollution, and hunting for food. The biggest single threat appears to be *B. dendrobatidis*.

A [search](#) on the database using "\"diseases\"" as a keyword in "\"all\"" habitat types, biogeographic realm and countries results in a list of 547 species impacted by diseases (IUCN, Conservation International, and NatureServe. 2006).

Management Info

Preventative measures: Knowledge of the infectiveness and spread of *Batrachochytrium dendrobatidis* is relevant to all control strategies, particularly in the development of preventative measures. The infective unit of the fungus is the zoospore. Infection by the fungus (and thus spread of the disease) requires water because the zoospore does not tolerate dehydration. *B. dendrobatidis* remains viable for up to 3 weeks in tap water, up to 4 weeks in deionised water and even longer in lake water. Infection by an extremely small inoculum (100 zoospores) is sufficient to cause a fatal infection (Berger *et al.* in Speare *et al.* 2001; Johnson and Speare, 2003; Berger, Speare and Hyatt, 2000, in Daszak *et al.* 1999).

Please see [main preventative management strategies](#) for a summary under the following headings: improving diagnostics and knowledge of epidemiology, developing trade and quarantine regulations, raising awareness and control options.

[The Amphibian Conservation Action Plan \(ACAP\)](#) is designed to provide guidance for implementing amphibian conservation and research initiatives at all scales from global down to local. Chapter 4 outlines action steps relating to the detection and control of chytridiomycosis.

Principal source: Berger *et al.* 1999. Chytrid fungi and amphibian declines: Overview, Implications and Future Directions.

[Berger *et al.* 1998. Chytridiomycosis Causes Amphibian Mortality Associated With Population Declines in the Rain Forests of Australia and Central America.](#)

[Daszak *et al.* 1999. Emerging Infectious Diseases and Amphibian Population Declines](#)

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ALIEN RANGE

[85] AUSTRALIA

[4] COSTA RICA

[2] GERMANY

[1] ITALY

[3] MEXICO

[2] CANADA

[4] ECUADOR

[1] GHANA

[2] KENYA

[5] NEW ZEALAND

[3] PANAMA
[1] SPAIN
[14] UNITED STATES
[1] VENEZUELA

[9] SOUTH AFRICA
[1] SWAZILAND
[2] URUGUAY
[1] WEST AFRICA

Red List assessed species 512: EX = 8; CR = 196; EN = 126; VU = 63; NT = 29; DD = 36; LC = 54;

