

## RANAVIRUS INFECTION IN AMPHIBIANS

ANIMAL GROUP AFFECTED	AGE GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE?	TREATMENT	PREVENTION & CONTROL
Amphibians  Ranaviruses can also infect fish and reptiles	Larvae and metamorphs primarily  Adults less often  Eggs/embryos can be affected but prevalence is unknown	Direct contact, cannibalism, through the water	skin ulceration, systemic haemorrhages, lethargy, erratic swimming, inappetence, "red leg"	May be epizootic with high mortality, dependant on virus and amphibian species	Control secondary bacterial growth	<i>In houses</i> Isolate affected amphibians. Tanks should have separate water sources.  <i>in zoos</i> Isolate affected amphibians. Tanks should have separate water sources.

<b>Fact sheet compiled by</b> Rachel E. Marschang, Institut für Umwelt- und Tierhygiene, Hohenheim University, Stuttgart, Germany	<b>Last update</b> December 2008
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<b>Susceptible animal groups</b> Amphibians of the orders Anura and Caudata, salamanders (e.g. <i>Ambystoma</i> spp.), toads (e.g. <i>Bufo</i> spp.), frogs (e.g. <i>Limnodynastes</i> spp., <i>Rana</i> spp.) and others. Ranaviruses also infect fish and reptiles, and some ranavirus isolates may be able to infect animals from more than one class.	
<b>Susceptible age groups</b> Larvae and metamorphs are most affected. Adult morbidity and mortality occurs less often. The effect on eggs remains unknown.	
<b>Causative organism</b> Ranaviruses. There are several different isolates of ranaviruses, some of which may be more host specific than others.	
<b>Zoonotic potential</b> No.	
<b>Distribution</b> Worldwide.	
<b>Transmission</b> Horizontal transmission: Direct contact, cannibalism, through the water. Vertical transmission: Suspected but remains unknown.	
<b>Incubation period</b> Dependent on developmental stage, virus isolate, temperature, and amount of virus. Approx. 1 to several weeks.	
<b>Clinical symptoms</b> Infected amphibians often have swollen appendages and reddening of the skin. Anorexia, lethargy, ataxia. "Red leg" (although ranaviruses are not the only possible cause of "red leg" in amphibians). Chronically infected inapparent carriers have been described.	
<b>Post mortem findings</b> Necrotizing, vesicular, and ulcerative dermatitis, gastrointestinal ulceration, hepatic, splenic, renal, lymphoid and hematopoietic necrosis. Intracytoplasmic inclusions in cells of affected tissues.	
<b>Diagnosis</b> <ul style="list-style-type: none"> <li>• PCR</li> <li>• real-time PCR</li> <li>• virus isolation (followed by immunofluorescence or immunohistochemistry)</li> </ul>	



- histology (followed by immunofluorescence or immunohistochemistry)

**Material required for laboratory analysis**

Liver and/or kidney samples from dead animals. Toe or tail clips, as well as cloacal or lesion swabs from live animals can be used for diagnosis

**OIE Reference Laboratories**

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**Relevant diagnostic laboratories**

- Dr. NJ Olesen, DTU Veterinary, National Veterinary Institute, Technical University of Denmark, Høngøvej 2, 8200 Århus, Denmark
- Prof. Barry Hill, CEFAS Weymouth Laboratory, The Nothe, Weymouth DT4 8UB, UK
- Dr. Guiseppe Bovo, Istituto Zooprofilattico Sperimentale delle Venezie, Viale dell'Università, 10-35020, Legnaro-Padova, Italy
- Dr. Hannele Taipiovara, Mustialankatu 3, FI-00790 Helsinki, Finland
- Dr. Thomas Vesely, Veterinary Research Institute, Hudcova 70, 621 32 Brno, Czech Republic
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**Treatment**

Control of secondary bacterial infection is the suggested therapy. Additionally, stress should be minimized.

**Prevention and control in zoos**

- Newly acquired animals should be kept isolated and should undergo thorough physical examinations both before and after quarantine. Tests for virus detection should also be carried out during quarantine. Different life stages can have different susceptibilities to disease, so testing should be done during different stages of development.
- Enclosures and all equipment should be disinfected regularly.
- Waste water should be treated for ranavirus inactivation.

**Suggested disinfectant for housing facilities**

All virucidal disinfectants. Remove debris from surfaces, then disinfect. Although others may be effective, Nolvasan (2%) and bleach (3%) for at least 1 minute exposure have been shown to inactivate ranaviruses. Rinse facilities well following disinfection.

**Notification**

Listed as notifiable by OIE.

Recommended on importation of amphibians from a non-ranavirus free country:

- Keep imported animals in biosecure environment for continuous isolation from the local environment
- Treat effluent and waste in a manner that ensures inactivation of ranaviruses
- Breed F-1 generation in quarantine
- Test F-1 generation at different life stages for presence of ranaviruses and pests
- If F-1 generation is found free of ranavirus and other pests, F-1 stock may be defined as free of infection with ranavirus

**Guarantees required under EU Legislation**

None for amphibians

**Guarantees required by EAZA Zoos****Measures required under the Animal Disease Surveillance Plan**

None currently. See: [http://www.oie.int/Eng/normes/fcode/A\\_summry.htm](http://www.oie.int/Eng/normes/fcode/A_summry.htm)

**Measures required for introducing animals from non-approved sources**

Suggested measures see notification.

**Measures to be taken in case of disease outbreak or positive laboratory findings**

Dead animals should be submitted for necropsy. Morbid animals should be immediately isolated and tested. If Ranavirus is diagnosed, the affected aquarium/terrarium should be quarantined, treatment initiated to prevent secondary bacterial infection and stress minimized. If the species is not a threatened or endangered species, euthanasia of positive animals should be considered.

**Conditions for restoring disease-free status after an outbreak**

None established. See: [http://www.oie.int/Eng/normes/fcode/A\\_summry.htm](http://www.oie.int/Eng/normes/fcode/A_summry.htm)

**Contacts for further information****References**

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