


Why Ranavirus is Horrible and Taking Over the World

Reilly Jackson
WFS 433

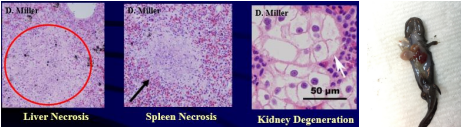
What is Ranavirus?

- Family: Iridoviridae
- A quickly emerging pathogen that is known to infect at least 180 species within 52 families, among fish, reptiles, and amphibians (Duffus et al. 2015)
- At least 6 species



So... what does it do?

- Once the virus has entered the host cells, it takes a matter of hours before replication of the virus begins (Chinchar, 2002)
- Results in cell death via necrosis of apoptosis
- Ultimately leads to organ failure and death of host (Gray et al., 2009)
- Mainly affects larva, tadpoles, and metamorphs



Where is it?... It's Everywhere

- Found in numerous countries on six continents (because Antarctica has minimal life)

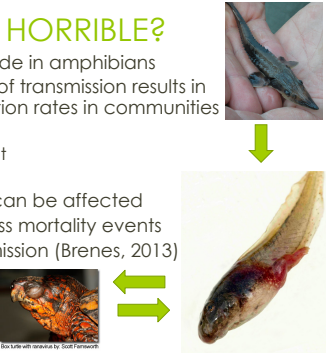


Duffus et al. 2015


USGS scientists have isolated ranaviruses associated with die-offs involving more than 20 species of amphibians and turtles. Massive die-offs of amphibians are often caused by ranaviruses. USGS scientists have isolated ranaviruses associated with die-offs in over 25 states involving more than 20 species of turtles and amphibians in mortality events ranging from one to thousands of individuals affected. Some events may involve a single species, others may involve multiple species. Frogs and salamanders in the same pond, for example, may die from ranaviral infections at the same time.

Why is it so HORRIBLE?

- International trade in amphibians
- Multiple means of transmission results in increased infection rates in communities
 - Direct contact
 - Indirect contact
 - Ingestion
- All age classes can be affected
- Potential for mass mortality events
- Interclass transmission (Brenes, 2013)




The Evidence!

NEWS Posted October 6, 2014 | Updated October 6, 2014 INCREASE FONT SIZE 

Bowdoin professor identifies likely cause of mass frog deaths

Nathaniel Wheelwright's paper, published recently in an academic journal, is getting the attention of scientists around the country.

A Maine biologist says a virus-caused die-off of some 200,000 tadpoles in his backyard pond is the largest documented mass natural death of amphibians ever recorded in academic literature.



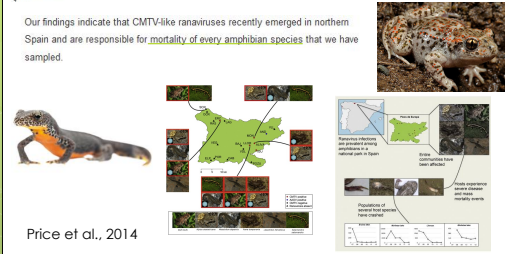
N. Wheelwright

More evidence

Collapse of Amphibian Communities Due to an Introduced *Ranavirus*

Stephen J. Price^{1,2}, Trenton W.J. Garner, Richard A. Nichols, François Balloux, César Ayres, Amparo Mora-Cabello de Alba, Jaime Bosch

Our findings indicate that CMTV-like ranaviruses recently emerged in northern Spain and are responsible for mortality of every amphibian species that we have sampled.




Price et al., 2014

Just in case you weren't convinced

First Report of a Ranavirus Associated with Morbidity and Mortality in Farmed Chinese Giant Salamanders (*Andrias davidianus*)

Y. Geng^{1,2}, K.Y. Wang^{1,2}, Z.Y. Zhou¹, C.W. Li¹, J. Wang¹, M. He¹, Z.Q. Yin¹, W.M. Lai¹

From February to May 2010, a disease outbreak occurred in farmed Chinese giant salamanders in Hanzhong County, Shanxi Province, China. Larval, juvenile and adult salamanders were affected. During the outbreak, approximately 350 of 670 salamanders died. Twelve sick salamanders (four larvae, five juveniles and three adults) were collected and transferred alive to the Key Laboratory of Animal Disease and Human Health of Sichuan Province to determine the cause of the disease.



- <https://www.youtube.com/watch?v=7rW0wQ7Ata4#t=138>
- Start at 1:25

References

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- Wheelwright, Nathaniel T., Matt J. Gray, Rachel D. Hill, and Debra L. Miller. "Sudden Mass Die-off of a Large Population of Wood Frog (*Lithobates sylvaticus*) Tadpoles in Maine, USA, Likely Due to Ranavirus." *Herpetological Review* 45.2 (2014): 240-42. Web.

Questions?

#RANAVIRUSISTHEWORSTTHINGEVER

Ranaviruses represent a significant threat to the global biodiversity of ectothermic vertebrates

- Dr. Matt J. Gray