[Adelotus brevis](#) NT
[Agalychnis moreletii](#) CR
[Alytes cisternasii](#) NT
[Aplastodiscus callipygius](#) LC
[Aromobates alboguttatus](#) EN
[Aromobates nocturnus](#) CR
[Atelopus angelito](#) CR
[Atelopus arthuri](#) CR
[Atelopus bomolochos](#) CR
[Atelopus carauta](#) CR
[Atelopus carrikeri](#) CR
[Atelopus chiriquiensis](#) CR
[Atelopus chrysocorallus](#) CR
[Atelopus cruciger](#) CR
[Atelopus ebenoides](#) CR
[Atelopus epikeisthos](#) CR
[Atelopus eusebianus](#) CR
[Atelopus famelicus](#) CR
[Atelopus flavescens](#) VU
[Atelopus galactogaster](#) CR
[Atelopus guanujo](#) CR
[Atelopus halihelos](#) CR
[Atelopus laetissimus](#) CR
[Atelopus longibrachius](#) EN
[Atelopus lozanoi](#) CR
[Atelopus mandingues](#) CR
[Atelopus minutulus](#) CR
[Atelopus monohernandezii](#) CR
[Atelopus muisca](#) CR
[Atelopus nanay](#) CR
[Atelopus nicefori](#) CR
[Atelopus oxapampae](#) EN
[Atelopus pachydermus](#) CR
[Atelopus patazensis](#) CR
[Atelopus peruensis](#) CR
[Atelopus petruizi](#) CR
[Atelopus pinangoi](#) CR
[Atelopus pulcher](#) CR
[Atelopus reticulatus](#) CR
[Atelopus seminiferus](#) CR
[Atelopus sernai](#) CR
[Atelopus siranus](#) DD
[Atelopus soriano](#) CR
[Atelopus spurrelli](#) VU
[Atelopus tamaense](#) CR
[Atelopus varius](#) CR
[Atelopus zeteki](#) CR
[Bokermannohyla claresignata](#) DD
[Agalychnis annae](#) EN
[Allobates olfersioides](#) VU
[Anaxyrus canorus](#) EN
[Aplastodiscus flumineus](#) DD
[Aromobates leopardalis](#) CR
[Atelopus andinus](#) CR
[Atelopus arsyecue](#) CR
[Atelopus balios](#) CR
[Atelopus boulengeri](#) CR
[Atelopus carbonerensis](#) CR
[Atelopus certus](#) EN
[Atelopus chochoensis](#) CR
[Atelopus coynei](#) CR
[Atelopus dimorphus](#) EN
[Atelopus elegans](#) CR
[Atelopus erythropus](#) CR
[Atelopus exiguus](#) CR
[Atelopus farci](#) CR
[Atelopus franciscus](#) VU
[Atelopus glyphus](#) CR
[Atelopus guitarraensis](#) CR
[Atelopus ignescens](#) EX
[Atelopus limosus](#) EN
[Atelopus longirostris](#) EX
[Atelopus lynchi](#) CR
[Atelopus mindoensis](#) CR
[Atelopus mittermeieri](#) EN
[Atelopus mucubajiensis](#) CR
[Atelopus nahumae](#) CR
[Atelopus nepiozomus](#) CR
[Atelopus onorei](#) CR
[Atelopus oxyrhynchus](#) CR
[Atelopus palmatus](#) DD
[Atelopus pedimarmoratus](#) CR
[Atelopus petersi](#) CR
[Atelopus pictiventris](#) CR
[Atelopus planispina](#) CR
[Atelopus quimbaya](#) CR
[Atelopus sanjosei](#) DD
[Atelopus senex](#) CR
[Atelopus simulatus](#) CR
[Atelopus sonsonensis](#) CR
[Atelopus spumarius](#) VU
[Atelopus subornatus](#) CR
[Atelopus tricolor](#) VU
[Atelopus walkeri](#) CR
[Bokermannohyla circumdata](#) LC
[Bokermannohyla hylax](#) LC

