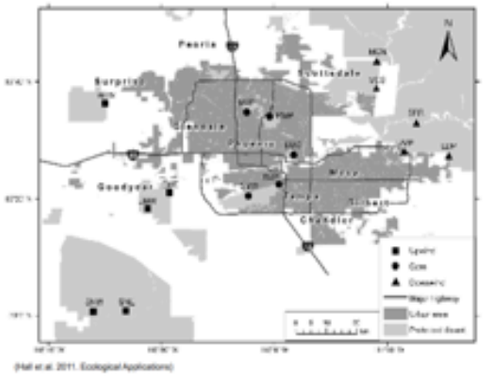
The role of *Ambrosia dumosa* litter degradation in n-Fertilization cycles in urban vs. rural environments

M. Christman[1] and B. Ball[2]

[1]School of Sustainability, 800 S. Cady Mall, Tempe, AZ; [2]ASU West, 4701 W. Thunderbird Road, Glendale, AZ

Introduction:

- In fast urbanizing arid ecosystems, nitrogen (N) deposition is increasing due to anthropogenic sources.
- Previous studies show that N deposition is significantly higher in the Phoenix city core than in surrounding areas.
- Unlike wet ecosystems, dry ecosystem research in this area is sparse, but previous work suggests that processes that promote N retention in other ecosystems are qualitatively different or absent in deserts, and that multiple N-loss pathways are prevalent.
- While excess N exists in the ecosystem and its plants, this excess accumulated N may be re-released during the photodegradation process for samples vulnerable to UV.



Hypothesis:

- Previous studies suggest that photodegradation can expedite nutrient and lignin loss of desert plants.
- Additionally, photodegradation has also been shown to expedite mass loss, which one could possibly extend to carbon and microbial loss.
- Therefore, we hypothesize that core samples will likely experience greater amounts of nitrogen loss in terms of total N but possibly not in terms of percentage lost.
- We pose a similar theory for pre-enriched litter from the N+P plots in comparison to the control plots

Methodology:

- A litter decomposition experiment is being conducted to explore the possible fates of added N temporarily stored in herbaceous vegetation.
- Over 40 weeks of decomposition, nitrogen, carbon, phosphorous, lignin, and microbial biomass will be observed to represent both the chemical and biological dynamics during litter degradation.
- *A. dumosa* litter was collected from city or downwind sites from plots receiving N+P treatments or plots receiving no nutrient addition.
- 3 g of litter from each treatment and site was then placed into either UV transparent or UV opaque litter bags.
- Bags were then placed in the field, with litter from the city core or downwind at a single core or downwind site, respectively.
- Samples will be collected at intervals of 10, 20, 30, and 40 weeks and tested to determine whether differences in nutrient release during biological and photodegradation differs between the urban and rural ecosystem.

Implications:

- This experiment will give a more precise look into the role plant uptake and subsequent litter degradation play in the fate of N from air pollution in desert ecosystems.
- By tracking nutrient release from litter with and without UV radiation, we will determine how photodegradation vs. biological decomposition influences nutrient dynamics during litter degradation in the desert ecosystem.