


Chytridiomycosis (*Batrachochytrium dendrobatidis*)

"The largest infectious disease threat to biodiversity" (Kilpatrick et al. 2010)

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What is it?

- Fungus that causes skin disease
- Causes thickening of the skin, and infected toads and frogs tend to shed skin frequently (Northern Rocky Mountain Science Center)
- Thickening of the skin may impair gas exchange and affect the animal's ability to absorb water (Northern Rocky Mountain Science Center)
- Chytrid fungus infects keratinized mouthparts of tadpoles and keratinized skin, and has caused significant die-offs (Nichols et al. 2001)
- Lunged- Abnormal electrolyte levels cause the heart to stop beating and the death of the animal (Voyles et al. 2009)
- Lungless-Suffocation



World of Frogs: <http://theworldoffrogs.weebly.com/Chytrid-Fungus.html>

Where is it?

- Has been detected on at least 350 species of amphibians worldwide (Fisher et al. 2009)
- Detected on every continent that has amphibians (Fisher et al. 2009)

How did it get here?

- Africa is the origin of the amphibian chytrid
- International trade of *X. laevis* (African clawed frog) began in the mid-1930s (Weldon, Ché et al. 2004.)



saveTheFrog.com

Importance

- Bd has been called "the worst infectious disease ever recorded among vertebrates" in terms of the number of species impacted, and it's tendency to drive them to extinction (Gascon et al. 2007).
- Rapid decline- sometimes over a few weeks (Lips et al., 2006)
- Disproportionately eliminates species that are rare, specialized, and endemic (Smith et al., 2009)
- "Typhoid Mary"

Figure 3: Spatial distribution and pairwise overlap of the three main factors threatening global amphibian biodiversity, projected for the year 2080 (Hol, et al. 2011)

Some of these threats can be mitigated through legal and physical protection of species, but many – such as the amphibian chytrid fungus cannot. (Maryland Zoo)

Outbreaks

- Severe impacts upon amphibian populations at a number of locations around the world, specifically in Australia (Berger et al. 1998), Central America (Lips 2006), USA (Fellers et al. 2001), South America (Young et al. 2001)

Examples

- **Panamanian golden frogs**
 - listed as critically endangered
 - last recorded in the wild in 2009 (Smithsonian Science News)
 - may be extinct now in the wild (Maryland Zoo)
- **Golden toad**
 - Last seen in the wild in 1989 (Columbia University, Earth Institute)

When Bd arrives in an area:
 Amphibian decline: 4-6 months
 >50% species extirpated
 Remaining species at 20%
 Recovery time ~15 yrs
(Data from Lips et al. 2006, Conserv. Biol. 21: 1078-1088)

Figure 1. Lips et al. 2006. PNAS 103(9): 3165-3170.