Bolitoglossa conanti EN	Bolitoglossa copia DD
Bolitoglossa dofleini NT	Bolitoglossa magnifica EN
Bolitoglossa pesrubra VU	Bolitoglossa sombra VU
Bolitoglossa sooyorum EN	Bolitoglossa subpalmata EN
Bombina pachypus EN	Bromeliohyla bromeliacia EN
Bromeliohyla dendroscarta CR	Bufo bufo LC
Centrolene audax EN	Centrolene ballux CR
Centrolene buckleyi VU	Centrolene geckoideum VU
Centrolene gemmatum CR	Centrolene heloderma CR
Centrolene lynchi EN	Centrolene medemi DD
Centrolene peristictum VU	Centrolene pipilatum EN
Centrolene scirtetes DD	Charadrahyla altipotens CR
Charadrahyla nephila VU	Charadrahyla trux CR
Chiropterotriton cracens EN	Chiropterotriton multidentatus EN
Craugastor anciano CR	Craugastor andi CR
Craugastor angelicus CR	Craugastor azueroensis EN
Craugastor berkenbuschii NT	Craugastor brocchi VU
Craugastor catalinae CR	Craugastor charadra EN
Craugastor chrysozetetes EX	Craugastor cruzi CR
Craugastor daryi EN	Craugastor emcelae CR
Craugastor emleni CR	Craugastor epochthidius CR
Craugastor escoces EX	Craugastor fecundus CR
Craugastor fleischmanni CR	Craugastor greggi CR
Craugastor guerreroensis CR	Craugastor inachus EN
Craugastor laevisimus EN	Craugastor laticeps NT
Craugastor lineatus CR	Craugastor melanostictus LC
Craugastor merendonensis CR	Craugastor mexicanus LC
Craugastor milesi CR	Craugastor obesus EN
Craugastor olanchano CR	Craugastor omoaensis CR
Craugastor pechorum EN	Craugastor phasma DD
Craugastor podiciferus NT	Craugastor polymniae CR
Craugastor punctariolus EN	Craugastor ranoides CR
Craugastor rhyacobatrachus EN	Craugastor rostralis NT
Craugastor rugulosus LC	Craugastor rupinius LC
Craugastor sabrinus EN	Craugastor saltuarius CR
Craugastor sandersoni EN	Craugastor stadelmani CR
Craugastor tabasarae CR	Craugastor taurus CR
Craugastor trachydermus CR	Crania georgiana LC
Crania pseudinsignifera LC	Crossodactylus dispar DD
Crossodactylus gaudichaudii LC	Cycloramphus boraceiensis LC
Cycloramphus ohausi DD	Cycloramphus semipalmatus NT
Duellmanohyla chamulae EN	Duellmanohyla ignicolor EN
Duellmanohyla lythrodes EN	Duellmanohyla salvavida CR
Duellmanohyla schmidtorum VU	Duellmanohyla soralia CR
Duellmanohyla uranochroa CR	Ecnomiohyla echinata CR
Ecnomiohyla rabborum CR	Eleutherodactylus barlagnei EN
Eleutherodactylus cooki VU	Eleutherodactylus gryllus EN
Eleutherodactylus hedricki EN	Eleutherodactylus jasperii CR
Eleutherodactylus karlschmidti CR	Eleutherodactylus longipes VU
Eleutherodactylus orcutti CR	Eleutherodactylus patriciae EN
Eleutherodactylus portoricensis EN	Eleutherodactylus richmondi CR
Eleutherodactylus ruthae EN	Eleutherodactylus schmidti CR
Eleutherodactylus semipalmatus CR	Eleutherodactylus symingtoni CR
Eleutherodactylus turquinensis CR	Eleutherodactylus unicolor VU

Eleutherodactylus wightmanae EN	Epipedobates tricolor EN
Euproctus platycephalus EN	Exerodonta juanita VU
Exerodonta melanomma VU	Exerodonta pinorum VU
Gastrotheca cornuta EN	Gastrotheca dendronastes VU
Gastrotheca guentheri VU	Gastrotheca litonedis EN
Gastrotheca orophylax EN	Gastrotheca ovifera EN
Gastrotheca piperata LC	Gastrotheca plumbea VU
Gastrotheca pseustes EN	Gastrotheca riobambae EN
Gastrotheca splendens EN	Geocrinia rosea LC
Heleioporus australiacus VU	Heleioporus eyrei LC
Hyalinobatrachium fleischmanni LC	Hyalinobatrachium guairarepanense EN
Hyla bocourti CR	Hylarana chalconota LC
Hylodes dactylocinus DD	Hylodes magalhaesi DD
Hylodes meridionalis LC	Hylodes perplicatus LC
Hylodes phyllodes LC	Hylomantis lemur CR
Hyloscirtus armatus LC	Hyloscirtus bogotensis NT
Hyloscirtus colymba CR	Hyloscirtus lindae VU
Hyloscirtus pantostictus EN	Hyloscirtus platydactylus VU
Hyloscirtus ptychodactylus CR	Hyloscirtus staufferorum EN
Hyloscirtus torrenticola VU	Hyloxalus anthracinus CR
Hyloxalus bocagei LC	Hyloxalus breviquartus DD
Hyloxalus chocoensis DD	Hyloxalus delatorreae CR
Hyloxalus elachyhistus EN	Hyloxalus lehmanni NT
Hyloxalus pulchellus VU	Hyloxalus vertebralis CR
Hypodactylus dolops VU	Hypsiboas cymbalum CR
Incilius cycladen VU	Incilius fastidiosus CR
Incilius holdridgei EX	Incilius melanochlorus LC
Incilius periglenes EX	Incilius peripatetes CR
Incilius porteri DD	Incilius tacanensis EN
Incilius tutelarius EN	Isthmohyla angustilineata CR
Isthmohyla calypsa CR	Isthmohyla debilis CR
Isthmohyla graceae CR	Isthmohyla pictipes EN
Isthmohyla tica CR	Isthmohyla xanthosticta DD
Leiopelma archeyi CR	Leiopelma hamiltoni EN
Leiopelma hochstetteri VU	Leptobranchium hasseltii LC
Leptodactylus fallax CR	Limnodynastes dumerilii LC
Lithobates chiricahuensis VU	Lithobates omiltemanus CR
Lithobates sierramadrensis VU	Lithobates subaquavocalis CR
Lithobates tarahumarae VU	Lithobates taylori LC
Lithobates vibicarius CR	Lithobates warszewitschii LC
Lithobates yavapaiensis LC	Litoria adelaidensis LC
Litoria aurea VU	Litoria booroolongensis CR
Litoria caerulea LC	Litoria castanea CR
Litoria chloris LC	Litoria dayi EN
Litoria ewingii LC	Litoria genimaculata LC
Litoria lesueurii LC	Litoria lorica CR
Litoria moorei LC	Litoria myola CR
Litoria nannotis EN	Litoria nudidigita LC
Litoria nyakalensis CR	Litoria pearsoniana NT
Litoria phyllochroa LC	Litoria piperata CR
Litoria raniformis EN	Litoria rheocola EN
Litoria spenceri CR	Litoria verreauxii LC
Mannophryne caquetio CR	Mannophryne cordilleriana CR
Mannophryne herminae NT	Mannophryne lamarcai CR

