

BIODIVERSITY OF TREES

Group: Kanye

Ashton Alston, Torie Garcia, Parker Hill, Rachel Riley,
Ava Sambrano, Jann Smith

Principles of Biology, Sec28 Hybrid - EMPACTS,
Spring 2024, Dr. Casey Brewster



INTRODUCTION

Biodiversity explains the variety of living species and variability of life on Earth.

Biodiversity is important to trees because trees provide habitat and shelter for organisms, food sources, soil organisms, and they provide oxygen for humans and animals to breathe.

To test the biodiversity of trees, we will need to measure a specific area in which trees are located, or the richness of the species on the NWACC campus.



SPECIES INTERACTION

- Trees are producers that have a competitive species interaction. Even though they are of the same species, they still have to fight over resources like water and sunlight exposure

METHODS

- The growing concern for tree preservation and the significant benefits trees provide to the environment led our group to choose trees as our primary topic of study.



Our group used the "iNaturalist" app to identify species and collect data, and we selected a tree-rich area on our Bentonville NWACC campus.

- Some questions we asked ourselves during this experiment:
- What kind of trees are commonly found on the NWACC campus?
- What trees prove more beneficial for animals and wildlife to use as a source of survival?
- Are there any non-native species present on campus, and if so, where does it originate from.



OUR TESTING SITE

TREES FOUND HEADING NORTH

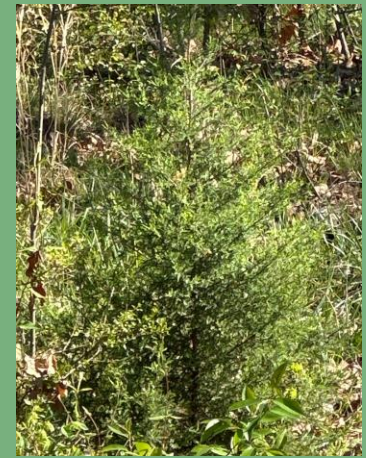
As part of our field survey, we entered the populated tree area from the North and stopped approximately every ten yards to observe and identify the trees.



