

RANAVIRUS

CAUSE

Ranavirus is an infectious disease of amphibians, reptiles, and fish caused by viruses from the genus *Ranavirus*. There are several different species of ranavirus that cause varying levels of disease in affected animals.

SIGNIFICANCE

Ranavirus is believed to be the cause of several recent massive mortality events in amphibian populations across the globe. With a mortality rate of 90%-100%, the disease has the potential to eliminate entire species if not controlled. Ranavirus outbreaks can affect multiple species at the same time.

SPECIES AFFECTED

Ranaviruses affect amphibians, reptiles, and fish. In the United States, the USGS National Wildlife Health Center has identified ranaviruses in 16 species of frogs, 1 species of toad, and 6 species of salamanders, including the true frog, the tree frog, and the mole salamander. Ranavirus also severely affects both captive and wild populations of eastern box turtles and true tortoises and has been diagnosed in snakes and lizards. The viruses have been linked to mortality in several species of bony fish, including the pallid sturgeon and the three-spine stickleback. Ranaviruses affect these animals at all life stages, though in general, mortality rates are highest if the animal contracts the virus during the larval stage. Ranavirus does not affect wild mammals or humans.

DISTRIBUTION

Ranavirus mortality has been identified in North America, South America, Europe, Asia, and Australia. In the United States, confirmed cases have been documented in the northeast, southeast, Midwest, and northwest. In Canada, mortalities due to ranavirus have been found in frogs and salamanders from at least 5 provinces.

TRANSMISSION

Transmission of ranavirus occurs through direct contact, ingestion of the virus, ingestion of infected animals, or exposure to infected soil or water sources. Because ranaviruses most severely affect amphibians and reptiles in the larval stage, mortality events tend to be seasonal. In amphibians, mortality events due to ranavirus are most frequently seen in the spring and summer, while in turtles they are most common in the late summer and autumn. Though it is poorly understood at present, ranaviruses are believed to be able to persist in the environment for a period of time and can likely survive for months in water under favorable conditions.

CLINICAL SIGNS

Frequently, the first sign of an outbreak of ranavirus is the sudden onset of illness and death in large numbers of amphibians and/or reptiles over a 1-5 day period. Clinical signs in amphibians include mild to severe hemorrhages in the skin, especially near the base of the hind limbs and the vent opening, lethargy, weak or erratic swimming, buoyancy problems, gasping for air, and mild to severe fluid accumulation under the skin of the abdomen or hind legs. At necropsy, there may be fluid accumulation in the body cavity and hemorrhages on the surfaces of the heart, stomach, and liver. Occasionally, the liver or spleen are affected and ulcers in the skin and palate may be observed.

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DIAGNOSIS

Laboratory examination of diseased tissue and isolation and identification of the ranaviruses is used to confirm diagnosis of this disease. Confirmation of a case requires histopathologic examination of tissues fixed in either 70% ethanol or 10% formalin and a positive PCR test (or, less frequently, viral culture).

TREATMENT

There is currently no treatment or vaccine for ranavirus.

MANAGEMENT AND PREVENTION

Since there is no treatment for ranavirus, management is focused on quarantine and sterilization to prevent the spread of the virus to other animals and new environments. Any infected animals should be quarantined to prevent infection of other animals. Water from captive facilities and home aquariums should be disinfected prior to disposal to prevent the virus from spreading into new water sources. All equipment, surfaces, and storage tanks in captive facilities should be disinfected after use. Wildlife biologists, veterinarians, rehabilitators, and anyone else involved in amphibian or reptilian fieldwork should disinfect all equipment and clothes before and after working at a field site.

SUGGESTED READING

National Wildlife Health Center. 2013. Ranavirus. United States Geological Survey.

www.nwhc.usgs.gov/disease_information/other_diseases/ranavirus.jsp

American College of Veterinary Pathologists. 2013. Ranavirus Fact Sheet.

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