Mannophryne neblina CR	Mannophryne oblitterata DD
Mannophryne olmonae CR	Mannophryne riveroi EN
Megaelosia massarti DD	Megastomatohyla pellita CR
Mesotriton alpestris LC	Mixophyes balbus VU
Mixophyes fasciolatus LC	Mixophyes fleayi EN
Nymphargus griffithsi VU	Nymphargus megacheirus EN
Oedipina EN	Oophaga arborea EN
Osteopilus pulchrilineatus EN	Osteopilus vastus EN
Paratelmatobius lutzii DD	Paratelmatobius mantiqueira DD
Pelobates fuscus LC	Philoria frosti CR
Phrynomedusa appendiculata NT	Phyllobates bicolor NT
Phyllomedusa ecuatoriana EN	Physalaemus barrioi DD
Physalaemus moreirae DD	Plectrohyla acanthodes CR
Plectrohyla ameibothalame DD	Plectrohyla arborescandens EN
Plectrohyla avia CR	Plectrohyla bistincta LC
Plectrohyla calthula CR	Plectrohyla calvicollina CR
Plectrohyla celata CR	Plectrohyla cembra CR
Plectrohyla charadricola EN	Plectrohyla chryses CR
Plectrohyla chrysopleura CR	Plectrohyla crassa CR
Plectrohyla cyanomma CR	Plectrohyla cyclada EN
Plectrohyla dasypus CR	Plectrohyla ephemera CR
Plectrohyla exquisita CR	Plectrohyla glandulosa EN
Plectrohyla guatemalensis CR	Plectrohyla hartwegi CR
Plectrohyla hazelae CR	Plectrohyla ixil CR
Plectrohyla lacertosa EN	Plectrohyla matudai VU
Plectrohyla mykter EN	Plectrohyla pachyderma CR
Plectrohyla pentheter EN	Plectrohyla pokomchi CR
Plectrohyla psiloderma EN	Plectrohyla pycnochila CR
Plectrohyla quecchi CR	Plectrohyla robertsorum EN
Plectrohyla sabrina CR	Plectrohyla sagorum EN
Plectrohyla siopela CR	Plectrohyla tecunumani CR
Plectrohyla teuchestes CR	Plectrohyla thorectes CR
Pleurodema marmoratum LC	Pristimantis albericoi CR
Pristimantis anotis DD	Pristimantis bicolor VU
Pristimantis calcarulatus VU	Pristimantis caprifer LC
Pristimantis caryophyllaceus NT	Pristimantis chalceus LC
Pristimantis cremnobates EN	Pristimantis crenunguis EN
Pristimantis crucifer VU	Pristimantis diaphonus VU
Pristimantis diogenes VU	Pristimantis duellmani VU
Pristimantis fallax EN	Pristimantis fetusus EN
Pristimantis ginesi EN	Pristimantis gracilis VU
Pristimantis ignicolor EN	Pristimantis incanus EN
Pristimantis jorgevelosai EN	Pristimantis labiosus LC
Pristimantis lancinii EN	Pristimantis lichenoides CR
Pristimantis lymani LC	Pristimantis molybrignus NT
Pristimantis nigrogriseus VU	Pristimantis penelopus VU
Pristimantis prolatus EN	Pristimantis quinquagesimus VU
Pristimantis ruedai VU	Pristimantis sanctaemartae NT
Pristimantis sanguineus NT	Pristimantis savagei NT
Pristimantis scoloblepharus EN	Pristimantis scolodiscus EN
Pristimantis signifer VU	Pristimantis sulculus EN
Pristimantis tamsitti NT	Pristimantis uranobates LC
Pristimantis urichi EN	Pristimantis verecundus VU
Pristimantis vicarius NT	Pristimantis zophus EN

