Batrachochytrium dendrobatidis

Species profile


System: Undefined

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
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<tr>
<td>Fungi</td>
<td>Chytridiomycota</td>
<td>Chytridiomycetes</td>
<td>Chytridiales</td>
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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.

[Accessed 20 August 2019]
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).


Click 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 sapropytically (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 lead 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 hyloid 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 precedence 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 uniflagellated 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](http://www.iucngisd.org/gisd/species.php?sc=123). Key findings of the *The Global Amphibian Assessment* have 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](http://www.iucngisd.org/gisd/species.php?sc=123) 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.  
Daszak *et al.* 1999. *Emerging Infectious Diseases and Amphibian Population Declines*

**Compiler:** National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG) with support from the Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme (Copyright statement)
Review: Matthew J. Parris Assistant Professor, Department of Biology University of Memphis USA

Publiction date: 2006-08-14

ALIEN RANGE

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

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>IUCN Category</th>
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<td>Adelotus brevis</td>
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<td>Agalychnis moreletti</td>
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<td>Alytes cisternasii</td>
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<tr>
<td>Atelopus monohernandezii</td>
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Adelotus brevis: NT
Agalychnis moreletti: CR
Alytes cisternasii: NT
Aplastodiscus calliprygius: LC
Aromobates alboguttatus: EN
Aromobates nocturnus: CR
Atelopus angelito: CR
Atelopus arthuri: CR
Atelopus bomolochos: CR
Atelopus carauta: CR
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Atelopus galactogaster: CR
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Atelopus halihelos: CR
Atelopus laetissimus: CR
Atelopus longibachirius: EN
Atelopus lozanoi: CR
Atelopus mandingues: CR
Atelopus minutulus: CR
Atelopus monohernandezii: CR

[Accessed 20 August 2019]
GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Batrachochytrium dendrobatidis*

Atelopus muisca CR
Atelopus nanay CR
Atelopus nicolai CR
Atelopus oxapampae EN
Atelopus pachydermus CR
Atelopus patazensis CR
Atelopus peruensis CR
Atelopus petirruizi CR
Atelopus pinangoi CR
Atelopus pulcher CR
Atelopus reticulatus CR
Atelopus seminiferus CR
Atelopus sermae CR
Atelopus siranus DD
Atelopus soriano CR
Atelopus spurrelli VU
Atelopus tamaense CR
Atelopus varius CR
Atelopus zeteki CR
Bokermannohyla claresignata DD
Bolitoglossa conanti EN
Bolitoglossa dolefini NT
Bolitoglossa pesrubra VU
Bolitoglossa sooyorum EN
Bombina pachypus EN
Bromeliohyla dentroscarta CR
Centrolene audax EN
Centrolene buckleyi VU
Centrolene gemmatum CR
Centrolene lynchii EN
Centrolene persictum VU
Centrolene scirtetes DD
Charadrahyla nephila VU
Chiropterotriton cracens EN
Craugastor anciano CR
Craugastor angilicus CR
Craugastor berkenbuschi NT
Craugastor catalinae CR
Craugastor chrysozetetes EX
Craugastor daryi EN
Craugastor emleni CR
Craugastor escoces EX
Craugastor fleischmanni CR
Craugastor guerrerensis CR
Craugastor laevissimus EN
Craugastor lineatus CR
Craugastor merendonensis CR
Atelopus nahumae CR
Atelopus nepiozomus CR
Atelopus onorei CR
Atelopus oxyrhynchus CR
Atelopus palmarus DD
Atelopus pedimarmoratus CR
Atelopus petersi CR
Atelopus pictiventris CR
Atelopus planispius 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 copia DD
Bolitoglossa magnifica EN
Bolitoglossa sombra VU
Bolitoglossa subpalma EN
Bromeliophyla bromeliacia EN
Bufo bufo LC
Centrolene ballux CR
Centrolene geckoideum VU
Centrolene heloderma CR
Centrolene medemini DD
Centrolene pipilatum EN
Charadrahyla aliptotens CR
Charadrahyla trux CR
Chiropterotriton multidentatus EN
Craugastor andi CR
Craugastor azueroensis EN
Craugastor brocchi VU
Craugastor charandra EN
Craugastor cruzi CR
Craugastor emcelae CR
Craugastor epochthidius CR
Craugastor fecundus CR
Craugastor greggi CR
Craugastor inachus EN
Craugastor laticeps NT
Craugastor melanostictus LC
Craugastor mexicanus LC

