

THE 'AHAKHAV NATIVE PLANT NURSERY ON THE COLORADO RIVER INDIAN RESERVATION: GROWING TREES AND SHRUBS FOR SOUTHWEST RESTORATION

JENNIFER KIEFFNER

Jennifer Kleffner is the former Nursery Director, 'Ahakhav Tribal Preserve, Parker, AZ. She can currently be contacted at PO Box 666, Bayfield, CO 81122.

jkleffner@hotmail.com

Kleffner, J. 2002. The 'Ahakhav Native Plant Nursery on the Colorado River Indian reservation: Growing Trees and Shrubs for Southwest Restoration. In: Dumroese, R.K.; Riley, L.E.; Landis, T.D., technical coordinators. National Proceedings: Forest and Conservation Nursery Associations-1999, 2000, and 2001. Proceedings RMRS-P-24. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station: 345349. Available at: <http://www.fcnet.org/proceedings/2001/kleffner.pdf>

Abstract

The Colorado River Indian Reservation is located in southwestern Arizona on the California/Arizona border. On the reservation is the 'Ahakhav Tribal Preserve, located on the banks of the Lower Colorado River. On the preserve is the 'Ahakhav Native Plant Nursery, specializing in plants used for southwest riparian restoration. The nursery primarily grows native mesquite, cottonwood and willow. Due to increased competition and minimal tribal support, the nursery is at a critical turning point.

Key Words

Colorado River Indian Tribes (CRIT), *Populus fremontii*, *Prosopisglandulosa*, *Prosopispubescens*, *Salix exigua*, *Salix gooddingii*, southwest riparian restoration, Tamarix

THE RESERVATION

The Colorado River Indian Reservation (CRIR) was established on March 3, 1865. The reservation is on the Arizona/California border on the banks of the Lower Colorado River and is approximately 375,000 acres. It 3,500 members come from four Indian nations, the Mohave (having the most members), Chemehuevi, Navajo and Hopi.

The Mohave and Chemehuevi are native to the area. The Mohave were traditionally more agricultural, utilizing fish from the river and mesquite beans as a food source. The Chemehuevi were more nomadic. The BIA, in an effort to get more of the reservation under cultivation, offered to relocate Hopi and Navajo members to the CRIR with the promise of land to farm in the 1940s. Not surprisingly, this was not a popular project with the Mohave. However, at this point many tribal members are of mixed ethnic origin, including Hispanic. Today, the Colorado River Indian Tribe's (CRIT) primary industries are agriculture (crops requiring no refrigeration, such as wheat, cotton, hay and

onions), light industry, and tourism/river recreation.

The tribe owns the Bluewater Resort and Casino, a popular boating and gambling destination. Eighty four thousand acres of the reservation are under cultivation, and the tribe has a 717,000 acre feet water allotment from the Colorado River, almost 1/3 of the entire state's allotment. Not all of this water is currently used. The primary town is Parker, Arizona, with a population of about 4,000.

The climate of the region is very hot, with temperatures reaching over 100 °F from mid May through mid October, and temperatures over 110 °F not uncommon in the summer. Winters are beautiful, attracting many "snow bird" winter commuters. At most, the region may experience a week of light frost a year.

The region is also very dry. The historic average yearly rainfall is less than four inches, and recent years have proven to be even drier. Summer rains, called the monsoons, are often spotty, with some areas receiving a deluge, while others just miles away remain totally dry. The winter rains tend to be more widespread and gentle.

Agriculture brought to the community some financial independence and improved infrastructure, but also degraded wildlife habitat, increased soil salinity, and increased fires. With fire came the loss of the traditional mesquite bosques used in traditional Mohave ceremonies and a massive saltcedar (*Tamarix spp.*) incursion.

Saltcedar has been found to bloom in the area 12 months out of the year, can use up to 200 gallons of water per day per tree, is fire and flood adapted, increases soil salinity and is estimated to infest 1.5 million riparian acres in the Southwest. It is not, however, a no man's land for wildlife, and the endangered Southwestern Willow Flycatcher has been found to nest in saltcedar as a alternative to its degraded or non-existent traditional willow habitat.

THE PRESERVE

The 'Ahakhav Tribal Preserve, located on the CRIR, was established in 1995 and has been maintained through grants from many different federal and state agencies. It consists of just over 1,000 acres situated along the Lower Colorado River. Its three goals are recreation, restoration and education. The Preserve receives a small operating budget from the tribe, but otherwise is solely dependant upon grants.

Over 400 acres of land have been revegetated on the Preserve. This revegetation has consisted of mechanical removal of saltcedar, soil testing to determine appropriate native plants for revegetation, planting of native willow, cottonwood and mesquite, and drip irrigation until the plants are established. Additionally, an old backwater channel has been dredged out and restored for fish habitat, swimming and canoeing, ('ahakhav is the Mohave word for backwater) and a four acre grass park area with picnic tables and BBQs has been established. The preserve has been featured in *Native Peoples Magazine*, *Arizona Highways Magazine*, *Landscape Architecture* and several restoration journals.

