

# Southwest

## Native Seeds/Search: Cultivating the Past to Preserve the Future

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"Old is new again," says Nicholas Garber, Conservation Program Manager at Native Seeds/SEARCH (NS/S), a nonprofit seed bank, grower and seed-distribution center based in Tucson, Arizona. Garber is referring to the rich genetic diversity embodied in seeds harvested from some 1900 Southwestern US and northern Mexico "accessions" (plants with unique genetic backgrounds) the organization maintains. Most were developed over time by indigenous farmers cultivating smaller fields, some of which have been producing food for centuries.

As the climate changes, preserving highly adaptable plants will become more and more crucial.

"We manage the crops in ways that preserve their genetic background, their biodiversity," Garber says, "and at a population size that's big enough to keep the genetics of the accessions healthy. One novel aspect of the collection is that it's mostly 'land-race seeds,' which are often discounted because the breeding has taken place in the field by farmers [rather than through large-scale seed companies producing for "commodity farmers"]—we've really been gifted by the ancient farmers who have been growing in this area despite the challenges. You end up with a really diverse genetic background with every lineage. It's that diversity that adversity can hone to make these plants adapt to different environments."

NS/S assembled its original collection through links with anthropologists conducting research in indigenous Tarahumara and Mayo communities in northern Mexico, under the US Dept. of Agriculture's "Meals for Millions" program. Over the nonprofit's 35-year existence, its seed collection has expanded significantly, mainly through gifts from and exchanges with growers in a geographic region that Garber says stretches "from Las Vegas, New Mexico, to Las Vegas, Nevada, and from Durango, Colorado, to Durango, Mexico." The majority of accessions come from tribal and other indigenous growers, including Hispanic communities in northern New Mexico.

### Native Seeds/SEARCH's mission is five-fold:

- banking seeds
- distributing seeds
- supporting growers
- conducting botanical research
- providing education to community members

### SEED STORAGE

The seed bank preserves numerous species of corn; desert peas and beans such as the tepary bean, a staple of southern Arizona tribes; squash; tobacco; chile; and many more. The seeds are stored in three locations: a -40-degree F freezer that can sustain their viability and genetic character for an estimated 200+ years; a 32-degree F freezer where original seeds are kept (both freezers are in Tucson); and "backup" storage at a USDA facility in Ft.

Collins, Colorado. The additional location helps ensure the seeds will survive potential catastrophic events such as the storage-facility flood that occurred last year at the Svalbard Global Seed Vault in Norway, when surrounding permafrost melted. At the Ft. Collins USDA facility they maintain a "black box" storage program. That means NS/S knows the contents but the federal agency does not. Garber explains, "We want our partners to know that NS/S is maintaining control of the seeds they provide us."

### **SEED CULTIVATION, CLIMATE AND SEED ADAPTABILITY**

Preservation and cultivation of its seed collection for distribution have long been the primary aims of the organization, but Garber says, "Seeing the climate change has really motivated us to get the seeds growing again at their places of origin, because we figure there will be less aberration from the traditional climate norms if they grow in the places where they've adapted."

For years they cultivated most plants at their farm in Patagonia, Arizona. At 4000 feet in elevation, conditions there mimic those of the northern Mexico region from which their early seed stock came. "At the Patagonia farm," Garber says, "we haven't had to worry about things like lots of corn farmers in the area [whose pollen might interfere with their plants' genetic makeup]. But in some ways, Patagonia is too nice a place to grow these crops—the temperature is mild, the water table is high, and it rains all the time."

As temperatures rise and drought increases the stress on crops across the Southwest, NS/S wants to make sure plants continue adapting to their centuries-old environments—a process only possible when they're grown in their original, demanding environments. In particular, "low input" seeds from plants that have long grown in harsh conditions can fairly rapidly lose their ages-old adaptability if cultivated in less-demanding environments. "And you don't know they've lost it," Garber says, "until you plant and they don't grow."

To prevent that loss of adaptability, the organization relies increasingly on farming contractors in low-input regions. One is the Gila River Indian Community near Phoenix, a particularly hot, dry part of the Sonoran Desert. Crops such as tepary beans can better maintain their superb adaptive qualities if they continue to grow where conditions challenge their adaptability. Salt River offers a perfect location for such cultivations, as precipitation is minimal and summer temperatures in the area often exceed 110 degrees (F).

Tepary beans, Garber notes, hold a special dietary significance for tribes in the low desert; those who consume them as part of a traditional diet, rather than a traditional "Western diet" high in fat, sugar and carbohydrates, are much less prone to developing diabetes, a scourge of tribes across the nation. The beans may also serve to mitigate climate-related challenges related to longtime agricultural-feed practices. As temperatures rise, alfalfa—long a staple for livestock feed—becomes less adaptable in climate-stressed areas. The USDA Plant Materials Center is presently testing the salt-tolerant, low-input tepary bean (Garber jokes that it's "almost allergic to water"), which researchers suggest could eventually replace alfalfa as a major Southwestern livestock feed. "That would be a remarkable change," he says.

