Nutrient dynamics during photodegradation for *Ambrosia deltoidea* litter in an arid, urban ecosystem

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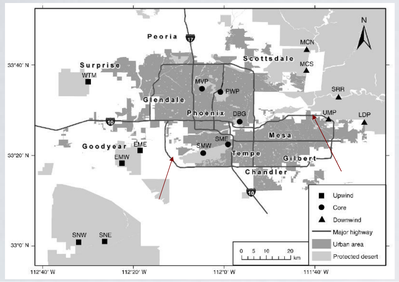
Introduction:

- 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, that processes that promote N retention in other ecosystems are qualitatively different or absent in deserts, and that multiple N-loss pathways are prevalent.

- Excess N taken up by plants gets recycled through decomposition, but we don't know much about nutrient dynamics during photodegradation.



Methodology:

- A litter decomposition experiment was 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 were observed to represent both the chemical and biological dynamics during litter degradation.

- *Ambrosia deltoidea* 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 at the Salt River Recreation Area (downwind) and the South Mountain East site (city core), with litter from the downwind or city core, respectively.

- Samples were 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.

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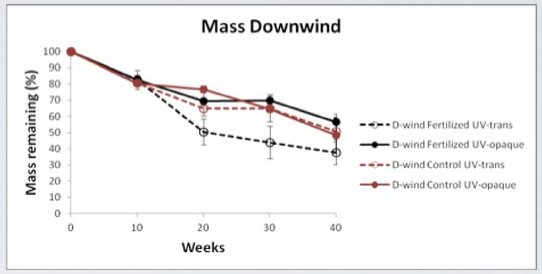
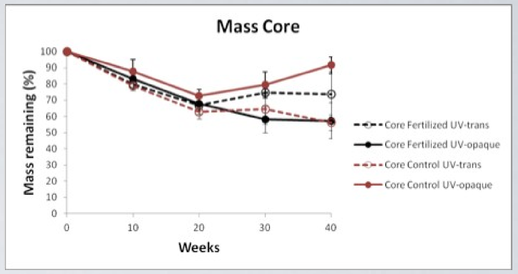
Results:

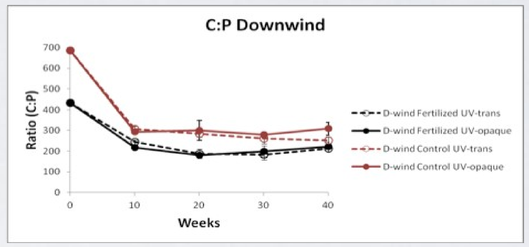
- Mass loss occurs more quickly in downwind samples ($P < 0.001$).

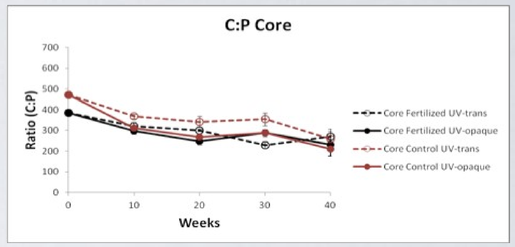
- UV transparent samples lose mass faster than the other treatments, especially when fertilized and downwind (site*bag*fertilization $P < 0.001$).



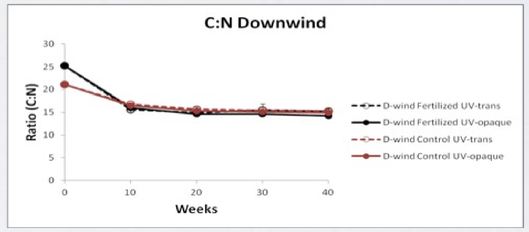


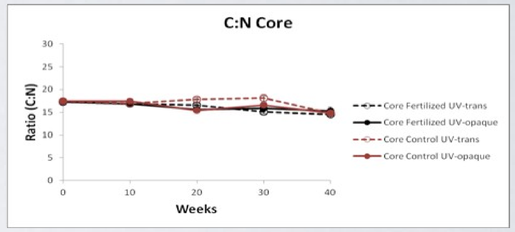
- There is a lower C:P ratio in fertilized vs. non-fertilized ($P < 0.001$); treatment ($P < 0.001$) and sampling period ($P < 0.001$) also had a significant effect on C:P ratio.





- Only sampling period ($P < 0.001$) was significant for C:N ratio.





Implications:

- This experiment shows that mass loss is more rapid in downwind samples.

- N and P behave according to microbial decomposition; photodegradation isn't a significant factor.

- Since N and P weren't significantly effected by photodegradation, it is possible that what is currently known in the literature can be applied directly to arid ecosystems.

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