

PLANTING HOPE

Seed banking and plant restoration projects at the ABQ BioPark are helping to conserve rare New Mexico species

Just behind the New Mexico BioPark Society (NMBPS) office sit about a dozen white plastic containers potted with a rather unassuming plant.

But looks can deceive. It turns out that these are actually salvaged specimens of one of New Mexico's rarest plants — Aztec gilia (*Aliciella formosa*). By late spring, they'll display small trumpet-shaped purple flowers deserving of the plant's other common name, "beautiful gilia."

Aztec gilia is threatened by oil and gas development. These particular plants were collected from an area that is being converted to a highway, and they would have been decimated if the ABQ BioPark hadn't stepped in.

The idea is that the BioPark can get these plants healthy and either transplant them back into the wild later or collect their seeds for research or restoration projects.

"Rather than let them get destroyed, we thought we could keep them here at the BioPark," said Clayton Meredith, NMBPS's species survival officer for plants. "We thought, 'how can we make the most out of a bad situation?'"

Aztec gilia is just one part of the BioPark's larger plant conservation and research program, which includes salvage projects like this as well as seed collection and seed banking.

Photos by Clayton Meredith



*Salvage of Aztec Gilia (*Aliciella formosa*) plants in advance of a road construction project.*



Aztec Gilia plants loaded for transport back to Albuquerque. Ice is placed on the soil surface to keep the soil cool and moist during transport. This minimizes stress to the plants and increases the potential for survival.

In search of seeds (and gypsum)

In 2023, Meredith took to the field 11 times to investigate and collect seeds from four plant species endemic to gypsum environments—gypsum Townsend's aster, Todilto blazingstar, Sivinski's scorpionweed and tufted sand verbena.

His goal was to collect as many seeds as possible to store in a conservation seed bank. Meredith is also studying the seeding habits of these little-known plants—gypsum formations occur globally, but little is known about the plants (called gypsophiles) that grow in these environments.

"They occur all over the world and are largely ignored in the plant community," he said.

What is known is that the unusual mineral content of gypsum soils presents a significant growth barrier for most plant life. The plants that do grow in these areas often end up isolated,

"so you get weird species that occur in one place and nowhere else," Meredith said.

So, how do you collect wild seeds? Well, it turns out that it's pretty difficult, especially when the species you're searching for are data deficient. Washed out and impassable roads didn't help Meredith much either, he said (he had to abandon his truck and hike it several times over the summer, and his vehicle even became completely stuck in the mud once).

But before all of this seed-searching strife, Meredith started in an office doing some basic research on each species—he wanted to find out where each plant may grow and more about their life cycles. Then, he took to satellite imagery to identify possible collection sites (you can see gypsum landscapes from space). Albuquerque is close to two gypsum formations—the 70- to 80-million-year-old Todilto Formation to the north and the 180-million-year-old Yeso Formation to the south. He eventually zoned in on some Bureau of Land Management (BLM)- owned lands in Sandoval County and the Socorro area.

To the field!

After getting the necessary collection permits from the BLM, Meredith began taking trips out to the sites, looking for dense populations of each species (he said this gives you more bang for your buck when it comes to seed collecting).

The window for seed collection can be quite short and occurs after a flowering plant has bloomed. Meredith had to guesstimate when each species might flower, given broad bloom windows and environmental factors like heat and precipitation.

But even when you get the window correct, seed gathering is by trial and error, as each species' seeds are just a bit different and require different collection methods (for instance, Meredith figured out that the blazingstar seeds are ready when they're warm to the touch).

By this time, Meredith had enlisted a team of BioPark horticulture staff to assist. In addition to helping to collect the seeds, the team of horticulturalists analyzed sites to record the conditions each plant thrived in. This information will help them later when they attempt to grow each species at the BioPark.

The crew collected seeds from each individual plant separately into labeled envelopes. This will help the BioPark keep track of where each seed came from so they don't end up growing 500 plants from the same mother.

"We want to make sure we're pulling at least 30 maternal lines from each species at each site," Meredith said, explaining that this helps to maintain genetic diversity.

They also collected soil from each site, as some plants have symbiotic relationships with other organisms like fungi.



ABQ BioPark horticulture staff collecting at Ojito Wilderness

Into the future

Once they were back at the BioPark, a team of volunteers processed the seeds by cleaning them and removing the chaff (the husk surrounding a seed). Then, they estimated how many seeds they had and weighed them.

In the coming months and years, the BioPark plans to conduct viability testing, which includes periodically growing a select number of each plant from seed. This will help determine how long seeds will last in storage. Some of these plants may eventually make it back out to the wild by way of conservation transplant projects. Others will be put on display so guests can learn about New Mexico's plant life. The BioPark is also investigating which insects might have relationships with each plant.

The other seeds will sit safely in a specialized refrigerator at the BioPark and at a backup facility, just in case.

Meanwhile, the BioPark plans to stay involved with other non-seed conservation initiatives like the rescue and eventual transplant of species like the Aztec gilia. For instance, Meredith visited a site near Lordsburg in November to collect specimens of the Lordsburg noino, a rare flowering plant whose habitat is being disturbed by an electrical transmission line. The power company paid NMBPS to recover the plants, which Meredith hopes can one day aid in habitat restoration efforts.

Seed support

The New Mexico BioPark Society would like to thank Nusenda Credit Union for its generous support of our seed banking initiatives through multiple grants that have covered seed collection expenses and enabled the purchase of seed storage equipment and other vital supplies.



Photos by Clayton Meredith



*Gypsum Townsend's Aster
(Townsendia gypsophila)*



Todilto Stickleaf (Mentzelia todiltoensis)

The next cure for cancer?

Having these plants and seeds at the BioPark is kind of a big deal, Meredith said.

"To my knowledge, we're the only facility that holds at least three of these [Sivinski's scorpionweed, Todilto blazingstar, and Lordsburg noino]," he said. "I'm really impressed that we have these species that no one else has."

Beyond bragging rights, the collection and study of these species could have far-reaching impacts.

First off, the BioPark will help contribute to scant scientific knowledge on each plant, which will help with conservation initiatives down the road.

And when it comes to the gypsophiles, "A lot of these plants are really endangered," Meredith said, adding that they are also incredibly important in stabilizing soil and preventing erosion in their ecosystem. They also support an active community of organisms like fungi, bacteria and insect life. Gypsum formations—and all the plant life that supports them—may even play an important role in storing carbon and thereby mitigating the effects of climate change.

Plus, "the next cure for cancer could be in there," Meredith said. "We just don't know."

Why create a seed bank?

We all want to save elephants and orangutans from extinction, but we don't always think about conserving plant species through seed banking. The good news is that it's easier and cheaper than animal conservation. Just collect some seeds and store them!

Plus, seeds are a long-lasting investment.

*"Under the right conditions, many seeds can survive decades or even centuries," said Clayton Meredith, the New Mexico BioPark Society's species survival officer for plants. **B***