COLLEGE OF AGRICULTURE & LIFE SCIENCES

CAMPUS ARBORETUM

From Arizona to Texas and back again...

One of our very own campus trees has contributed to science in a big way

This *Populus mexicana* tree was grown from a cutting collected in 1970 by UA Professor Warren Jones. Over 50 years later it has grown into a towering tree with a story to tell.

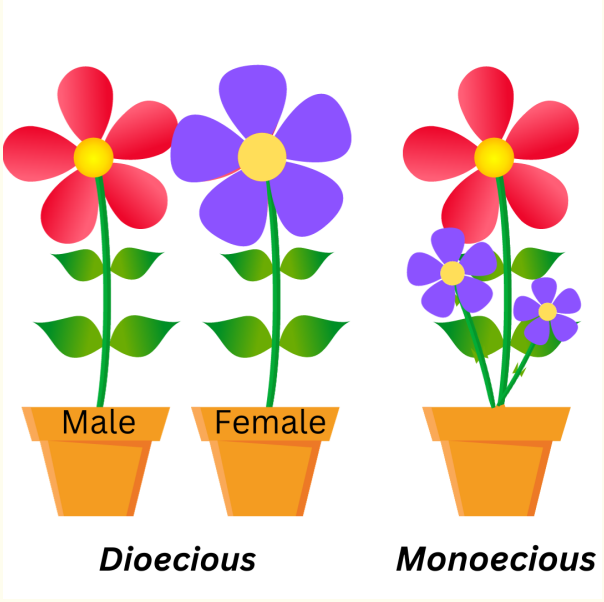
In October 2018, Professor Matt Olson and a team of researchers from Texas Tech University's Biological Sciences Department reached out to the Campus Arboretum to request living samples of the Yaqui cottonwood (*Populus mexicana)* we have growing in our collection. **Why?** The researchers needed a sample of a ***female dioecious*** tree.

Dio- what?

Only about 7% of flowering plants are **dioecious** [dai-**ee**-shuhs], meaning the **male and female flowers grow on separate plants**.

The remaining 93% of flowering plants are **monoecious** [maa-**nee**-shuhs], meaning **male and female flowers grow on a single plant**.

Even though there are far less dioecious



species, they happen to be the most abundant trees and shrubs in many parts of the U.S and China.

Why do only 7% of species have separate 'male' and 'female' plants? Why did the majority evolve to have both flowers on the same plant? The researchers at Texas Tech are trying to uncover why plants evolved to be primarily monoecious and map the genetic code for this evolutionary change to emerge.

Many of the trees used in the timber and biofuel industries are dioecious. So from an economic and resource standpoint, If they can better understand the differences between the male and female trees, there can be some insight on how to improve growth and yield.

The researchers also have questions about smell

How are the chemical compounds emitted into the air different between male and female plants, and do the differing smells affect insect biodiversity? Does a flower's 'gender' influence pollinator attraction or herbivore feeding preferences?

The researcher's first step to beginning to answer some of these questions starts with mapping the genetic code of dioecious species. The sample of our dioecous *Populus mexicana* subspecies dimorpha helped them to map the sex chromosomes in this species and assemble a genome sequence.

Learn more about the research

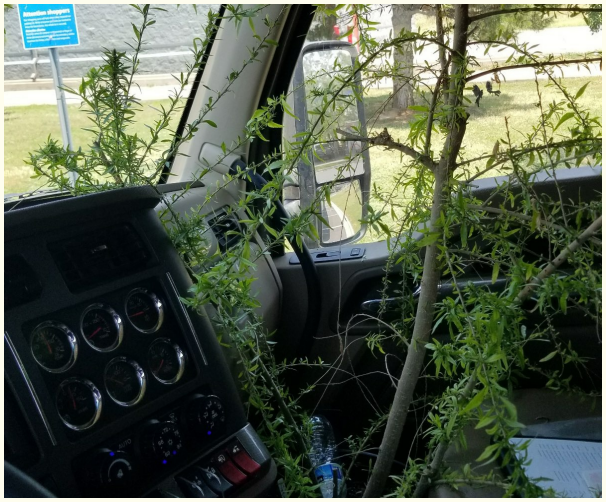
The Traveling Trees

For their research they needed to grow a specimen in a greenhouse to collect tissue… but there were some issues. Firstly, they needed to make sure they obtained a female plant. Growing a female seed would take decades and importing a female tree from its native region of Mexico would be too difficult. This is where the Campus Arboretum was able to supply a sample from our mature female accession growing west of Douglass Hall.

Thanks to the UA Grounds Services staff and a bucket truck, stem samples were collected from various heights along the enormous tree and sent off to Texas. 3 years later in June of 2021, the entire genome of the female had been sequenced from our sample.

A Gift from Texas Tech

As part of their dioecious research they also sequenced the genome of a male Yaqui cottonwood. When the male was no longer needed for the project, it was growing too large for their greenhouse and wouldn't survive in their cold winters outdoors. Since the tree had great scientific and horticultural value, it was offered to the Campus Arboretum. Civano Wholesale Growers in Tucson came to the rescue to pick up the tree in Texas and deliver it to Arizona.



"Your Populus tree is here, safe, and we nicknamed it Penny. Penny slept in the cab each night with the driver, who sang kumbaya to it each night before bed. It's been quite entertaining to hear the story of Penny's voyage to Tucson."
-Jackie Lyle, Civano Grower

The male tree was installed and nursed back to health in the shade of the mature female at Douglass Hall. Two years later by August of 2023, the male transplant is thriving! Even after one of the hottest summers on record, the tree has grown by 17 feet!

"This tree went from 3ft to 20ft tall in just 3 years. I don't think I have ever seen any tree grow like that and even in the extreme heat it looks completely unaffected... like brand new! How remarkable."

-Drew Barna, CIC, CLIA Landscape Manager - PHC, Irrigation, Arbor Care

It's an inspiring story of collaboration and use of our collection for research... but it's also revealing of the incredible performance and potential for this species in our climate! This plant is proving to be a model of resilience!

Read the full story here

Common Name: Yaqui cottonwood
Botanical Name: *Populus mexicana*
Family Name: Salicaceae

Populus Mexicana is a significant species of the culture in Sonora, Mexico. They even have restaurants named after them! Los Alamos translates to poplars (genus Populus) the genus that contains cottonwoods.

CAMPUS ARBORETUM

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Promote stewardship and conservation of urban trees in Arizona.

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