


Effects of *Areomonas hydrophila* and Amphibian Decline

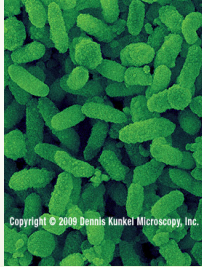
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teachnuclear.com

Introduction

- FDA definition:
 - *Areomonas hydrophila* is a species of bacterium that lives in freshwater bodies. It can cause illness and infection if ingested or transported through an open wound (in humans) (fda.gov, 2014)
- First discovered in 1962 while researchers were looking at the causes of the fish disease "red fin."



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So what about the amphibians?

- Factor 1:
 - Anurans and Caudates have highly permeable skin and need water to carry out their life history strategies. Unfortunately, *Areomonas hydrophila* needs water to exist, also.



express.co.uk


Red Leg Syndrome= *Areomonas hydrophila* bacterium

Signs:

- *Redness at cloaca and base of legs
- *Skin lesions
- *Necrosis


Cause:

- *hemorrhaging intestines



frogforum.net

Signs of *Areomonas hydrophila*:



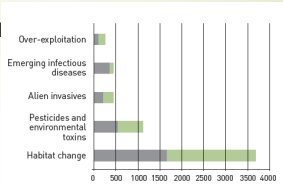
hemorrhage

www.talktothefrog.org

Evidence in die-offs and declines

According to sapiens.revues.org:

S.A.P.I.E.N.S
Surveys



Environmental Risk	Number of Species Affected (Approximate)
Over-exploitation	500
Emerging infectious diseases	1000
Alien invasives	1000
Pesticides and environmental toxins	1500
Habitat change	3500


Total (green+blue) and threatened (green) numbers of amphibian species that are affected by five of the six major environmental risks. N.B. Data were not available for determining how many amphibian species are threatened by Global climate change (Chanson et al., 2008).

1948: Outbreak of red leg in Charleston, West Virginia

Pond was visited 3 days in a row


All but a few breeding pairs died

Study revealed red leg to blame (Shotts, 1948)



Cause?

- Explosive breeders



Golden Toad males prepping for breeding season

www.the-scientist.com

est.noaa.gov

Cause?

- Mass Migrations

Skin to skin contact spreads disease

Spotted Salamanders, *Ambystoma maculatum*



19 Gf facility, Adams Co., OH March 1, 2012 (70)


River frogs, *Rhombophis heisterkampfi*

gandalfrey.com/accounts/GA20W/0a6f6a/7ee6e1

Stressors


Breeding Season:
Very stressful!
Stressors lower immune response

... "stress directly causes suppression of the immune system, or indirectly causes immunosuppression by effecting elevated secretion of adrenal cortical hormones" (Carey, 1993).



Disease Transmission

- Skin to skin contact will spread disease



backyardzoologist.wordpress.com

Antibiotics?

- In a study conducted on the virulence of the bacterium on the Chinese giant salamander (*Andrias davidianus*), *Aeromonas hydrophila* was found to be resistant to antibiotics such as vibramycin, furazolidone and erythromycin, although certain antibiotics such as sulfafurazole, ciprofloxacin and penbritin proved to fight the bacterium (Wang et al, 2012).




www.cryptozoo.com

Ubiquity of *Aeromonas hydrophila*

"Red-leg" is a bacterial infection caused by *Aeromonas hydrophila* (formerly *Pseudomonas hydrophila*) (Shotts 1984).

These bacteria, found ubiquitously in fresh waters, infect fish, amphibians, reptiles, and even humans (Reed & Toner 1942; Reichenbach-Klinke & Elkan 1965; Davis et al. 1978).



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