Prostherapis dunni CR	Pseudacris triseriata LC
Pseudoeurycea unguidentis CR	Pseudophryne corroborree CR
Pseudophryne pengillyei EN	Ptychohyla CR
Ptychohyla acrochorda DD	Ptychohyla dendrophasma CR
Ptychohyla erythromma EN	Ptychohyla euthysanota NT
Ptychohyla legleri EN	Ptychohyla leonhardschultzei EN
Ptychohyla macrotympanum CR	Ptychohyla panchoi EN
Ptychohyla salvadorensis EN	Ptychohyla sanctaecrucis CR
Ptychohyla spinipollex EN	Ptychohyla zophodes DD
Rana muscosa EN	Rana sierrae EN
Ranitomeya abdita CR	Rhacophorus margaritifer LC
Rhaebo haematiticus LC	Rheobatrachus vitellinus EX
Rhinella amabilis CR	Rhinella chrysophora EN
Rhinoderma darwini VU	Rhinoderma rufum CR
Scinax albicans LC	Scinax heyeri DD
Silverstoneia nubicola NT	Smilisca cyanosticta NT
Strabomantis cheiroplethus VU	Strabomantis necerus VU
Strabomantis zygodactylus LC	Taudactylus acutirostris CR
Taudactylus diurnus EX	Taudactylus eungellensis CR
Taudactylus liemi NT	Taudactylus pleione CR
Taudactylus rheophilus CR	Telmatobius arequipensis VU
Telmatobius atacamensis CR	Telmatobius atahualpai DD
Telmatobius bolivianus NT	Telmatobius brevipes EN
Telmatobius brevirostris EN	Telmatobius carrillae VU
Telmatobius ceiorum EN	Telmatobius cirrhacelis CR
Telmatobius colanensis EN	Telmatobius contrerasi DD
Telmatobius culeus CR	Telmatobius dankoi DD
Telmatobius degener EN	Telmatobius edaphonastes EN
Telmatobius gigas CR	Telmatobius hauthali VU
Telmatobius hockingi VU	Telmatobius hypselocephalus EN
Telmatobius ignavus EN	Telmatobius intermedius DD
Telmatobius jelskii NT	Telmatobius laticeps EN
Telmatobius latirostris EN	Telmatobius marmoratus VU
Telmatobius mayoloi EN	Telmatobius necopinus EN
Telmatobius niger CR	Telmatobius pefauri CR
Telmatobius peruvianus VU	Telmatobius philippii DD
Telmatobius pinguiculus DD	Telmatobius pisanoi EN
Telmatobius platycephalus EN	Telmatobius schreiteri EN
Telmatobius scrocchii EN	Telmatobius sibiricus EN
Telmatobius simonsi NT	Telmatobius stephani EN
Telmatobius thompsoni EN	Telmatobius timens DD
Telmatobius truebae EN	Telmatobius vellardi CR
Telmatobius verrucosus VU	Telmatobius vilamensis DD
Telmatobius yuracare VU	Telmatobius zapahuirensis CR
Thoropa lutzi EN	Thoropa miliaris LC
Thoropa petropolitana VU	Thoropa saxatilis NT

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