


Saprolegnia: Killer Cotton

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Overview

- ◆ What is *Saprolegnia*?
- ◆ How does it affect amphibians?
- ◆ What makes *Saprolegnia* the most important factor in amphibian declines?

Saprolegnia

(van den Berg et al. 2013, Fernández-Benítez 2008)

- ◆ *Saprolegnia* spp. are common microorganisms in the class Oomycetes.
- ◆ Most species are saprophytic, several are known pathogens.
- ◆ *S. ferax* and *S. parasitica* are two parasitic aquatic species affecting amphibians.




Image: Tom Volk, University of Wisconsin

Saprolegnia

(Bruno et al. 1996, Willoughby 1994, Beakes 1982)

- ◆ Diploid life cycle (2n)
- ◆ Spores release asexual zoospores.
- ◆ Once the zoophore finds suitable substrate, the sexual phase begins.
- ◆ If the zoospore cannot find suitable substrate, it will continue producing more zoospores.

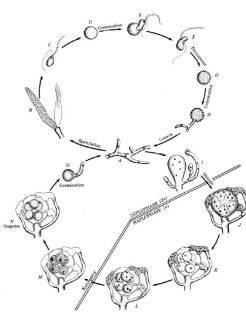


Image: Bold et al. 1987

Mortality: Eggs

(Fry et al. 2010, Petrisko et al. 2008)

- ◆ *Saprolegnia* is the only genus of oomycete pathogens includes only water-borne organisms
- ◆ Infection = mortality
- ◆ Parasitizes eggs





Image: American Phytopathological Society

Mortality: Larvae

(Romansic 2009)

- ◆ Comparative study of the effects of *S. ferax* on
 - ◆ *Pseudacris regilla* (Pacific treefrog)
 - ◆ *Rana cascadae* (Cascades frog)
 - ◆ *Ambystoma macrodactylum* (long-toed salamander)
 - ◆ *Rana aurora* (red-legged frog)



Mortality: Larvae

(Romansic 2009)

- ◆ A one week exposure to *S. ferax* killed *P. regilla* larvae
- ◆ A two week exposure killed *R. aurora* larvae
- ◆ Other species were unaffected after one week

Mortality: Adults

(Prada-Salcedo et al. 2011)

- ◆ *Atelopus mittermeieri*, an endangered toad endemic to Colombia, has been exposed to *S. ferax* after introduction of rainbow trout



Mortality: Adults

(Prada-Salcedo et al. 2011)

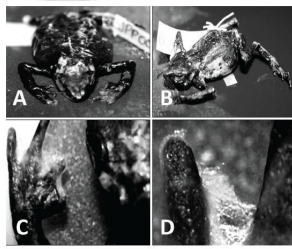


Figure 4. Detail of specimens of *Atelopus mittermeieri* (A) MJU 4318, (B) MJU 4367, (C) Skin of *Atelopus mittermeieri* in the specimen MJU 4367, (D) Detail of *Atelopus mittermeieri*. Image: Prada-Salcedo

Amphibian Declines

(Kiesecker et al. 1995, Fry et al. 2010)

- ◆ Usually considered a secondary pathogen, in concert with other issues such as chytrid fungus or UV-B radiation exposure, *Saprolegnia* infection is the fatal blow.
- ◆ Under the right circumstances, *Saprolegnia* can act as a primary pathogen, causing mycosis and mortality.

Prolonged Effects?

(Blaustein et al. 1994)

- ◆ Mean egg survival rates are dropping drastically.
- ◆ Fewer eggs mean fewer adults!

Location	Condition	Survival Rate (%)
Lost Lake	No fungus	~95
	Fungus	~75
Three Creeks	No fungus	~95
	Fungus	~55

Image: Kiesecker et al.

Summary

- ◆ *Saprolegnia* is a parasitic microorganism
- ◆ It kills amphibian eggs, larvae, and adults
- ◆ When other factors weaken amphibian populations, *Saprolegnia* infection can be a devastating blow to species

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Questions?