Craugastor milesi  
Craugastor olandchano  
Craugastor pechorum  
Craugastor podiciferus  
Craugastor punctarioius  
Craugastor ryacobatrachus  
Craugastor rugulosus  
Craugastor sabrinus  
Craugastor sandersoni  
Craugastor tabasarae  
Craugastor trachydermus  
Crinia pseudinsignifera  
Cyclobranchus gaudichaudi  
Duellmanohyla chamulana  
Duellmanohyla lythrodes  
Duellmanohyla schmidtorum  
Duellmanohyla uranochroa  
Economiohyla rabborn  
Eleutherodactylus cooki  
Eleutherodactylus hedricki  
Eleutherodactylus karlschmiedti  
Eleutherodactylus turquinensis  
Eleutherodactylus wightmanae  
Euproctus platycephalus  
Exerodonta juanitae  
Gastrotheca cornuta  
Gastrotheca quentheri  
Gastrotheca orthophyax  
Gastrotheca piperata  
Gastrotheca pseustes  
Gastrotheca splendidens  
Heleioporus australiacus  
Hyalinobatrachium fleischmanni  
Hyla bocourti  
Hylodes dactyloicus  
Hylodes meridionalis  
Hylodes phylloides  
Hyloscirtus armatus  
Hyloscirtus colymba  
Hyloscirtus ptychodactylus  
Hyloscirtus pantostictus  
Hyloscirtus ptychodactylus  
Hyloscirtus torrenticola  

Craugastor obesus  
Craugastor omoaensis  
Craugastor phasma  
Craugastor polyniaea  
Craugastor rostralis  
Craugastor rupinius  
Craugastor saltuarios  
Craugastor stadelmani  
Craugastor taurus  
Crinia georgiana  
Crossodactylus dispar  
Cycloramphus boraceiensis  
Cycloramphus semipalmatus  
Duellmanohyla ignicolor  
Duellmanohyla salvavida  
Duellmanohyla soralia  
Economiohyla echinata  
Eleutherodactylus barlagnei  
Eleutherodactylus gryllus  
Eleutherodactylus jasperi  
Eleutherodactylus longipes  
Eleutherodactylus patriciae  
Eleutherodactylus richmondi  
Eleutherodactylus schmidenti  
Eleutherodactylus symingtoni  
Eleutherodactylus unicolor  
Epipedobates tricolour  
Exerodonta juanitae  
Exerodonta pinorum  
Gastrotheca dendronastes  
Gastrotheca litonedis  
Gastrotheca ovifera  
Gastrotheca plumba  
Gastrotheca riombambae  
Geocrinia rosea  
Heleioporus eyrei  
Hyalinobatrachium guairarepanense  
Hylarana chalconota  
Hylodes magalhaesi  
Hylodes perplicatus  
Hylomantis lemur  
Hyloscirtus bogotensis  
Hyloscirtus lindae  
Hyloscirtus platydaactylus  
Hyloscirtus staufferorum  
Hyloplus anthracinus
GLOBAL INVASIVE SPECIES DATABASE
FULL ACCOUNT FOR: Batrachochytrium dendrobatidis

Hyloxalus bocagei LC
Hyloxalus chocoensis DD
Hyloxalus elachyhistus EN
Hyloxalus pulchellus VU
Hypodactylus dolops VU
Incilius cycladen VU
Incilius holdridgei EX
Incilius periglenes EX
Incilius porteri DD
Incilius tutelarius EN
Isthmohyla calypsa CR
Isthmohyla graceae CR
Isthmohyla tica CR
Leiopelma archeyi CR
Leiopelma hochstetteri VU
Leptodactylus fallax CR
Lithobates chiricahuensis VU
Lithobates sierramadrensis VU
Lithobates taraumarae VU
Lithobates vibicarius CR
Lithobates yavapaiensis LC
Litoria aurea VU
Litoria caerulea LC
Litoria chloris LC
Litoria ewingii LC
Litoria lesueurii LC
Litoria moorei LC
Litoria nannotis EN
Litoria nyakalensis CR
Litoria phyllochroa LC
Litoria raniformis EN
Litoria spenceri CR
Mannophryne caquetio CR
Mannophryne herminae NT
Mannophryne neblina CR
Mannophryne olmonae CR
Megaelosia massarti DD
Mesotriton alpestris LC
Mixophyes fasciolatus LC
Nymphargus griffithsi VU
Oedipina EN
Osteopilus pulchilineatus EN
Paratelmatobius luizii DD
Pelobates fuscus LC
Phrynomedusa appendiculata NT
Phyllomedusa ecuatoriana EN
Physalaemus moreirae DD

