

BASICS

Ranaviruses are a group of viruses that belong to the *Iridoviridae* family, which is characterized by relatively large, double-stranded DNA viruses.

MASS DIE-OFFS attributed to ranavirus have affected several species of amphibians and turtles, and the virus can also have fatal consequences for fish and reptiles. All life stages are potentially susceptible.

Strains of ranavirus that infect amphibians may cause **90%–100% MORTALITY** in tadpoles and adults, and while some outbreaks may involve only a single species, others can affect multiple species. Infection rates are high in spring and summer when larval amphibians are undergoing metamorphosis.

CLINICAL SIGNS in amphibians can include abnormal behavior/swimming, lethargy, swelling of the limbs or body, fluid accumulation in the body, skin hemorrhage (especially towards the hind area), and sometimes skin ulcers.

This is also the case for **FISH AND REPTILES**, though lesions can also sometimes be seen inside the mouth of affected individuals, as well as swollen eyelids and discharge from the nose and mouth. Affected animals die due to the failure of multiple organs, and often within 1-5 days.

Ranaviruses are **TRANSMITTED** through several routes: contaminated water, physical contact, and ingestion of infected tissues.

DIAGNOSIS is made using PCR, cell culture, and/or microscopy of infected tissues.

There are currently **NO TREATMENTS** or preventative vaccines available for ranavirus. Ranavirus tends to persist in aquatic environments; it can last for weeks regardless of the presence of a host. **BIOSECURITY** is paramount; bleach (10%) and chlorhexidine (0.75%) are effective options for disinfection of equipment and boots when handling amphibians.



DETAILS

As of 2025, seven distinct species of Ranavirus have been identified, but there is still a wide variety of characteristics within viral species. The most common species *Ranavirus rana1* (formerly known as Frog Virus 3) can infect amphibians, reptiles, and fish.

This wide host range means that it's important to think about ranaviruses in terms of the environment rather than the individual animal. If a single frog in a pond has ranavirus, the disease can spread not only to other frogs, but also to salamanders, turtles, and fish that might be living in and around that pond.

Aside from the potential for mass mortality, there is another concern; while many of the species in die-offs are fairly common and widespread, some die-offs affect species that are either declining in number or are already endangered.

TRANSMISSION For an animal to develop ranavirosis, the disease caused by ranavirus, the animal needs to be susceptible to infection by the virus and in the same place as the virus. Most commonly, this happens by horizontal transmission: animals can become infected by directly coming

into contact with an infected animal or indirectly by sharing a contaminated environment. Ranavirus has also been found in mosquitoes during outbreaks in turtles, suggesting that mosquitoes may transmit it. It is also possible that ranaviruses are transmitted vertically from parents to offspring, but this is likely a less important mode of transmission.

It is not guaranteed that an animal will develop disease if they are infected with a ranavirus. Several species of amphibians and reptiles can be infected without showing signs of disease. The presence of stressors, such as pesticides, can affect an individual's susceptibility to developing ranavirosis. Temperature and life stages are important factors that affect disease in amphibians. Amphibian larvae going through metamorphosis or post-metamorphic juveniles are the most susceptible to disease.

For this reason, most infections occur in the spring and summer, when the majority of amphibians are undergoing this process. However, individuals who do manage to survive an infection may develop an immunity to future infections. For example, box turtles that survived a die-off were able to be reinfected with ranavirus and shed virus in an experimental challenge, but the disease was generally less severe.



Wood frog by Dave Huth
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