

# INVASIVE SNAKE LUNGWORM: *RAILLIETIELLA ORIENTALIS*

Image source: Terry Farrell, Stetson University, Florida.  
Photograph of an invasive lung parasite in the lung of a Pygmy Rattlesnake (*Sistrurus miliarius*).

## OVERVIEW of PENTASTOMES

Pentastomes are wormlike crustaceans that parasitize the lungs of reptiles and mammals. They rely on host blood for sustenance. Several pentastome genera occur in North American snakes, but the native range of the pentastome *Raillietiella orientalis* is restricted to Asia and Africa. This invasive species of pentastome is a conservation concern as severe infections are related to sublethal and lethal impacts in North American snakes.

## SPILLOVER: INTRODUCTION to NORTH AMERICA

The snake lungworm, *Raillietiella orientalis*, is thought to have been introduced to the United States by the establishment of Burmese Pythons (*Python bivittatus*) in Florida. Parasite spillover from nonnative pythons to native snakes has been found in 20 Florida counties. Infections have recently been found as far north as St. Johns County, Florida (see map). At least 17 Florida snake species are known to have been infected with *R. orientalis*, including snakes of the genera *Agkistrodon*, *Crotalus*, *Coluber*, *Drymarchon*, *Lampropeltis*, *Masticophis*, *Nerodia*, *Pantherophis*, *Python*, *Sistrurus*, *Farancia*, and *Thamnophis*. The introduction to North America and the rapid geographic range expansion of *R. orientalis* may be related to the pet trade. There has been no surveillance for this parasite in the pet trade, yet biologists have opportunistically discovered four known captive snake infections.

## LIFE CYCLE

Snake pentastomes have complex life histories with the parasite infecting multiple species throughout their life cycle. Fishes, amphibians, and mammals may serve as intermediate hosts for pentastomes that infect snakes as their final or definitive host species before reproduction and egg release. Snake pentastomes are transferred to their final snake host when the snake preys upon an infected intermediate host. The life cycle of *Raillietiella orientalis* in Florida begins with a coprophagous invertebrate (those that feed on feces). Larval forms are transferred to a lizard, anuran, or small mammal when they consume an infected invertebrate.

## UNKNOWNNS

*Raillietiella orientalis* has only recently received attention of USA scientists and managers concerned with snake health and conservation. Several unknowns of *R. orientalis* at this time include the current range; full list of intermediate and definitive hosts; effects on intermediate and definitive hosts; roles in population declines of vulnerable snake species; and possible biosecurity measures that might impede its invasion. Will this novel parasite invade the entire continent if left unchecked?

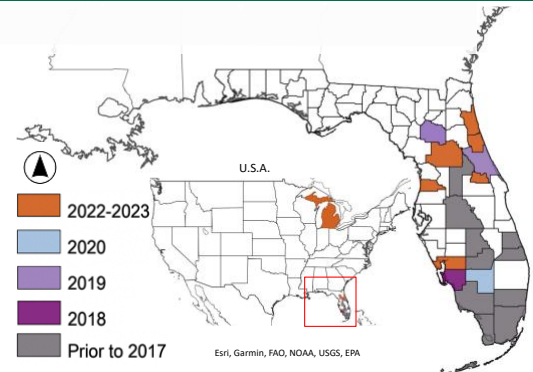


Image Source: Jenna N. Palmisano. The distribution of *R. orientalis* in the USA. In Michigan, one captive water snake was observed with *R. orientalis*. The legend corresponds to unpublished findings (SLAM – Snake Lungworm Alliance and Monitoring) and the references below (1-8).

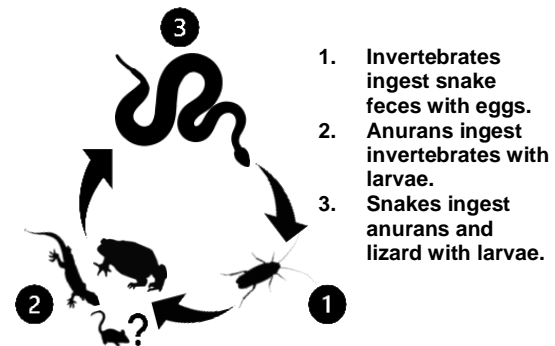


Image Source: Jenna N. Palmisano. The life cycle of *R. orientalis*. Studies have demonstrated that anurans are prominent intermediate hosts. The role of mammals in this lifecycle is less clear.

## SUGGESTED READING

1. Bogan, et al. 2022. Herpetological Review 53:147.
2. Farrell, et al. 2019. Herpetological Review 50:73-76.
3. Farrell, et al. 2023. Journal of Veterinary Diagnostic Investigation 35:2. <https://doi.org/10.1177/10406387221147856>
4. Metcalf, et al. 2019. Herpetological Review 50: 389.
5. Miller, et al. 2020. Ecosphere 11(6): e03153. <https://doi.org/10.1002/ecs2.3153>
6. Palmisano et al. 2022. Journal of Herpetology 56(3):355-361. <https://doi.org/10.1670/21-061>
7. Palmisano et al. 2023. Southeastern Naturalist 22(1) N17-N22. <https://doi.org/10.1656/058.022.0110>
8. Walden, et al. 2020. Frontiers in Veterinary Science 7:467. <https://doi.org/10.3389/fvets.2020.00467>