Hyloxalus breviquartus DD
Hyloxalus delatorreae CR
Hyloxalus lehmanni NT
Hyloxalus vertebralis CR
Hypsiboas cymbalum CR
Incilius fastidiosus CR
Incilius melanochlorus LC
Incilius peripatetes CR
Incilius tacanensis EN
Isthmohyla angustilineata CR
Isthmohyla debilis CR
Isthmohyla pictipes EN
Isthmohyla xanthosticta DD
Leiopelma hamiltoni EN
Leptobrachium hasseltii LC
Limnodynastes dumerilli LC
Lithobates omiltemanus CR
Lithobates subaquavocalis CR
Lithobates taylori LC
Lithobates warszewitschii LC
Litoria adelaidensis LC
Litoria boorooolongensis CR
Litoria castanea CR
Litoria dayi EN
Litoria genimaculata LC
Litoria loria CR
Litoria myola CR
Litoria nudidigita LC
Litoria pearsoniana NT
Litoria piperata CR
Litoria rheocola EN
Litoria verreauxii LC
Mannophryne cordilleriana CR
Mannophryne lamarciai CR
Mannophryne obliterata DD
Mannophryne riveroi EN
Megastomatothyia pellita CR
Mixophyes balbus VU
Mixophyes fleayi EN
Nymphargus megacheirus EN
Oophaga arboarea EN
Osteopilus vastus EN
Paratelmatobius mantiqueira DD
Philoria frosti CR
Phyllobates bicolor NT
Physalaemus barrioi DD
Pelectrohyla achantodes CR
GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: Batrachochytrium dendrobatidis

Plectrohyla ameibothalame DD
Plectrohyla avia CR
Plectrohyla calhula CR
Plectrohyla celata CR
Plectrohyla charadrilocla EN
Plectrohyla chrysoleura CR
Plectrohyla cyanomma CR
Plectrohyla dasypus CR
Plectrohyla exquisita CR
Plectrohyla guatemalensis CR
Plectrohyla hazelae CR
Plectrohyla lacertosae EN
Plectrohyla mykter EN
Plectrohyla penithera EN
Plectrohyla psiloderma EN
Plectrohyla quechi CR
Plectrohyla sabrina CR
Plectrohyla siopela CR
Plectrohyla teuchestes CR
Pleurodema marmoratum LC
Pristimantis anotis DD
Pristimantis calcarulatus VU
Pristimantis caryophyllaceus NT
Pristimantis crennobates EN
Pristimantis crucifer VU
Pristimantis diogenes VU
Pristimantis fallax EN
Pristimantis ginesi EN
Pristimantis ignicolor EN
Pristimantis iorgevelesoi EN
Pristimantis lancini EN
Pristimantis lymani LC
Pristimantis nigroprisorueus VU
Pristimantis prolatus EN
Pristimantis ruedai VU
Pristimantis sanguineus NT
Pristimantis scoloboleparus EN
Pristimantis signifer VU
Pristimantis tamsitii NT
Pristimantis urichi EN
Pristimantis vicarius NT
Prostherapis dunni CR
Pseudoeurycea unguidentis CR
Pseudophryne pengilleyi EN
Ptychohyla acrochorda DD
Ptychohyla erythroderma CR
Ptychohyla legleri EN
Ptychohyla arborescendens EN
Ptychohyla bistincta LC
Ptychohyla calvicolita CR
Ptychohyla cembra CR
Ptychohyla chryses CR
Ptychohyla crassa CR
Ptychohyla cyclada EN
Ptychohyla ephemerae CR
Ptychohyla glandulosa EN
Ptychohyla hartwegi CR
Ptychohyla ixil CR
Ptychohyla matudai VU
Ptychohyla pachyderma CR
Ptychohyla pokomchi CR
Ptychohyla pychnochea CR
Ptychohyla robbertsoruae EN
Ptychohyla sagorum EN
Ptychohyla tecunumanae CR
Ptychohyla theorceretae CR
Ptychohyla theorectes CR
Pristimantis albericoli VU
Pristimantis bicolor VU
Pristimantis caprifer LC
Pristimantis chalceus LC
Pristimantis crenonquius EN
Pristimantis diaphonus VU
Pristimantis duellmanii VU
Pristimantis fetosus EN
Pristimantis gracilis VU
Pristimantis incanus EN
Pristimantis labiosus LC
Pristimantis lichenoides CR
Pristimantis molybrignus NT
Pristimantis penelopus VU
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Pristimantis sanctamartae NT
Pristimantis savagei NT
Pristimantis scolodiscus EN
Pristimantis sulculus EN
Pristimantis uranobates LC
Pristimantis verecundus VU
Pristimantis zophus EN
Pseudacris triseriata VU
Pseudophryne corroboree CR
Ptychohyla CR
Ptychohyla dendrophasma CR
Ptychohyla euthysanota NT
Ptychohyla leonhardschultzei EN

