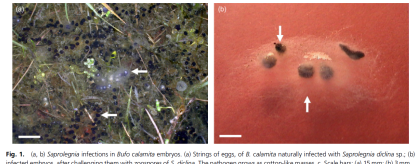


THE CONTRIBUTION OF SAPROLEGNIA TO AMPHIBIAN DECLINES

Chelsea Conner
Wildlife and Fisheries Science

What is *Saprolegnia*?

- Class: Oomycota
- Disrupts host immune pathways




Fernandez-Beneitez et al. (2007)

Fig. 1. (a) *Saprolegnia* infections in Bull Terrier embryos. (b) Arrangements of eggs of Bull Terrier naturally infected with *Saprolegnia diclina* sp. (c) Infected embryos, after challenging them with zoospores of *S. diclina*. The pathogen grows as cotton-like masses. c. Scale bars: (a) 15 mm; (b) 3 mm.

How does it kill?

- Hyphae kill embryos
- With the help of
 - Climate change
 - UV-B radiation
 - Stocking of fish
 - Acid rain
 - Pollutants (Fertilizers, heavy metals, etc)
 - High density of hosts
 - Laying of communal egg masses



Saprolegnia diclina
(Fernandez-Beneitez, 2007)

1. *Bufo boreas*

- Oregon
- Players:
 - Climate change
 - UV-B
 - *Saprolegnia ferax*
- Kiesecker et al. (2001)

Disease Outbreak
Possible Outcomes:
- Population Declines
- Alteration of competitive interactions

2. *Ambystoma maculatum*, *Rana sylvatica*, and *Bufo americanus*

- Massachusetts
- Clutch mortality of up to 90%
- Early hatching
- *Saprolegnia* sp.
- Gomez-Mestre et al. (2006)

Disease Outbreak
Possible Outcomes:
- Population Declines
- Alteration of competitive interactions

3. *Bufo calamita*

- Spain
- *Saprolegnia diclina*
- Fernandez-Beneitez et al. (2007)

Disease Outbreak
Possible Outcomes:
- Population Declines
- Alteration of competitive interactions

4. *Bufo bufo*, *Rana arvalis*, *Rana temporaria*, *Rana 'esculenta'*, *Bufo calamita*

- The Netherlands
- Water acidity
- *Saprolegnia sp.*

• Leuven et al. (1986)

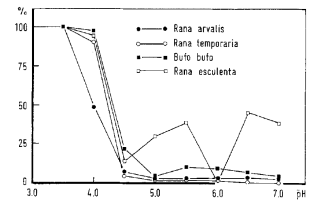


Figure 4. The egg mortality rates (%) of four amphibian species in relation to the pH of the culture medium.

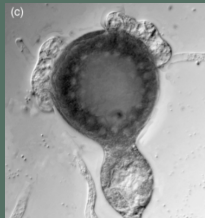
5. *Atelopus mittermeieri*

- Colombia
- Rainbow trout: introduced species
- *Saprolegnia sp.*
- Prada-Salcedo et al. (2011)



Why is *Saprolegnia* so important?



- Climate change
- Acid rain
- UV-B radiation
- Heavy metals
- Silt (Lefcort et al., 1997)
- Introduced species
- Gleason et al. (2014)



Saprolegnia diclina
(Fernandez-Beneitez, 2007)

Potential Solutions

- Screen fish in aquaculture
- Work to decrease stressors

Saprolegnia diclina (Fernandez-Beneitez, 2007)

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Questions?



Saprolegnia diclina (Fernandez-Beneitez, 2007)
