



STATE WILDLIFE GRANT—INDIANA

Snake Fungal Disease Testing in Indiana



A queen snake is swabbed to test for snake fungal disease. (Photo by Seth LaGrange)

CURRENT STATUS

First year of a two-year project

FUNDING SOURCES AND PARTNERS

State Wildlife Grant Program (T7R22)
University of Illinois
Illinois Natural History Survey

PROJECT PERSONNEL

Dr. Matt Allender, Principal Investigator, Veterinary Clinical Medicine and Comparative Biosciences, University of Illinois
Dr. Sarah Baker, Co-principal Investigator, Illinois Natural History Survey
Dr. Ellen Haynes, College of Veterinary Medicine, University of Illinois
Megan Britton, College of Veterinary Medicine, University of Illinois
Seth LaGrange, Illinois Natural History Survey

BACKGROUND AND OBJECTIVES

Emerging fungal pathogens are becoming increasingly relevant to the conservation of wildlife populations. Widespread die-offs from diseases such as white-nose syndrome in bats and chytrid fungus/*B. sal* in amphibians have been implicated in population declines and pose a serious threat to many species. Snake fungal disease (SFD) is an emerging fungal pathogen in North America. The causative agent of SFD has been identified as *Ophidiomyces ophiodiicola*, which can persist in soil and grows at a wide range of temperatures. Snake fungal disease causes skin lesions ranging from minor scale abnormalities to severe swelling, disfiguration, loss of tissue/bone, and death. Known fate mortality rate for some species can exceed 90%. The primary mode of transmission remains unknown, but it is likely that infection can occur through contact with soil (especially if there are abrasions on the skin),



A milk snake is captured during surveys to test for snake fungal disease. (Photo by Sarah Baker)

contact with other infected individuals, or passed from mother to offspring.

To date, SFD has been documented in 21 states and in more than 15 genera of captive and free-ranging snakes. No targeted sampling has been conducted in Indiana, despite confirmation of SFD in all bordering states. Many of the genera reported to be susceptible to SFD occur in Indiana, thereby providing a gap in the understanding of this pathogen and subsequent conservation plans. The objectives of this project are to:

1. Determine the occurrence and prevalence of SFD in free-ranging snakes throughout Indiana.
2. Make relevant management and conservation recommendations based on the results.

METHODS

In year one, all snake captures were made by visual encounter surveys, road-cruising surveys, or snakes found dead on roads and submitted to the DNR. All live-captured snakes were given a wellness exam consisting of a behavioral assessment and thorough visual assessment of the skin for lesions or abnormalities. If present, lesion number and location were recorded. All live snakes were sexed, weighed and measured. Captured individuals were marked with a scale clip to

prevent repeat sampling of the same individual. Skin swabs were taken from all captured snakes whether or not lesions were present and stored at -20°C until processed.

To determine the presence/absence and prevalence rates of SFD, collected swabs were tested for presence of *Ophidiomyces ophiodiicola* DNA using quantitative polymerase chain reaction (qPCR) techniques. DNA was extracted using a Qiagen DNEasy kit, and DNA concentration and purity were determined using a spectrophotometer. qPCR assays were conducted using a real-time PCR thermocycler and data analyzed using associated software.

PROGRESS TO DATE

Sampling in 2017 was conducted from August to October in 10 central and southern Indiana counties. Swabs were taken from 53 individual snakes of 14 species. Timber rattlesnakes (*Crotalus horridus*) were the most commonly sampled species (16 individuals), followed by northern watersnake (*Nerodia sipedon*; 10), queen snake (*Regina septemvittata*; 5), milk snake (*Lampropeltis triangulum*; 4), rat snake (*Pantherophis spiloides*; 4), racer (*Coluber constrictor foxii*; 3), copperhead (*Agkistrodon contortrix*; 2), ringneck snake (*Diadophis punctatus*; 2), rough green snake (*Opheodrys aestivus*; 2) and one each of the following five species: brown snake (*Storeria dekayi*), garter snake (*Thamnophis sp.*), prairie kingsnake (*Lampropeltis calligaster*), ribbon snake (*Thamnophis sauritus*), and smooth earth snake (*Virginia valeriae*).

Genetic analyses identified 14 positive samples from 13 individuals of four species and 41 negative samples. Infected individuals included eight of 10 northern watersnakes, two of four milk snakes, two of three racers and one of five queen snakes that were collected in Brown, Monroe and Harrison counties. The overall prevalence of individuals positive for *Ophidiomyces* was 24.5%.

Additional analyses to determine the presence and prevalence of SFD by species or region of the state will follow as more snakes are collected when field work resumes in spring 2018.

COST: \$159,666 FOR THE COMPLETE TWO-YEAR PROJECT