### Full Account for: **Batrachochytrium dendrobatidis**

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### Bibliography

55 references found for **Batrachochytrium dendrobatidis**

**Management Information**


Summary: 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. Available from: http://www.amphibians.org/newsletter/ACAP.pdf [Accessed 9 June 2008]


Speare R, Berger L, Global distribution of chytridiomycosis in amphibians. 


General information
Summary: This paper discusses the role of disease in amphibian decline, and the immunological response.
Summary: The Global Amphibian Assessment (GAA) is the first-ever comprehensive assessment of the conservation status of the world's 5,918 known species of frogs, toads, salamanders, and caecilians. This website presents results of the assessments, including IUCN Red List threat category, range map, ecology information, and other data for every amphibian species.
Johnson, Pieter T.J., 2006. Amphibian diversity: Declination by disease. Published online before print February 21, 2006, 10.1073/pnas.060293103
Summary: Available from: http://www.pnas.org/cgi/content/full/103/9/3011 [Accessed 14 August 2006]
Kingsley D. Environment News, 23 April 2002


Norman, R. Undated. Chytrid fungus disease in New Zealand. Massey University Institute of Veterinary, Animal and Biomedical Sciences.

Summary: Article outlining the first case of chytrid fungus in New Zealand.


Summary: B. dendrobatidis differentially affects genotypes between two species of hybridizing leopard frogs (Rana). Hybrid genotypes are more susceptible to infection, and suffer greater reductions in growth and development from the fungus.


Summary: B. dendrobatidis alters the outcome of natural predator - prey dynamics in a larval amphibian - predator system.


Summary: B. dendrobatidis impacts on Hyla larvae may be somewhat ameliorated in a heavy metal (Cu) aquatic environment. Thus, pathogenic effects may be a result of interactions with other aquatic contaminants.


Summary: This paper documents that B. dendrobatidis induces competitive effects in the larval environment between a toad (Bufo) and treefrog (Hyla) species.


Summary: This paper outlines the role of antimicrobial peptides in deterring chytrid infection.

Speare R, Berger L. Chytridiomycosis in amphibians in Australia.


Summary: The pathogen Batrachochytrium dendrobatidis (Bd), which causes the skin disease chytridiomycosis, is one of the few highly virulent fungi in vertebrates and has been implicated in worldwide amphibian declines. However, the mechanism by which Bd causes death has not been determined. We show that Bd infection is associated with pathophysiological changes that lead to mortality in green tree frogs (Litoria caerulea). In diseased individuals, electrolyte transport across the epidermis was inhibited by >50%, plasma sodium and potassium concentrations were respectively reduced by ~20% and ~50%, and asystolic cardiac arrest resulted in death. Because the skin is critical in maintaining amphibian homeostasis, disruption to cutaneous function may be the mechanism by which Bd produces morbidity and mortality across a wide range of phylogenetically distant amphibian taxa.


Summary: This article gives details about the first case of chytrid fungus in New Zealand, including possible means of introduction and spread.


Summary: A discussion of the factors involved in the population declines of amphibians in Latin America.