RANAVIRUS

Office of Fish and Wildlife Health and Forensics

Introduction

Ranavirus is a virus belonging to the *Iridoviridae* family. Ranaviruses are large, double stranded DNA viruses and are distributed worldwide. They can cause major mortality events in species of amphibians and turtles.

Species Affected

Ranaviruses are known to infect 173 ectothermic vertebrates worldwide (amphibians, reptiles, and fish), including 91 amphibian species depending on the strain.

Clinical Signs

Clinical signs for amphibians can include swelling and fluid accumulation throughout the limbs or body, skin hemorrhage, lordosis (abnormal forward curvature of the spine) and skin ulcers. Behavioral signs can include abnormal swimming and lethargy. Amphibians going through metamorphosis are at the highest risk. In addition to the previous clinical signs, reptiles and fish can also experience lesions inside the mouth, swollen eyelids and discharge from the mouth and nose. Animals showing clinical signs typically die within 1-5 days due to multiple organ failure.

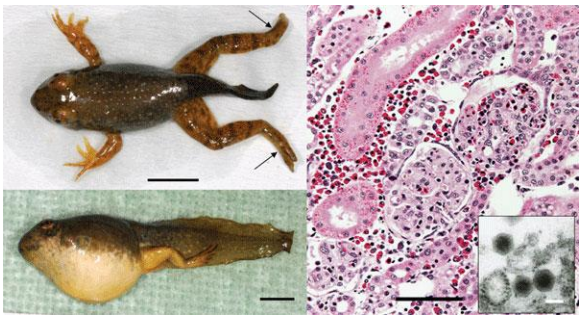

Image from CDC: https://wwwnc.cdc.gov/eid/article/15/7/08-1636-techapp1

Transmission

Ranaviruses are extremely hardy and can persist in the environment for a long time without having a host. Transmission of ranaviruses occur through water, direct contact as well as ingestion of infected tissues. Animals exposed to stressors, juvenile amphibians, and those that are or have just gone through metamorphosis may

be more susceptible to this virus. Water temperature during metamorphosis can be a stressor which can aid in the propagation of ranavirus. Infections most commonly occur during spring and summer while many amphibians are undergoing metamorphosis.

Diagnosis

PCR, cell culture, or histology is used to diagnosis ranavirus.

Epidemiology

The first time ranavirus was documented was during 1966 in primary kidney cell cultures of northern leopard frogs. In total, there are six species of ranavirus that are known to cause infection. Die-offs due to ranavirus typically happen during the summer months, but in the American Southeast it can happen during October. Additionally, it is possible for individuals to survive the infection. When reinfected, the infection tends to be less severe. Ranavirus is common in captive populations of ectotherm vertebrates as well as wild ones.

What to Do/Who to Contact

Ranavirus persists in the environment, even without a host. It is essential to use appropriate biosecurity measures when handling amphibians, reptiles, or fish in locations that could be contaminated with ranavirus. Clean equipment with bleach (1%) and chlorhexidine (0.75%). If large numbers of amphibians, reptiles or fish is found, please contact and report to Brian Zarate (brian.zarate@dep.nj.gov) and 1-877-WARN-DEP (1-877-927-6337).

Additional Information

Ranavirus | Cornell Wildlife Health Lab

Ranavirus | Amphibian and Reptile Conservation (arc-trust.org)

Global Ranavirus Consortium – Scientific collaboration to advance our understanding of ranaviruses.

infection-ranavirus.pdf (awe.gov.au)

Water Temperature Affects Susceptibility to Ranavirus - PubMed (nih.gov)

Appendix Figure - Ranavirus Outbreak in North American Bullfrogs (Rana catesbeiana), Japan, 2008 - Volume 15, Number 7—July 2009 - Emerging Infectious Diseases journal - CDC

Ranavirus Ecology and Evolution: From Epidemiology to Extinction | SpringerLink

Cover Image from: https://www.gardenwildlifehealth.org/portfolio/ranavirus-disease/