



The Arizona
Native Plant
Society

In this Issue:

Interdisciplinary Botany

- 1 Arizona Native Food Plants for a Dry Future
- 6 Oaks, Cycads, Orchids, and Conservation in the Sierra Huérfana, Sonora
- 8 Special Soils and their Role in Plant Evolution, Distribution, and Regional Diversity
- 13 Characterization of the *Selaginella arizonica x eremophila* Hybrid Zone in Southern Arizona

& Our Regular Features

- 2 President's Note
- 11 Flora of North America Honors AZNPS
- 15 Who's Who at AZNPS
- 16 Spotlight on a Native Plant: Mexican Tansyaster
- 17 Book Review: *Trees of Western North America*
- 18-19 Announcements

©2014 Arizona Native Plant Society. All rights reserved.

The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

Volume 37, Number 2

Fall 2014



Wild sunflower, Rio Rico, Arizona, 23 August 2014. Photo by Susan D. Carnahan.

Arizona Native Food Plants for a Dry Future

by Richard Felger¹

While learning some of the intricacies of Western Apache knowledge of food plants and historic landscapes, I wondered: How different would it be if they or other Native Americans had been able to teach invasive Euro-Americans about native food resources and greater respect for local ecosystems?

The Sonoran Desert Region is rich in plant diversity, and rich in plants used for indigenous cuisine. Dozens of such wild plants are suitable for agricultural crops and home gardens. Fit the crop to the land, not the land to the crop: the concept includes no-tillage land use and native plants that have been wild-harvested since ancient times. The implications for energy and water conservation are huge.

Some years ago I had the privilege of searching the world for new aridland/salt-tolerant food crops and now I find some of the best ones right here in our backyard. Among the

continued next page

¹University of Arizona Herbarium and Sky Island Alliance, Tucson.



Opposite: Wild sunflower, Rio Rico, Arizona, 23 August 2014. Photo by Susan D. Carnahan. Above, left: Eric Leahy harvesting wild sunflowers near the Gila River in New Mexico, with a sheet over the hood of the pickup, 15 October 2014. Center: Initial screening of sunflower achenes (“seeds”) by Eric Leahy and Gregg Dugan, 15 October 2014. Right: Winnowing freshly screened sunflower achenes, 14 October 2014.

Arizona Native Food Plants for a Dry Future *continued*

several hundred wild food plant species in the Sonoran Desert Region, several dozen provided Native Americans with staples. Wild regional staples include agaves, saguaro and organ pipe, mesquites, sunflowers, a richness of grasses, even native palms, and many more. Some of these wild food plants are promising “new” food crops for home gardens as well as large- and small-scale agriculture. Certain South American mesquites, or *algarrobas*, are gaining major significance in their native lands, and our native mesquites are likewise gaining prominence as local food resources.

Driving from Tucson to New Mexico in late summer I noticed the native sunflower, *Helianthus annuus*, along the roadside, mile after mile. A few weeks later I noticed abandoned farmland had become a jungle of these sunflowers reaching above head height. Although no-tillage farming usually implies use of perennials, this sunflower and some of its relatives are annuals that can naturally reseed year after year without plowing. These hardy plants thrive in disturbed habitats, although best at elevations above the desert or in home gardens. The wild sunflower is late ripening, in fall after most summer crops have been harvested. Native Americans made extensive use of the “seeds,” actually an achene, which includes the husk and its enclosed seed.

This wild sunflower, native across North America, is the progenitor of domesticated, agronomic varieties, with a very large and often single seed head, larger seeds, and different cultivars bred for thinner shells and high seed oil. Russia and the Ukraine produced 16 million tons of sunflower seeds last year—that’s 32 billion pounds. The wild sunflower differs in part by having smaller but numerous flower heads, smaller achenes/seeds, and a much wider range of ecological

tolerance. Simple commercial and artisanal methods of harvesting and cleaning are well known. In early October, New Mexico Gila River farmer Eric Leahy collected wild sunflowers from an abandoned field and showed us how to separate the achenes from the chaff using screens, and further winnowing using a fan. Apaches and others ground the whole achene, seed and husk together, for an esteemed food resource. Some people boiled the achenes whole and, after cooling, the oil would be skimmed off, providing sunflower oil. Why not farm these plants? It would be more like managing a sunflower-filled land.

