To use or not to use the chytrid pathogen, *Batrachochytrium dendrobatidis,* to attempt to eradicate Coqui frogs from Hawai'i

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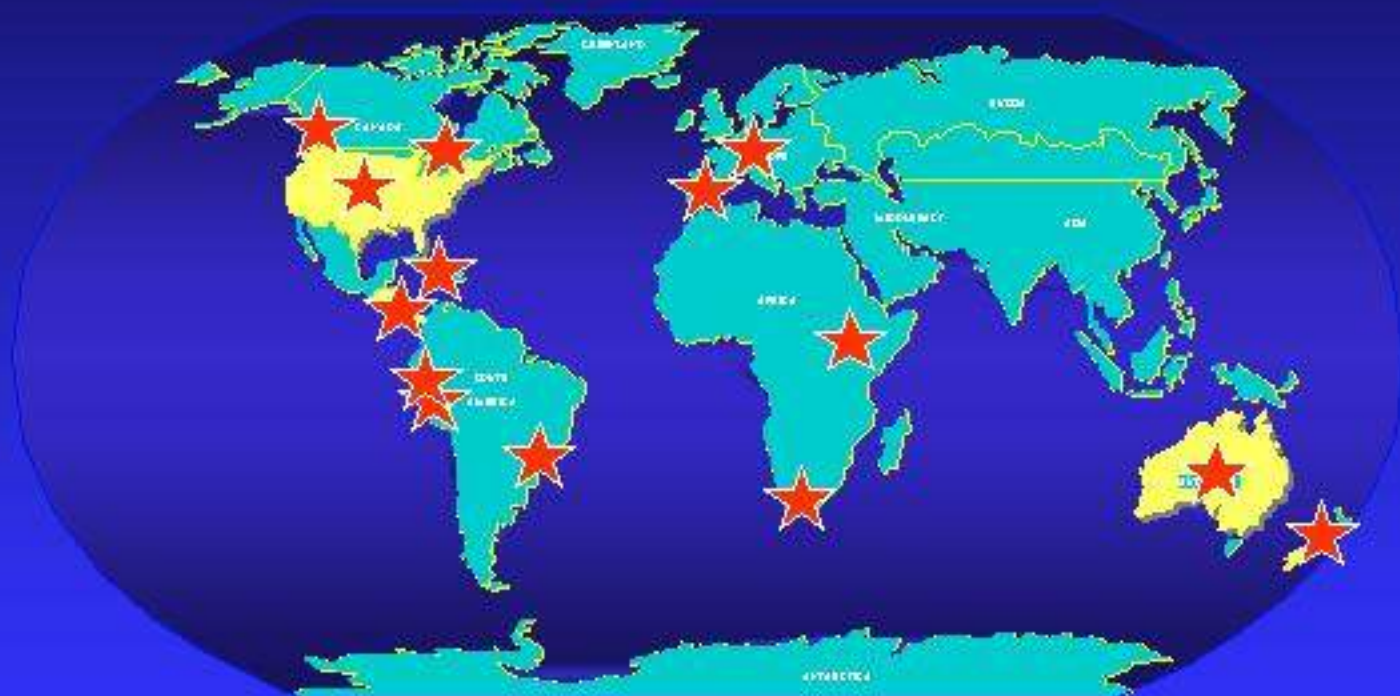### University of Colorado

Batrachochytrium dendrobatidis (Bd)