Honey Locust



Common Pear



Eastern Redcedar



Blackjack Oak



Eastern Walnut



Juniper

TREES FOUND HEADING WEST



Black Cherry



Oaks Genus Quercus



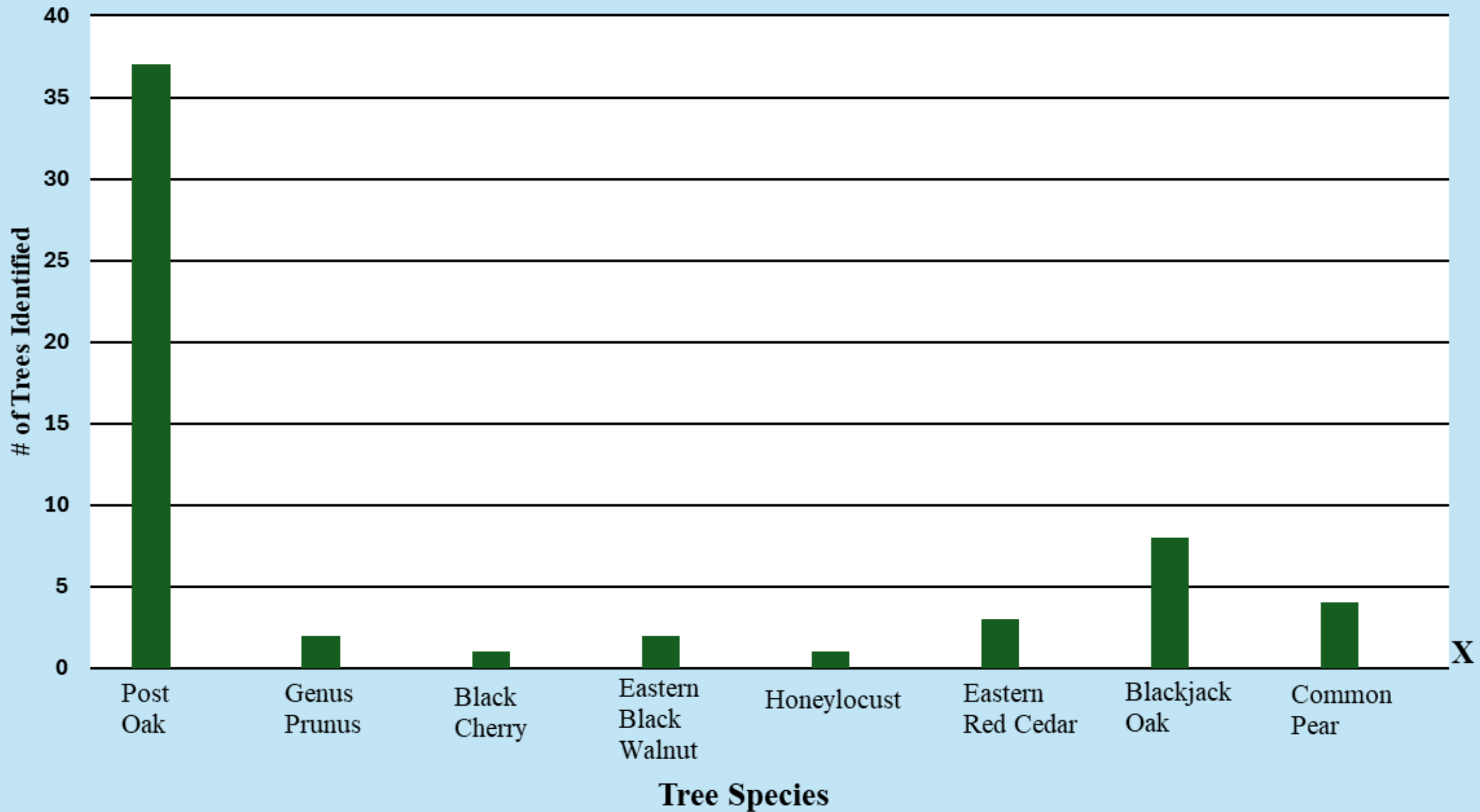
Post Oak

TREE SPECIES IDENTIFIED

Species ID	Species Common Name	Total Number of observed Species
A	Post Oak	37
B	Genus Prunus	2
C	Black Cherry	1
D	Eastern Black Walnut	2
E	Honey locust	1
F	Eastern Red Cedar	3
G	Blackjack Oak	8
H	Common Pear	4



-
- . After identifying nine different tree species, the Post Oak was found to be the most common. It was followed by the Blackjack Oak and several oaks from the Quercus genus.
 - To measure the biodiversity of the area we produced two important diversity indices:
 - Shannon Diversity index: 1.27 (indicating relatively high diversity)
 - Shannon Evenness index: 0.611 (suggesting moderate evenness in species abundance)



MOST ABUNDANT TREE SPECIES ON CAMPUS

Post Oak

(*Quercus Stellata*)

Quercus stellata, the post oak or iron oak, is a North American species of oak in the white oak section. It is a slow-growing oak that lives in dry, poor soils, and is resistant to rot, fire, and drought. Interbreeding occurs among white oaks, thus many hybrid species combinations occur.



NON-NATIVE TREE SPECIE

- The Honeylocust, which is not native to the area and is originally from Europe, took over, which led to more research into how it affected the local ecosystem.



SO WHY WAS THIS IMPORTANT?

- Based on the diversity indices that were calculated, there were a lot of different species, and the numbers of each species were evenly spread out. This suggests that the ecosystem is healthy and balanced.
- Learning about the different kinds of trees on the NWACC campus helps us understand the important roles trees play in the environment and guides our efforts to protect and manage these trees. Because trees are so important for supporting biodiversity, keeping the climate stable, and providing ecosystem services, our results show how important it is to keep and improve tree diversity in urban areas like the NWACC campus.

SAVE THE TREES!

- Not only do trees increase biodiversity, but they also keep the climate stable and provide important services to the ecosystem. For the health and resilience of our environment, we need to keep working to protect and manage trees. Our results show that more research and conservation efforts are needed to keep and improve tree diversity and protect the many environmental benefits trees provide.



LITERATURE BIBLIOGRAPHY

Barrios, E., Valencia, V., Jonsson, M., Brauman, A., Hairiah, K., Mortimer, P. E., & Okubo, S. (2017, December 4). Contribution of trees to the conservation of biodiversity and ecosystem services in agricultural landscapes. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 14(1), 1-16. <https://doi.org/10.1080/21513732.2017.1399167>

Chen, C., H. Chen, H. Y., & Chen, X. (2019, October 2). Functional diversity enhances, but exploitative traits reduce tree mixture effects on microbial biomass. *Functional Ecology*, 34(1), 276-286. <https://doi.org/10.1111/1365-2435.13459>

Castro-Díez, P., Vaz, A. S., Silva, J. S., Alonso, Á., Aponte, C., Bayón, Á., Bellingham, P. J., Chiuffo, M. C., DiManno, N., Julian, K., Kandert, S., Porta, N. L., Marchante, H., Maule, H. G., Mayfield, M. M., Metcalfe, D., Monteverdi, M. C., Núñez, M. A., Ostertag, R., . . . Godoy, O. (2019, April 11). Global effects of non-native tree species on multiple ecosystem services. *Biological Reviews*, 94(4), 1477-1501. <https://doi.org/10.1111/brv.12511>

González, M., Baraloto, C., Engel, J., Mori, S. A., Pétronelli, P., Riéra, B., Roger, A., Thébaud, C., & Chave, J. (2009, October 16). Identification of Amazonian Trees with DNA Barcodes. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0007483>

Lutz, J. A., Larson, A. J., Swanson, M. E., & Freund, J. A. (2012, May 2). Ecological Importance of Large-Diameter Trees in a Temperate Mixed-Conifer Forest. *PLOS ONE* 7(5): e36131. <https://doi.org/10.1371/journal.pone.0036131>

Wang, C., Zhang, W., Li, X., & Wu, J. (2021, December 20). A global meta-analysis of the impacts of tree plantations on biodiversity. *Global Ecology and Biogeography*, 31(3), 576-587. <https://doi.org/10.1111/geb.13440>