

Snake Fungal Disease: Frequently Asked Questions

Since the early 1960's there have been reports of a skin disease affecting snakes in the eastern US that appears to be caused by a fungal infection, but observational reports of it have been increasing over the past few years. The disease, informally called snake fungal disease (SFD), has received attention from conservationists because it was determined to be affecting timber rattlesnakes in New England, and eastern massasauga in Illinois. The timber rattlesnake is listed as threatened or endangered in 11 states, and the eastern massasauga is listed as endangered in 2 states and is a candidate for federal listing under the Endangered Species Act.

What causes SFD?

The fungus *Ophidiomyces ophiodiicola* (formerly *Chrysosporium ophiodiicola*) is most commonly associated with SFD. Laboratory studies have confirmed that this fungus is capable of causing disease in healthy snakes.

What species of snake are affected?

Ophidiomyces ophiodiicola has been confirmed in 8 species of snake, and at least 7 more species have been reported with signs of SFD but have not yet been tested for the fungus. The disease is most frequently reported in rattlesnakes and several species of colubrids including racers and rat snakes. Copperheads, cottonmouths, water snakes, garter snakes, ribbon snakes, milk snakes, corn snakes, indigo snakes, and ring-necked snakes have all been reported with signs of SFD as well.

What does an infected snake look like?

Affected snakes may have swelling, crusty scabs, or open wounds on the skin. In pit vipers the signs are most severe on the head, although any area of the skin can be affected. Some snakes only show subtle signs, such as swelling in the area in front of the eye, thickened skin on the snout, abnormal scales, or small bumps under the skin. Snakes often appear most severely affected when they emerge from hibernation and may improve in appearance over the summer months, although this is not always the case. It is not known if the condition commonly referred to as "hibernation blisters" is related to fungal infection or SFD.



Above: This ratsnake emerged from hibernation with a subtle "blister" on the lower jaw.

Below: This timber rattlesnake was biopsied and diagnosed with *O. ophiodiicola*. The snake was released without any treatment and tracked for over two years.



Below: The same male 2 years later, disfigured but alive and apparently healthy



Where is SFD found?

Animals with clinical signs consistent with SFD have been reported across the eastern US from Florida to New Hampshire and as far west as Arkansas and Minnesota. The map below is of confirmed *O. ophiodiicola*, current as of 2015. Not every state is surveying for SFD, and thus the disease may occur in areas that are not mapped.



How does SFD affect the snake?

SFD affects different species in different ways. It has been fatal in some massasauga. In timber rattlesnakes mortality has occurred, however many animals have survived multiple years after infection, and responded well to treatment and rehabilitation. Prevalence and mortality appears to vary by species and population.

Where did SFD come from?

We do not know if *O. ophiodiicola* has always been present in the environment, if it was introduced, or if perhaps it has recently mutated allowing it to cause more severe disease. Related species of fungi have long been known to cause disease in both wild and captive reptiles. There is currently little evidence to suggest that *Ophidiomyces* or SFD came from the pet trade.

How is SFD transmitted?

How the disease is transmitted is not known. It is possible that it is spread by direct contact with other infected snakes, or that the causative agent is present in the environment. It may be possible to transfer the associated fungus on clothing, boots, or field equipment used to handle snakes. Until more is known about the transmission of SFD, it is best to disinfect potentially contaminated equipment when moving between different sites. Any item that has come in contact with a potentially infected snake or environment should be washed with soap and water and then soaked for 15 minutes in a dilute (10%) bleach solution. Rinse and allow to dry.



Above: Very young animals such as this juvenile timber rattlesnake have been found already showing signs of SFD.



Left: A massasauga with a severe *Ophidiomyces* infection. The mouth, eyes, and heat pits are all critically important organs that are commonly damaged.

Is the fungus dangerous to people?

The potential risks to human health from this disease are currently unknown. This type of fungus rarely causes disease in healthy mammals, and there has never been a report of *O. ophiodiicola* infection in a human. Anyone in contact with affected reptiles should take the basic safety precautions of wearing gloves and washing hands thoroughly.

Is it related to the white nose fungus affecting bat populations?

No, although the range map of infection is similar and they share some similarities, the two fungal species are not related.

What is currently being done?

Veterinarians, pathologists, and wildlife biologists from several universities, zoos, the USGS, the USFWS, and multiple state wildlife agencies are collaborating to determine if *O. ophiodiicola* is in fact the underlying cause of all cases of SFD, whether the disease is causing population-level impacts, and the best techniques for sampling for and diagnosing SFD. Currently a USFWS competitive State Wildlife Grant has funded intensive sampling for the disease in nine states (CT, IL, MA, MN, NH, NJ, TN, VT, WI). This grant also provides funding for transmission and treatment studies, and other conservation measures. Multiple snake species are being sampled, although each individual state has the choice to focus on specific species. The Roger Williams Park Zoo, Providence, RI, surveyed for the disease and determined health status of all New England timber rattlesnake populations from 2013-2014.

What should you do if you see an infected snake?

If you see a snake in the wild that you think may be suffering from this disease, please report the sighting to your state wildlife agency. Please obey all laws and regulations regarding interacting with wildlife. Many of the affected species are protected. Do not approach or attempt to handle venomous snakes unless you are trained and permitted to do so.

For more information and photographs see the bulletin from the National Wildlife Health Center at: http://www.nwhc.usgs.gov/disease_information/other_diseases/snake_fungal_disease.jsp

Images courtesy of: Matt Allender, Anne Stengle, Zach Whitman, Kevin McCurley & James Condon.

This information has been prepared as a collaboration between Northeast Partners for Amphibian and Reptile Conservation (NEPARC) and the Association of Reptilian and Amphibian Veterinarians (ARAV).