The Sonoran Region native bounty extends to grasses, too. Civilizations co-evolved with grasses: wheat, rice, corn, oats, barley, sorghum, and a richness of others. But these familiar crops are tropical and temperate-climate plants—requiring extensive irrigation in dry regions. They are also annuals, which require annual replanting and tillage (plowing). What if we developed arid-adapted no-tillage grain crops? One intriguing candidate is nipa (*Distichlis palmeri*) at the Colorado River delta, one of the very few grasses endemic to the Sonoran Desert. Nipa was a staple of the Cocopah people, thrives with pure seawater, and produces prodigious amounts of grain comparable to that of early strains of rice.

Most grass grain (technically a caryopsis, a seed fused to the fruit case, or pericarp) are edible, although many are too difficult to prepare or process. (However, avoid ergot-contaminated or otherwise infected grain, which will stand out as discolored and much larger than uninfected grain. Also, ensure proper storage to preclude the growth of fungi that produce mycotoxins.) Many Sonoran region grasses make up for being small by producing large quantities of

continued next page

Arizona Native Food Plants for a Dry Future *continued*

grain and, like many arid land plants, pack a lot of energy into their seeds. The Comcaac (Seri people) even harvested the minute grain of the six-weeks grama grasses (*Bouteloua aristidoides* and *B. barbata* var. *barbata*), which can carpet the desert after summer rains.

For home gardens and agriculture, we turn to some interesting perennial grasses. *Sporobolus* species are unusual among grasses because the actual seed ripens free from the surrounding pericarp and chaff (glumes, lemma, and palea), thus giving rise to the common name “dropseed grasses.” Perennial dropseed grasses, such as *S. cryptandrus* and especially *S. giganteus*, have seeds so minute as to be like flour. It is certainly possible that these seeds could be used like flour, without milling, because the surface-volume ratio is already very high.

Twila Cassadore, native food expert of the San Carlos Apache Tribe tells us the grain of *Panicum bulbosum* (*Zuloagaea bulbosa*) is the easiest to harvest and best tasting of the wild grasses. The Apache name translates as Red Grass, a more enticing name than bulb panicgrass; let's call it Apache Red Grass. Indeed the ripening panicles are usually reddish and the freshly harvested grain has a pleasant taste.

Apache Red Grass is a large perennial grass native to mountains in the Southwest and northern Mexico. The grain is like that of the related Common Millet, *Panicum miliaceum*, albeit smaller. You can easily strip off the ripe Red Grass grain by hand into a paper bag. Like other grains and seeds, it is essential to get them dry as soon as possible—all moldy seeds and grains need to be avoided. You can prepare it as you would any millet or small grain. Like many wild grasses and millets, Apache Red Grass grain is gluten-free.

Some Apache Red Grass plants have bluish-green foliage while others have yellow-green or bright green foliage, making them attractive landscape plants as well as a tasty food resource. Red Grass can be grown from seed or divisions of the short rhizomes of established plants. To get good seed set and ensure cross-pollination you should have more than one clone. Plant it along a walkway, as an accent plant, or backdrop screen, or in an experimental plot for grain production. The above-ground parts are frost-killed but remain as fall color in your garden, or cut the above-ground part and this perennial will resprout in spring.



Gregg Dugan harvesting Apache Red Grass, Pinos Altos Mountains, New Mexico, 10 September 2014. Photo by Jarrod Swackhamer.

