

Health status of vulnerable gopher tortoises revealed in Southeastern Florida

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Researchers assessed the health of gopher tortoises, including these two hatchlings, at two sites in southeastern Florida. Credit: Bethany Augliere

The gopher tortoise (*Gopherus polyphemus*) is declining because of habitat loss and fragmentation, human interaction including collisions

with vehicles, predation by domestic animals, and disease. These long-lived reptiles are found throughout Florida and are affected by various diseases including upper respiratory tract disease. A number of pathogens such as *Mycoplasma* spp., Herpesvirus, and Ranavirus are known to cause upper respiratory tract disease in gopher tortoises. Chronic disease resulting from these pathogens can lead to reduced reproduction, abnormal growth and development, increased susceptibility to secondary infections and, in some cases, a shorter life span. To date, little is known about the prevalence of these microorganisms in wild tortoises.

This lack of knowledge creates a dilemma for wildlife biologists, conservationists and public policy makers seeking to uphold and improve protections for this threatened species.

Researchers from Florida Atlantic University's Harbor Branch Oceanographic Institute and the Harriet L. Wilkes Honors College in collaboration with Loggerhead Marinelifelife Center and the University of Florida College of Veterinary Medicine, conducted a comprehensive health assessment of previously unstudied gopher [tortoise](#) aggregations at two sites in southeastern Florida.

Results of the study, published in the journal *Conservation Physiology*, showed that overall, 42.9 percent of all tortoises tested had circulating antibodies to *Mycoplasma agassizii*, an infectious bacterium that causes upper respiratory tract disease. Researchers detected antibodies to *M. agassizii* in 29 percent of tortoises at one of the sites and 70 percent at the other site, suggesting that at least one of these tortoise aggregations may be experiencing an outbreak of *M. agassizii*.



Researchers assessed the health of gopher tortoises, including this hatchling, at one of the two sites in southeastern Florida. Credit: Bethany Augliere

In contrast, none of the tortoises tested positive for Ranavirus or Herpesvirus via [polymerase chain reaction](#) (PCR), which represents important baseline data, since these viruses are thought to be emerging pathogens of other tortoise and turtle species.

For the study, researchers collected samples of blood and nasal, oral, and cloacal swabs (digestive, reproductive, and urinary tract openings) from 91 tortoises (48 adults, 35 juveniles and eight hatchlings) captured at FAU Harbor Branch in Fort Pierce in 2019, and Loggerhead Park in Juno Beach during 2018-2019. The samples were analyzed for hematology, plasma protein electrophoretic profiles, and infectious disease testing including *Mycoplasma* spp. serology and PCR assays for Ranavirus, Herpesvirus, and *Anaplasma* spp., a tick-borne bacteria of medical importance.

At both study sites, adult tortoises were significantly more likely to have clinical signs of upper respiratory tract disease than juveniles. There was a significant relationship between tortoise size and *M. agassizii* antibody test results. Physical examination revealed that 19.8 percent of the tortoises had clinical signs consistent with upper respiratory tract disease, including nasal discharge, asymmetrical nares, wheezing, eyelid/conjunctival swelling, and ocular discharge. In addition, 13.2 percent of tortoises had some other form of physical abnormality noted during [physical examination](#), including limb, eye and shell abnormalities or extra scutes on the tortoise's shell.

"The full effect of chronic disease on a long-lived species such as the gopher tortoise may take months to years to manifest in a population,"

said Annie Page-Karjian, D.V.M., Ph.D., lead author, clinical veterinarian and an assistant research professor, FAU Harbor Branch. "Because the gopher tortoise is one of the most commonly translocated species in North America, it is important to understand pathogen distributions within their populations and to monitor them using standardized techniques so that any changes associated with health problems may be detected over time."

Researchers also found that adult tortoises were significantly more likely than juvenile tortoises to have ticks as well as hemogregarine parasites in their red blood cells. Tortoises with ticks were significantly more likely to have the hemogregarine parasites. Ticks were found on 59 percent and hemoparasites were identified in 30 percent of the tortoises sampled at FAU Harbor Branch, while only a single tick was found, and no hemoparasites were identified in tortoises sampled at Loggerhead Park. These findings are noteworthy because hemogregarines in tortoises are thought to be transmitted by ticks.

"Free-ranging animals typically have higher internal and external parasite burdens and are likely exposed to pathogens more frequently than captive animals, which often are regularly treated with parasiticides and also receive supportive care such as anti-microbials when they are sick," said Page-Karjian. "Long-term studies of these animals and other populations will help us to better understand the consequences of [disease](#) and various stressors that impact their behavior and reproductive potential. Additional health assessments and surveillance of pathogens in southeastern Florida's gopher tortoises are warranted."

More information: Annie Page-Karjian et al, Comprehensive health assessment and blood analyte reference intervals of gopher tortoises (*Gopherus polyphemus*) in southeastern FL, USA, *Conservation Physiology* (2021). [DOI: 10.1093/conphys/coab015](https://doi.org/10.1093/conphys/coab015)

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