NS/S also grow plants on limited acreage around their Tucson headquarters, which at 3000 feet in elevation provides desert conditions that are hot and dry but still somewhat milder than the lower desert reaches.

Even the friendly growing environment at the original Patagonia farm is not immune to the ravages of a changing climate—which doesn't always translate to warmer temperatures. "We had two frosts in May [2017] that killed off some of our plantings," he says. "That was shocking, because frosts there normally occur in February and March. So while the summer is hotter and rain events are less frequent but more intense, we're still having to treat the Patagonia farm as if it's gone one or two USDA [climatic] zones cooler." Increasingly severe rainstorms also make life more difficult for farmers seeking to access fields and to hand-control weed growth, which NS/S farmers favor in

lieu of weed-killing chemicals.



*Native Seeds/Search intern Julian tends to squash plants at an NS/S garden. Photo courtesy of Native Seeds/Search.*



*Safflower from the village of Corrales, New Mexico. This red/orange thistle-like flower was used as a saffron substitute. Photo courtesy of Native Seeds/Search.*

## **GATHERING THE BOUNTY**

Presently, NS/S is not seeking new accessions—their present stock is extensive, and they rely on a small staff and volunteers to maintain their farming operations and seed-management and sales outlet in Tucson. They do, however, receive occasional gifts from growers. Their recent acquisition of Hopi cotton seeds is one example. Garber says fiber from the accession is "absolutely beautiful. We'll probably try to get it into distribution."

While most of the collection is accessible to commercial growers and individual buyers, a small number of successions are reserved by mutual agreement only for the seeds' donors. For example, four types of seed from Zuni Pueblo—corn, squash, melon and tomatillo, supplied by members of Zuni kivas—are maintained strictly for tribal members. "Agreeing not to distribute seeds is always an option," says Garber. In line with its larger mission, NS/S is also working with Zuni's wellness center "to make a larger commentary about dietary and nutritional fitness." Consumption of traditional foods can go far in mitigating health issues common in Indian country, such as diabetes, that stem from a switch to junk-food-rich Western diets.

## **Climate Stress and Agricultural Change**

NS/S has recently fielded more requests from researchers examining low-input species ("especially Tohono O'odham crops like the tepary bean"). "Overall," he says, "The key will be to reduce inputs in agriculture as much as possible," as agricultural activity contributes one third the total greenhouse gasses added to the atmosphere. He says demand has also grown for seeds that produce the best-tasting food. "Flavor, as well as consumer knowledge of where their food comes from, are increasingly important factors in terms of seed value."

Garber also sees a growing interest in alternative planting methods. For example, "waffle-bed planting," considered a Zuni invention, embeds seeds in large square holes that taper at the bottom, reducing evaporation, increasing precipitation capture, and placing plants closer to the water table. Companion planting, long avoided by commercial growers because of its labor-intensiveness, involves grouping plants such as the "three sisters"—corn, beans and squash—close together. The method reduces water use, helps better balance nitrogen levels, and aids in weed control. Climate change and the droughts it will likely bring, says Garber, will compel farmers to explore some of these "new" approaches because "as water becomes less available it will become more expensive."



*A Zuni woman tends to a waffle bed garden in this undated photo now in the National Archives.*



*Sonoran Big Cheese is one of many regional varieties of squash whose seeds are maintained by Native Seeds/Search. Photo courtesy of Native Seeds/Search.*

Garber is optimistic that older, more-sustainable agricultural modes are getting a serious second look from farmers long tied to modern modes of farming. "These are techniques the tribes have known about for centuries," he says. "They're systems of planting developed over time by incredibly watchful farmers. The careful observers are the ones who lead innovation. They've developed more of a system of symbiosis than a system of 'commodity agriculture.' And that's what we're going back to. The less land, the more plants and the better their interactions, the lower the inputs and the better the planting is on the environment. It's an inspiring return to a much more sensible system of agriculture. We're really excited that farming is returning to traditional ways in an attempt to adapt to this rapidly changing world."

This profile was developed in 2018 by Dennis Wall, Institute for Tribal Environmental Professionals, Northern Arizona University, with financial support from the Bureau of Indian Affairs. The profile is available on the Tribes & Climate Change website: [www7.nau.edu/itep/main/tcc/Tribes/](http://www7.nau.edu/itep/main/tcc/Tribes/). The tribal climate change profiles featured on the website are intended to be a pathway to increasing knowledge among tribal and non-tribal organizations interested in learning about climate change mitigation and adaptation efforts. **For more information please contact:**

**Nikki Cooley, Co-Manager**

- ☐ 928/523-7046
- ☐ [Nikki.Cooley@nau.edu](mailto:Nikki.Cooley@nau.edu)

**Karen Cozzetto, Co-Manager**

- ☐ 928/523-6758
- ☐ [Karen.Cozzetto@nau.edu](mailto:Karen.Cozzetto@nau.edu)