kacey.russo@ufl.edu

UF|IFAS UNIVERSITY of FLORIDA

How many plants are in your yard? Differences in how people perceive and manage lawn and non-lawn plant species affect patterns of urban plant diversity

Kacey A. Russo, Vitor Vieira Vasconcelos, Jesse C. Jones, Olesya Malakhova, Eben N. Broadbent, Adam G. Dale, Jiangxiao Qiu, Nicholas W. Taylor, Wendy L. Wilber, and Basil V. Iannone III

SCHOOL OF FOREST, FISHERIES, AND GEOMATICS SCIENCES

CLUE CENTER FOR LAND USE EFFICIENCY

Background

- Many small, inconspicuous plants exist in yards, especially in lawns, however people are "blind" to these small, less-aesthetic plants **(selective plant blindness)**[1]
- Differences in preference/acknowledgment and maintenance of large, more conventionally attractive plants[2] and less-conspicuous plants[3] may result in different diversity patterns for these plant groups
- We test for a divergence in diversity-area relationships in the context of two plant groups in residential yards:
  - **Lawn plants**: large ornamental plants, trees, shrubs etc.
  - **Non-lawn plants**: turf grass and other small, often self-recruiting plants which are mowed

Fig. 1 A plot capturing lawn and non-lawn plant species in a residential landscape. This mixed species lawn has ≥ 9 species

Hypotheses

H1: Homeowners self-report species richness based on non-lawn plant species, so perceived species richness is more strongly correlated to actual non-lawn species than lawn species richness

H2: Due to variation in landscaping plant choice, and preferences for minimal lawn species, with increasing spatial scale...

a. **Alpha diversity** of non-lawn plants *increases more rapidly* than alpha diversity of lawn plants

b. **Beta diversity** of non-lawn plants *decreases less rapidly* than beta diversity of lawn plants

Methods

- Surveyed homeowners to determine perceived species richness in front and back yards
- Nested sampling design (Fig. 3) used to identify plant species at four spatial scales
- Categorized species as lawn and non-lawn plants
- Perceived species richness modeled in response to actual species richness with a cumulative link mixed model
- Estimated alpha diversity as mean species richness at each scale
- Estimated beta diversity with Simpson's dissimilarity

Fig. 2 Lab members sampling a plot and recording species richness

Fig. 3 Our nested sampling design includes (A) four randomized 5m² plots (space permitting) in each front and back yard (B) of 30 residences (238 plots total) in four distinct neighborhoods (C) in Gainesville, Alachua County, Florida

Results

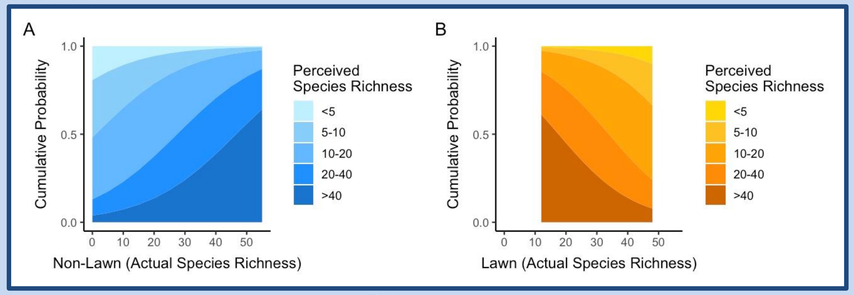

Fig 4. Perceived species richness is (A) positively correlated to **non-lawn** plants (B) and negatively correlated to **lawn** plants.

