



## Desert Tortoises Track the Seasonal Flowering Patterns of Preferred Food Plants

Desert tortoises (*Gopherus agassizii*) are known to be selective herbivores, altering their diet according to the availability of preferred food plants at different times of the year. It appears, however, that tortoises account for the spatial and temporal variability in the abundance of their preferred food plants during the spring season. This finding is published in *PLOS ONE*.

In the Desert Tortoise Research Natural Area, researchers observed 18 free-ranging adult tortoises take 35,388 bites during the spring foraging season. They estimated the relative abundance of potential food plants by sequentially sampling across different phenological periods of the 3-month long spring season, and sampling by different habitats and microhabitats.

This methodology allowed researchers to conduct statistical tests comparing tortoise diet against plant abundance. Results show that tortoises choose food plants non-randomly throughout the foraging season, a finding that matches the hypothesis that desert tortoises rely on key plants during different phenological periods of spring. Moreover, tortoises only consumed plants that were in a succulent state—at least until the last few weeks of spring, at which time most annuals and herbaceous perennials had dried and most tortoises had ceased foraging.

Many species of food plants—including several frequently eaten species—were not detected using these methods, yet tortoises located these rare plants in their home ranges. Over 50% of bites consumed were in the group of species undetected by survey methods. Most bites were of native plant species

Interestingly, tortoises focused heavily on several species of legumes, which could be nutritious foods. Tortoises also ate herbaceous perennials, which were rare yet represented about 30% of tortoise diet. Herbaceous perennials may be important in sustaining tortoise populations during droughts when native annual plants are absent. These findings also highlight the vulnerability of desert tortoises to climate change if such changes alter the availability of their preferred food plants.

### This Brief Refers To:

Jennings, WB and KH Berry. 2015. **Desert Tortoises (*Gopherus agassizii*) Are Selective Herbivores that Track the Flowering Phenology of Their Preferred Food Plants.** *PLOS ONE* 10(1): e0116716. doi:10.1371/journal.pone.0116716  
<http://www.werc.usgs.gov/ProductDetails.aspx?ID=5169>



An adult male desert tortoise eating from an individual *Astragalus layneae*. This legume and herbaceous perennial was one of the most preferred food plants of tortoises in this study. Photo: W.B. Jennings

### MANAGEMENT IMPLICATIONS

- If tortoises have evolved a dependence on particular forage plant species, then any factor that causes decline or extirpation of these limited food resources could also adversely affect the tortoises.
- Preferred food plants of tortoises are primarily native species, a topic that warrants consideration by resource managers. Invasive, exotic plant species are known to negatively affect abundance of native plant species and contribute to increased wildfires and loss of vegetation.
- The ability of tortoises to target plant species easily missed by common survey methods suggests a need to focus on these preferred forage plants in monitoring, management, and recovery efforts.
- The role of climate change on phenology and availability of native plant species should be studied in the context of desert tortoise recovery and management efforts.

### RESEARCH CONTACT

**Kristin Berry**  
Box Springs Field Station  
[kristin\\_berry@usgs.gov](mailto:kristin_berry@usgs.gov)  
[www.werc.usgs.gov/berry](http://www.werc.usgs.gov/berry)