Linking Husbandry Practices to Symptoms Consistent with U.R.I.'s in Captive Testudines

Kristy Hughes

College of Integrative Sciences and Arts, Arizona State University, Polytechnic

College of Integrative Sciences and Arts
Arizona State University

CISA Student Showcase

Introduction and Objectives

•Upper respiratory infections (U.R.I.'s) are fairly common in tortoises and can cause substantial physiological issues and stress.

•Multiple viruses and bacteria that can result in U.R.I. symptoms.

•Both captive and wild tortoises can catch this bacterial infection and may suffer from chronic recurrent illness or even death.

•Despite the variance in levels of severity, the most common symptoms include: mucous emerging from the nostrils, swollen eyelids, discharge from the eyes, lethargy, and excessive yawning or pumping[3].

•Infection will deteriorate the level of mucosal production and hinder the tortoise's olfactory senses which interferes with the ability to search for food[4].

•U.R.I.'s will invade the epithelial cells in the tortoise's nasal cavity and cause sinusitis or nasal scarring[3].

•Currently, what's been discovered is that tortoise U.R.I. 's are a social disease and are transmitted horizontally between individuals in close contact[4].

•Little is known about what variables prompt a U.R.I. infection and currently there is no cure for the chronic flare-ups of a U.R.I. other than antibiotic treatments.

•Research was done on categories revolving around husbandry, diet, location, and season to hone in on potential causes for an upper respiratory infection.

•Intent of survey was to correlate any husbandry, diet, or health variables with an increase in U.R.I. symptoms and severity.

• Developing a better understanding about the functionality of this disease can allow professionals to make educated decisions with regards to treatment prevention.

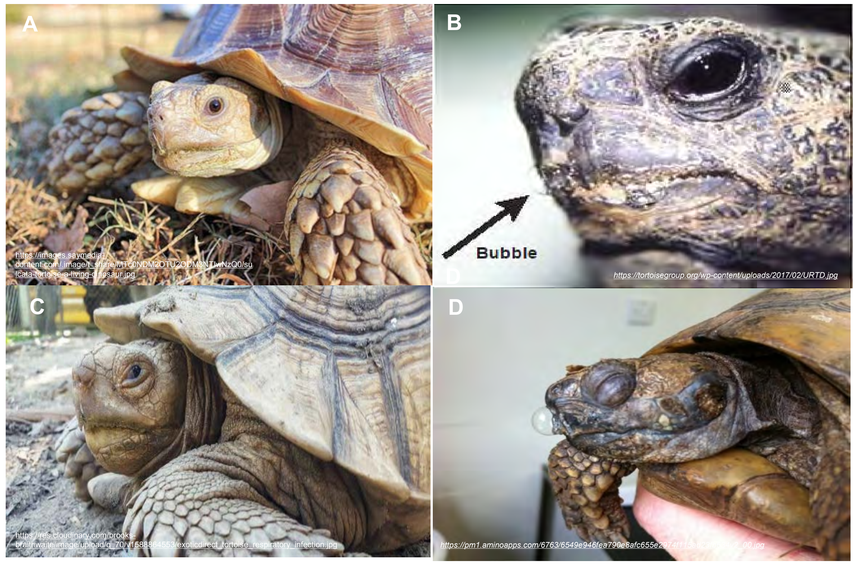

Figure 1. A visual representation of the different severities of a tortoise Upper Respiratory Infection. Question #38 in the survey asks respondents to rate their tortoise's U.R.I. severity on a scale of 0-3. Image A represents a Level 0- asymptomatic. Image B represents mild symptoms, Level 1. Image C represents a Level 3- moderate symptoms. Image D represents severe symptoms, a Level 4.

Results

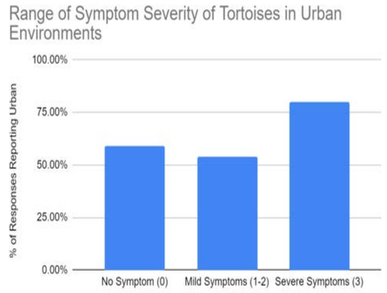

Figure 2. Representation of responses who live in urban environments. (N=13, p= .05, x^2= 2.982; Figure 2).

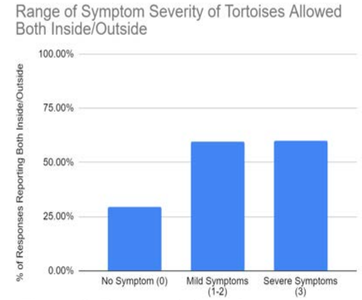

Figure 3. Representation of responses moving tortoises indoors/outdoors. (N= 24, p= .05, x^2= 1.429, ; Figure 3).