Phylum: Chytridiomycota
Order: Chytriodiomycetes

Longcore et al. Mycologia 91: 219-227
Berger et al.   PNAS 95:9031-9036

Reported distribution worldwide

Eradication Measures:
Hot water
Caffeinated sprays
Citric Acid sprays
Insecticides
Aspirin
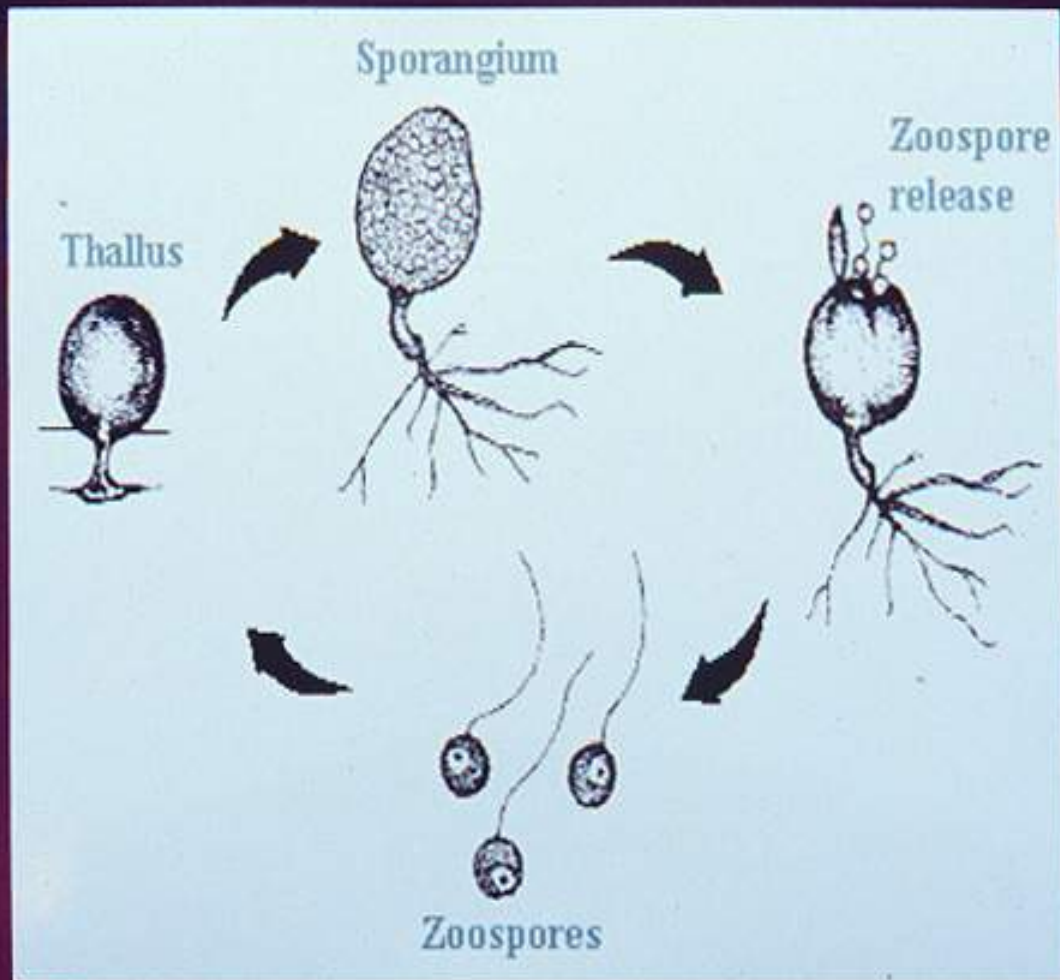Hydrated lime