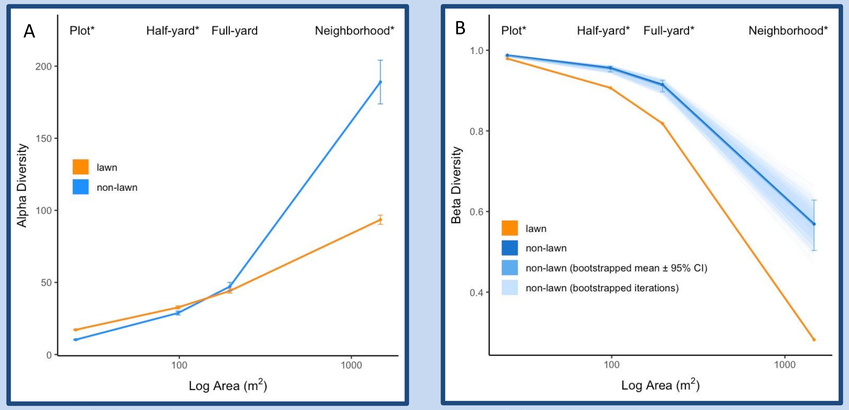

Fig 5. (A) alpha diversity increased more rapidly, (B) and beta diversity decreased less rapidly for **non-lawn** plants than **lawn** plants with increasing spatial scale.

Total number of plant species detected in the study area (species richness) = 501

- **Non-lawn species** = 406
  - 144 native
  - 259 non-native
  - 32 invasive
- **Lawn species** = 132
  - 72 native
  - 59 non-native
  - 9 invasive
- **Follow-up census** detected 172 additional species
  - 158 non-lawn
  - 14 lawn

Conclusions

- Evidence that perceived species richness is influenced by non-lawn plants rather than lawn plants (Fig. 4)
- Those with lower lawn species richness perceived higher overall species richness and vice versa
  - People may perceive variety rather than individual species
- Evidence of a divergence in diversity-area relationships
- Alpha diversity of non-lawn plants increases more rapidly than that of lawn plants (Fig. 5a)
  - Expected due to variation in landscape plants
  - Still, alpha diversity was greater in lawns at lower spatial scales
- Beta diversity of non-lawn plants decreases less rapidly than lawn plants with increasing spatial scale (Fig. 5 b)
  - Still, non-lawn beta diversity declines more rapidly than expected, perhaps due to limited plant palette

Further Considerations

- What are the ecological implications of unrecognized plant diversity, especially in lawns?
- How would these diversity patterns change in highly maintained yards, HOA's etc.?
- Educational programs and marketing aimed at enhancing the ecological value of urban landscapes could work to increase appreciate of the already present, but unrecognized, biodiversity in yards

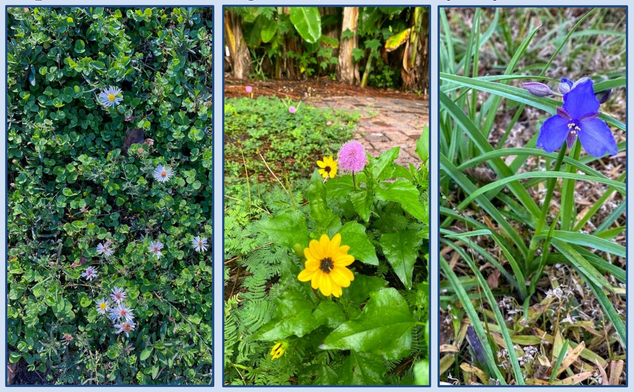

Fig. 7 How many plants are in your yard? Take a closer look and you may be surprised

References

1. Wandersee, J., & Schussler, E. (1970) [PDF] Toward a theory of plant blindness: Semantic Scholar. Retrieved from https://www.semanticscholar.org/paper/Toward-a-theory-of-plant-blindness-Wandersee-Schussler/423bb49b16b5a6726e906ebda55273b968199d31
2. Gobster PH, Nassauer JI, Daniel TC, Fry G (2007) The shared landscape: what does aesthetics have to do with ecology? Landscape Ecol 22:959–972. https://doi.org/10.1007/s10980-007-9110-x
3. Nassauer JI (1995) Messy Ecosystems, Orderly Frames. Landscape Journal 14:161–170

Acknowledgements

Made possible by UF Florida Agricultural Experiment Station SEEDIT Fund, USDA McIntire-Stennis Capacity Grant (#1012120), UF|IFAS Program for Resource Efficient Communities and Center for Land Use Efficiency, Federal University of ABC Brazil, and the residents of Gainesville, FL (IRB# IRB202002223).