Chytridiomycosis

College of Veterinary Medicine

BASICS

Chytridiomycosis is an infectious disease of amphibians caused by the fungus *Batrachochytrium dendrobatidis* (*Bd*). It is an emerging disease that is significantly impacting amphibian populations across the globe. The disease has caused the **DECLINE OR COMPLETE EXTINCTION** of hundreds of species of frogs and other amphibians.

Chytrid fungus has been found in **OVER 1,300 SPECIES** of amphibians, though it appears to be impacting frog species most severely. However, the disease does not have an effect on all frog species.

Bd infects the **KERATIN LAYER** of the skin, where it multiplies by producing zoospores, which are shed into the environment. The zoospores can live for weeks in **WATER,** depending on the temperature.

CLINICAL SIGNS vary by species. The earliest signs of chytrid disease tend to be anorexia and lethargy. Most frogs experience **EXCESSIVE SHEDDING** of skin, which appears opaque and gray-white or tan in color.

Other **COMMON SIGNS** include red skin, convulsions, lack of the righting reflex (a reflex that corrects the orientation of the body after it has been taken out of its normal upright position), abnormal feeding behavior, and discoloration near the mouth.

Bd is a waterborne fungus that disperses into the environment in order to search for a new host. The fungus travels through **WATER SOURCES** until it finds a new host, and enters through the skin.

DIAGNOSING true chytridiomycosis (disease, not just infection) requires histopathologic examination of tissues from dead animals.

It is often impractical to **TREAT** amphibians in the wild. Zoospores can be widespread in the environment, but can be treated broadly in specific environments.

Chytridiomycosis is easily spread by human activity. Boots, clothes, and equipment should be cleaned with fungicide. Wild amphibians **SHOULD NOT BE MOVED** between habitats.

DETAILS

Chytrid was described in 1998 after **MASSIVE MORTALITY** events in Australia and Central America involving several species of frog. Further studies have suggested that the fungus originated on the Korean peninsula and was globally distributed by the late 1800s or early 1900s.

Chytridiomycosis has caused the **MOST SIGNIFICANT LOSSES OF BIODIVERSITY FROM DISEASE** in recorded history.

Currently, the American bullfrog and the African clawed frog appear to be **RESISTANT** to the disease, but may still act as carriers. The disease is not known to affect humans.

Chytridiomycosis is present on **EVERY CONTINENT** except for Antarctica, though the disease is having the biggest impact in South and Central America, Australia, and North America.

In Canada, infection with *Bd* has been found in various species of frogs from at least 7 provinces and the Northwest Territory. The **HIGHEST INCIDENCE** of disease is occurring in the Western United States.

CLINICAL SIGNS Many frogs experience a thickening of the skin, which may **PREVENT OXYGEN EXCHANGE**, and impair thermoregulation, nutrient intake, and hydration. Secondary skin infections with bacteria can occur.

TRANSMISSION Once the host is infected with *Bd*, chytridiomycosis may or may not develop. The disease is transmitted through contact with zoospores in the environment, and possibly through **DIRECT CONTACT** with diseased amphibians, though this has not yet been confirmed. Research has shown that *Bd* grows best between 17-25°C (62-77°F), though different strains of the fungus have slightly different temperature preferences. In the wild, most disease outbreaks occur at higher elevations during **COOLER MONTHS**.

DIAGNOSIS Laboratory tests detect the DNA of *Bd* from skin samples or a skin swab of infected animals. Chytrid can also be seen in tissue sections from infected animals.

TREATMENT Captive animals may be treated for chytridiomycosis with antifungal medications and heat therapy. There is no universal vaccine, but research is ongoing to develop tools to help amphibians better withstand infections.

PREVENTION Captive amphibians should not be released into the environment or used as fishing bait. All newly acquired captive amphibians should be initially quarantined from other amphibians until it has been confirmed that they are disease-free by serial laboratory testing.

Chytridiomycosis is a **REPORTABLE DISEASE,** and any detection should be reported to the appropriate wildlife authorities.

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