Characteristics:
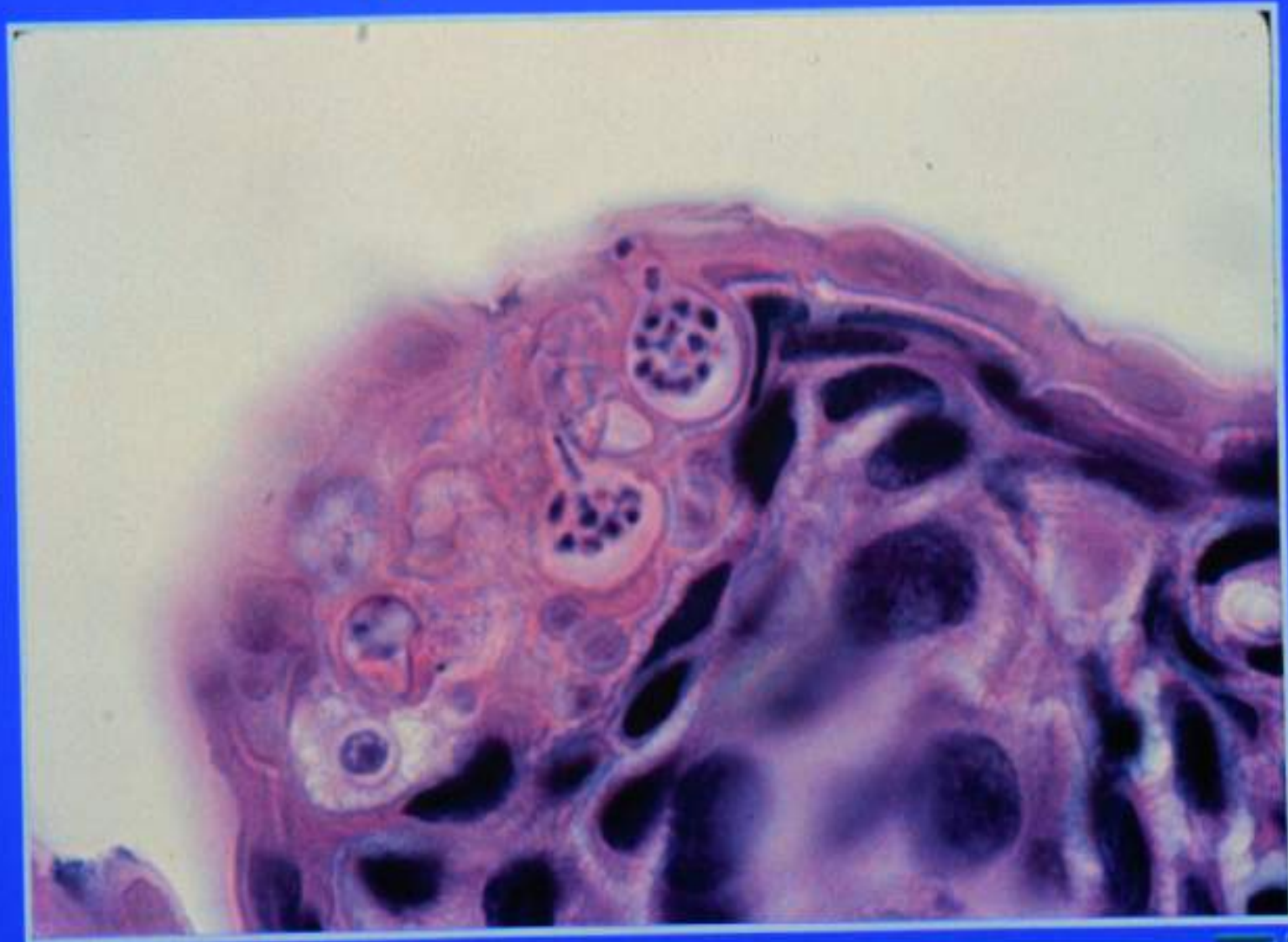
Aquatic

Most species degrade plant material

A few parasitic on insects or diatoms

Batrachochytrium dendrobatidis is the only chytrid known to be parasitic on any vertebrates

Fungus life cycle

Thallus → Sporangium → Zoospore release → Zoospores

Microscopic Lesions in Chytrid Infection

How do we know *Bd* is the culprit?

1. Histology
2. PCR
3. Fulfillment of Koch's postulates

Reasons why *Bd* would be ineffective as a tool to eradicate coqui from Hawaii

1. Relative to other amphibians, coqui are not very susceptible to *Bd*
2. *Bd* is already present in the Hawaiian Islands and does not seem to be causing mass mortalities
3. Summer temperatures may be too high for *Bd* to be effective
4. Other potential hosts of *Bd* are not known

Legend:
- Bufo b. boreas
- B. b. halophilus
- B. b. nelsoni
- B. canorus
- B. exsul

Experimental Design:

15 coqui per group
control, 1M, 1000, 100, 40 zoospores
24-hr exposure to JEL275

15 boreal toads per group
control and 1M zoospores

1. Less than 50 % of coqui were PCR positive at any dosage

2. Some PCR positive coqui lived at least 100 days

Conclusions:

1. Bd infection is not very lethal to coqui, compared to several other amphibian species

2. Even exposure to very high doses (1M zoospores) under optimal conditions will not infect some coqui

3. Even if coqui become infected, high air temperatures may allow coqui to clear the infection

Possible suggestions:

1. Create and release males that are sterile but hormonally "normal"?

2. Insert genes into genome that prevent maturation of immune system?