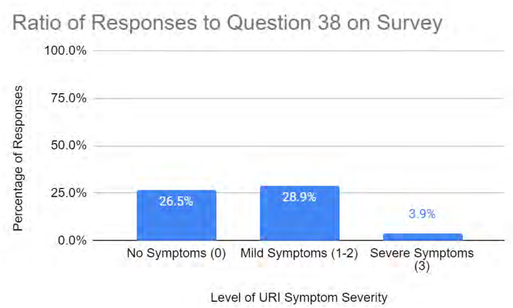

Figure 4. Range of responses (n=128) regarding levels of symptom severity.

Methods

QR code for Tortoise Conservation Survey

- A 40-question survey was sent to multiple social media platforms using Google Forms (QR code to the left).
- Survey questions were focused on 3 main sections:
  - **Tortoise Habitat**
  - **Tortoise Diet**
  - **Tortoise Health**
- Question #38 (Figure 4) was attributed to scaling U.R.I. symptom severity in tortoises.
- No tortoises were tested for U.R.I. during this research experiment.
- Comparisons were made between only "No Symptoms" responses and "Severe Symptoms" congruent with U.R.I.'s.
- "Mild Symptoms: not accounted for to reduce possibility of false positive U.R.I. case.

Literature Cited & Acknowledgements

1. Aiello, C., Esque, T., Nussear, K., Emblidge, P., & Hudson, P. (2019). The slow dynamics of mycoplasma infections in a tortoise host reveal heterogeneity pertinent to pathogen transmission and monitoring. *Epidemiology & Infection, 147*, E12. doi:10.1017/S0950268818002613
2. Bennett, E. P. (2023, March 22). Noi - gopher tortoise ESA not-warranted finding. https://www.biologicaldiversity.org/species/reptiles/gopher_tortoise/pdfs/2023-03-22--Gopher-Tortoise-not-warranted-NOI.pdf
3. Boyer, T. H. (n.d.). Nasal discharge in tortoises . https://newcms.eventkaddy.net/event_data/60/session_files/AV008_Conference_Note_jjacobs_cvma.net_AV008BOYERNasalDischargeinTortoises_20150512213127.pdf
4. Elliott R. Jacobson, Mary B. Brown, Lori D. Wendland, Daniel R. Brown, Paul A. Klein, Mary M. Christopher, Kristin H. Berry, Mycoplasmosis and upper respiratory tract disease of tortoises: A review and update, The Veterinary Journal, Volume 201, Issue 3, 2014, Pages 257-264, ISSN 1090-0233, https://doi.org/10.1016/j.tvjl.2014.05.039.
5. Goessling, J. M., Guyer, C., Godwin, J. C., Hermann, S. M., Sandmeier, F. C., Smith, L. L., & Mendonça, M. T. (n.d.). *Upper respiratory tract disease and associated diagnostic tests of mycoplasmosis in Alabama populations of Gopher tortoises, gopherus polyphemus*. PLOS ONE. https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0214845
6. Hekman, Jessica P et al. "Psychogenic Stress in Hospitalized Dogs: Cross Species Comparisons, Implications for Health Care, and the Challenges of Evaluation." *Animals : an open access journal from MDPI* vol. 4,2 (2014): 331-47. doi:10.3390/ani4020331
7. Jang, J.Y., Chun, B.C. Effect of diurnal temperature range on emergency room visits for acute upper respiratory tract infections. *Environ Health Prev Med* 26, 55 (2021). https://doi.org/10.1186/s12199-021-00974-w
8. Ordorica, A. M., Pough, F. H., Cate, S., & Deutch, C. E. (2008). Seasonal Variations in Microbial Communities in the Nasal Passages of Captive Desert Tortoises. *Journal of the Arizona-Nevada Academy of Science*, *40*(2), 121–127. http://www.jstor.org/stable/27641783
9. *The IUCN Red List of Threatened Species*. IUCN Red List of Threatened Species. (n.d.). https://www.iucnredlist.org/
10. *Why are tortoises on a trajectory toward extinction?* (2023, August 28). PALM DESERT CENTER. https://palmdesert.ucr.edu/calnatblog/2023/08/28/why-are-tortoises-trajectory-toward-extinction#:~:text=On%20top%20of%20it%20all,Death%20from%20a%20thousand%20cuts

Discussion/Conclusions

- Chai square goodness of fit test showed no difference among the number of asymptomatic and severe cases (Figures 2 & 3).
- Small sample size could have played a role in nonsignificant findings.
- Previous studies have shown tortoises in the Mojave desert located closer to human developments showed higher rates of U.R.I. infection[4] .
- In addition, there have been correlations between visits to the E.R. and diurnal temperature ranges from a human population of patients in South Korea. The study proposed that sudden temperature changes can inflame nasal epithelial cells triggering an immune response[7].