



Desert Tortoises Living Closer to Human Populations More Likely to Test Positive for Respiratory Disease

Desert tortoises (*Gopherus agassizii*) within shorter distances of human population centers have a higher prevalence of two respiratory disease pathogens, according to a study by USGS and University of Florida scientists published in *The Journal of Wildlife Management*.

Scientists evaluated 1,004 tortoises from the Mojave Desert for prevalence of two pathogens, *Mycoplasma agassizii* and *Mycoplasma testudineum*, both of which cause upper respiratory tract disease in desert tortoises. Tortoises were defined as “test-positive” if they were positive by culture and/or DNA identification, or positive or suspect for the respective antibody for either *Mycoplasma* species.

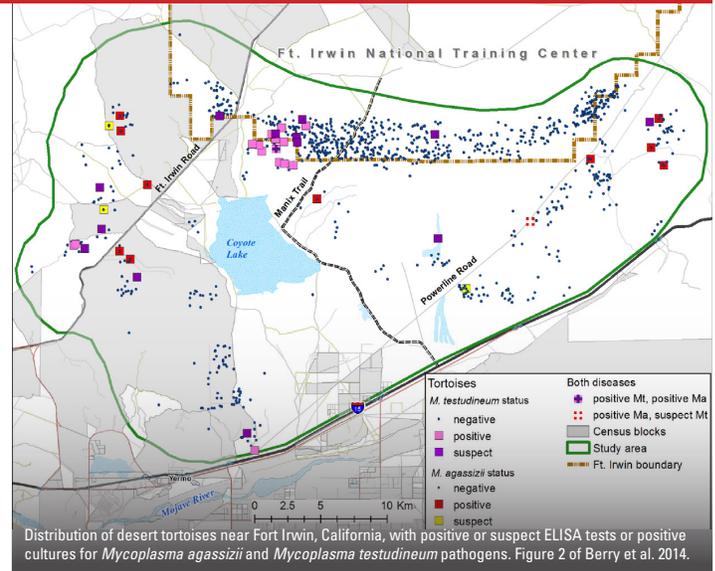
The scientists plotted *Mycoplasma* prevalence against tortoise GPS location; habitat factors (vegetation, elevation, slope, and aspect); tortoise size and sex; distance from another test-positive tortoise; and human activity variables (distances to roads, agricultural areas, playas, urban areas, and centers of populated census blocks). Analytical models evaluated the data for the two *Mycoplasma* species separately.

The most important factor determining disease prevalence was distance to human households. The prevalence of test-positive tortoises was low: 1.49% (15/1,004) for *Mycoplasma agassizii* and 2.89% (29/1,004) for *Mycoplasma testudineum*. The geographic distributions of test-positive tortoises for the two *Mycoplasma* species showed little overlap: only 2 tortoises were test-positive for both diseases.

The relationship between *Mycoplasma*-positive tortoises and distance to human populations may be due to escaped or released captive pet tortoises, because the prevalence of *Mycoplasma agassizii* in captive tortoises is known to be high. Indeed, the source of *Mycoplasma* upper respiratory tract disease in wild desert tortoises is thought to be infected captive tortoises, versus a natural origin in the Mojave. *Mycoplasma* species have been reported in various tortoise species imported for the pet trade from eastern U.S., Europe, Asia, and Africa.

This Brief Refers To:

Berry, KH, AA Coble, JL Yee, JS Mack, WM Perry, KM Anderson, MB Brown. 2014. **Distance to human populations influences epidemiology of respiratory disease in desert tortoises.** *The Journal of Wildlife Management* 79(1):122–136. doi: 10.1002/jwmg.816
<http://www.werc.usgs.gov/ProductDetails.aspx?ID=5147>



MANAGEMENT IMPLICATIONS

- The presence of tortoises with both *M. agassizii* and *M. testudineum* pathogens is notable because both pathogens are infrequently detected in the same tortoise. Protocols for testing for infectious diseases should include multiple species of *Mycoplasma* as well as herpesviruses, not just the better known *M. agassizii*.
- Clinical signs of mycoplasmal upper respiratory tract disease may be absent or subtle, so laboratory tests are an essential part of determining status of diseases in desert tortoises and related species.
- The link between higher *Mycoplasma* prevalence and human population centers is strong and deserving of management attention, such as pet owner education; signage and fencing at desert tortoise critical habitat boundaries near residential areas; and evaluation of distances to residences when releasing translocated desert tortoises.

RESEARCH CONTACT

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