# TICKS AND TORTOISES: INVESTIGATING ECTOPARASITE LOADS ON GOPHER TORTOISES AT THE GTM RESEARCH RESERVE

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### INTRODUCTION



Gopher tortoises (Gopherus polyphemus) have been well-studied in much of their range, but data on tortoises in coastal dune habitats are scant (Lau & Dodd, 2015). Less is published on associations with their chief external parasites, gopher tortoise ticks (Amblyomma tuberculatum).



We noted substantial tick loads on the gopher tortoises at our North Beach site and subsequently initiated a research project to investigate external parasites in two populations within the GTM Research Reserve: the coastal dune site at North Beach, and an upland peninsula site in closer proximity to the GTM Visitor Center.

### METHODS

- We hand-captured tortoises and documented GPS coordinates for distributional mapping
- We collected all captured tortoises' mass (g)
- We used tree calipers for shell morphometrics
- We removed any ticks present with tweezers
- We applied alcohol and betadine to the tick bite
- We inserted Passive Integrated Transponders ("PIT tags" with unique identification numbers)



- We stored all ticks from a given tortoise in 70% ethanol with the tortoise's unique PIT tag number to maintain demographic data with the parasites (Barradas et al., 2019)
- We photographed the dorsal, lateral, and ventral view of each tortoise with their scribed PIT tag ID
- Finally, we released the tortoise back to the spot where we captured it



References: Barradas, P. F., Mesquita, J. R., Lima, C., Cardoso, L., Alho, A. M., Ferreira, P., Amorim, I., Sousa, R., & Gärtner, F. (2019). Demography of the Tortoise Gopherus polyphemus in a Qatar live animal market. Transboundary and Emerging Diseases, 67(1), 461–465. https://doi.org/10.1111/tbed.13375, Diemer, J. E. (1992). Demography of the Tortoise Gopherus polyphemus in a Qatar live animal market. Transboundary and Emerging Diseases, 67(1), 461–465. https://doi.org/10.1111/tbed.13375, Diemer, J. E. (1992). Demography of the Tortoise Gopherus polyphemus in a Qatar live animal market. Transboundary and Emerging Diseases, 67(1), 461–465. https://doi.org/10.1111/tbed.13375, Diemer, J. E. (1992). Demography of the Tortoise Gopherus polyphemus in a Qatar live animal market. Northern Florida. Journal of Herpetology, 26(3), 281–289. https://doi.org/10.2307/1564882, Ennen, J. R., & Qualls, C. P. (2011). Distribution and habitat utilization of the gopher tortoise tick (Amblyomma tuberculatum) in Southern Mississippi. Journal of Parasitology, 97(2), 202–206. https://doi.org/10.1645/ge-2599.1, Lau, A., & Dodd, C. K. (2015). Multiscale burrow site selection of gopher tortoises (Gopherus and habitat utilization) in Southern Mississippi. Journal of Parasitology, 97(2), 202–206. https://doi.org/10.1645/ge-2599.1, Lau, A., & Dodd, C. K. (2015). Multiscale burrow site selection of gopher tortoises (Gopherus and habitat utilization) in Southern Mississippi. Journal of Parasitology, 97(2), 202–206. https://doi.org/10.1645/ge-2599.1, Lau, A., & Dodd, C. K. (2015). Multiscale burrow site selection of gopher tortoises (Gopherus and habitat utilization) in Southern Mississippi. Journal of Parasitology, 97(2), 202–206. https://doi.org/10.1645/ge-2599.1, Lau, A., & Dodd, C. K. (2015). Multiscale burrow site selection of gopher tortoises (Gopherus and habitat utilization) in Southern Mississippi. Journal of Parasitology, 97(2), 202–206. https://doi.org/10.1645/ge-2599.1, Lau, A., & Dodd, C. K. (2015). Multiscale burrow site selection of gopher tortoises (Gopherus and habitat utilization) in Southern Mississippi. Journal of Parasitology, 97(2), 202–206. https://doi.org/10.1645/ge-2599.1, Lau, A., & Dodd, C. K. (2015). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://doi.org/10.264882, Ennen, J. R., & Qualls, C. P. (2011). https://do polyphemus) in coastal sand dune habitat. Journal of Coastal Research, 31(2), 305-314. Retrieved from https://www.proquest.com/scholarly-journals/multiscale-burrow-site-selection-gopher-tortoises/docview/1663521038/se-2?accountid=10900, Moore, J. A., Strattan, M., & Szabo, V. (2009). Evidence for year-round reproduction in the gopher tortoise (Gopherus polyphemus) in southeastern Florida. Bulletin of the Peabody Museum of Natural History, 50(2), 387–392. https://doi.org/10.3374/014.050.0206, Mushinsky, H. R., Wilson, D. S., & McCoy, E. D. (1994). Growth and Sexual Dimorphism of Gopherus polyphemus in Central Florida. Herpetologica, 50(2), 119–128. http://www.jstor.org/stable/3893018









## GOPHER TORTOISE





loads from our primary study sites, comparing straight carapace length to the number of ticks present. There were no ticks on tortoises captured at the peninsula site. Number of ticks per tortoise increased in relation to tortoises' size at the dune site.

We hand-captured 30 gopher tortoises in this pilot study. Tortoises sampled from the North Beach dune population (n=15) had a substantial tick load versus those sampled from our upland/peninsula population also (n=15), where none were present. Ennen and Qualls (2011) determined that sand depth and soil type primarily delimit the gopher tortoise tick populations. Our gopher tortoise sites feature multiple sediment types. Further research is needed to examine our site-specific relationships to sand depth and soil type with gopher tortoise tick abundance.



Dr. Pin Hung Kao, Grace Ramcke, Kelsie Stanley, Amber Maughan, and Sam Schnitzker (Flagler College), Danielle D'Amato (U.S. Army Corps of Engineers), Dr. Nikki Dix, Candace Killian (GTM Research Reserve) FWC permit held by Dr. Ben Atkinson, permit number: LSSC-16-00048A

Capture locations of tortoises at the Peninsula site

### DISCUSSION