The coconut, oil palms, and date palm are among the more significant human food resources. The date, *Phoenix dactylifera*, is the desert palm of Egypt, but what about our desert palms? *Washingtonia filifera*, in desert oases and canyons in Arizona, California, Nevada, and Baja California, is the only palm native to the western United States. Its only close relative, *W. robusta*, is native to Sonora and the Baja California Peninsula. These fan palms are grown across the Sonoran Desert Region and arid/subtropical regions around the world. The fruit, produced in prodigious quantity, is similar to that of the date palm but much smaller, often only 6 mm long. Palm expert Don Hodel of the University of California Cooperative Extension found that a single *W. robusta* produced approximately 572,000 fruits weighing 101 kilograms (223 pounds). The Cahuillas of Palm Springs, California, made extensive use of the sweet fruit of *W. filifera*, fresh or dried, for beverages, or the whole fruit and seed ground into flour. Fine preserves and especially beverages might be the best modern-day applications, or as local food expert Carolyn Niethammer suggests, perhaps for baked goods instead of sugar or corn syrup, or a source for a granulated natural sweetener. Try experimenting with these fan palm fruits.

Palms require water, but like many other large monocots, the root system is not extensive. You only need to provide water close to the trunk, and poor-quality water will suffice, such as gray water, or water too alkaline or saline for other plants. You will need an extension pole, bucket lift, or some other way to harvest high-hanging fruit.

Any new agronomic crop faces challenges — observations, experimenting, serendipity, perseverance, and creativity can give results. Incentives for our own arid-adapted food crops

continued next page

Arizona Native Food Plants for a Dry Future *continued*

include adapting to a warming and drying climate, water shortages, energy conservation, more sophisticated consumers, and improved nutrition in everyday diet.



References

Bean, Lowell John and Katherine S. Saubel. 1972. Temalpakh: Cahuilla Indian knowledge and usage of plants. Reprinted 2001, Malki-Ballena Press, Banning, CA.



Desert fan palm, *Washingtonia filifera*. Arizona State University, Tempe. Photo by Les Landrum (from SEINet).

Buffalo Bird Woman's Garden Recounted by Maxi'diwiac (Buffalo Bird Woman) of the Hidatsa Indian Tribe, originally published as G.L. Wilson, 1917, Agriculture of the Hidatsa Indians: An Indian interpretation. University of Minnesota Studies in the Social Sciences 9. digital.library.upenn.edu/women/buffalo/garden/garden.html#III

Felger, Richard S. 2014. Perennial native grasses: Food for a dry world. Newsletter of the Native Plant Society of New Mexico 39 (4): 1, 6–7, 10. www.npsnm.org

Hodgson, Wendy C. 2001. Food plants of the Sonoran Desert. University of Arizona Press, Tucson.

Niethammer, Carolyn and Paul Mirocha. 2011. Cooking the wild Southwest: Delicious recipes for desert plants. University of Arizona Press, Tucson.

Pearlstein, S.L., R.S. Felger, E.P. Glenn, J. Harrington, K.A. Al-Ghanemd, and S.G. Nelson. 2012. Nipa (*Distichlis palmeri*): A perennial grain crop for saltwater irrigation. Journal of Arid Environments 82: 60–70.

Acknowledgements

I thank the many friends and colleagues who have contributed to the new crops work, especially co-investigator Gregg Graham Dugan, as well as Elizabeth "Betsy" Arnold, Susan Davis Carnahan, Twila Cassadore, A.T. Cole, Alicia Edwards, Ann Lane Hedlund, Donald R. Hodel, Kelly Kindscher, Russell Kleinman, Eric Michael Leahy, Jim Malusa, Gary Paul Nabhan, Carolyn Niethammer, William Norris, Seth Pilsk, Joseph "Joe" Ronald Runyan, Silke Schneider, Carolyn Ruth Smith, Douglas Arthur Smith, Jarrod Swackhamer, James "Jim" Thomas Verrier, Caleb Weaver, and Robert Hazard Winston. For financial support I thank New Mexico Native Plant Society, Southwestern Foundation for Education and Historical Preservation, and Agricultural Development and Promotion Funds Program of New Mexico.



The Arizona
Native Plant
Society

How can I help the Arizona Native Plant Society?
Donate a car!

Your donation is tax-deductible and will help us in our mission
to promote Arizona native plants and their habitat.

Visit our website or call 855.500.RIDE for more information.