THE NURSERY

The 'Ahakhav Native Plant Nursery was established in 1996 to provide native plants for the Preserve's restoration efforts. Over time, the nursery increased production to provide native plants for other restoration efforts on the reservation, and is now also providing plants for

restoration projects along the Lower Colorado River in Arizona. The nursery now includes low water use native and xeroscape plants for retail sale as well. The staff includes a nursery director and up to six part time nursery workers in the busy winter and summer months. Tribal members are hired when possible.

The nursery grows plants in 1, 5, and 15 gallon black plastic containers, propagated from seed, cuttings, or purchased liners. We grow eleven native species used for revegetation, eleven additional natives used in more conventional landscaping, and approximately 40 additional species for retail sale. We currently have room for approximately 50,000 one gallon containers. Typically, southwestern Arizona nurseries do not have greenhouses. We are no exception. Plants are either grown out in the open or under two large shade structures, which help to keep the soil temperature down in the summer. The irrigation system is a simple modified home lawn sprinkler system, mostly on 2.5 foot risers. Pots are placed on salvaged wood pallets, which are in turn on top of coarse gravel. Soil mix consists of 50% sand and 50% inexpensive bulk wood mulch. No sterilization of pots or soil is performed. Our most common restoration plants are western honey mesquite (*Prosopis glandulosa* var. *torreyana*), screwbean mesquite (*Prosopis pubescens*), Fremont cottonwood (*Populus fremontii* var. *fremontii*) and sandbar and Goodding willow (*Salix exigua* and *S. gooddingii* respectively).

SPECIES

Western Honey Mesquite

Propagation

Harvest seed pods in late June/early July. Minimize bruchid insect damage by picking pods when ripe and dry but before dropping to the ground. Store in airtight containers once seeds are thoroughly dry (not a problem during our 115 degree summer days). Grind seed pods in blender and sift out "flour." Break open remaining individual shells and remove seeds. (Similar to cracking sunflower seed shells.) We use needle nose pliers. Scarify seeds with sandpaper. Soak in water 24 hours. Plant seeds that swell, (you can dry off and rescarify those that don't) one per one gallon pot, at a depth of about double seed diameter. Plant seeds early

May through July/August, or anytime temperatures are over 90 degrees. Protect from rodent herbivory with hardware cloth until plants are a few inches tall.

Advantages/Disadvantages to Western Honey Mesquite

Advantages: The most drought tolerant of restoration species discussed here. Good salt tolerance. Great for wildlife. Many animals from deer and coyote to rabbit eat the pods. Disadvantages: Problems with psyllids (small insect similar to aphid.). Problems with browsing, especially by rabbits, both in nursery and in outplantings. Seed preparation is extremely labor intensive.

Success

Up to 95% germination rate within 5 days. Loss of 5% to 10% to rodent browsing, even when fenced and covered with hardware cloth. If planted in May, ready to outplant in four months (over 12 inches tall). Normally planted the following spring, prior to summer growing season. Our nursery has propagated over 7,000 Honey Mesquite.

Screwbean Mesquite

Propagation

Harvest, storage and planting times are identical to Western Honey Mesquite. Seed preparation is not as labor intensive. Seeds are much smaller, slightly larger than a mustard grain. The grinding process also serves to scarify. Once pods are ground, resulting flour/seed mixture can be rinsed in water to remove some of the flour, soaked for 24 hours, and planted one pinch per one gallon pot (approximately 2 to 3 seeds per pinch).

Advantages/Disadvantages to Screwbean Mesquite

Advantages: Does not suffer browse damage. Does not suffer major insect damage. Good salt tolerance. Much less intensive seed preparation. Disadvantages: Needs to be within eight feet of water table to survive. Truly a riparian species. Not as readily used as food source by wildlife.

Success

Percent germination is lower. Around 80% within 7 to 10 days. Old seed does not germinate as well. Growth rates are more variable. Because seed preparation is easier, we replant ungerminated pots every two weeks. If grown under shade, May plantings are ready to outplant by October. Normally planted the following spring. Over

15,000 Screwbean Mesquite trees propagated at our nursery.

We use no fertilizer on any mesquite as they are nitrogen fixing legumes and no positive effect has been shown when they are given fertilizer.

Rhizobium inoculant is quite successful for boosting growth on mesquite.

Fremont Cottonwood

Fremont cottonwood was once the dominant riparian tree species on the Lower Colorado, along with Goodding willow. A short-lived, fast growing tree, groves were over harvested for construction lumber and steamboat fuel in the early part of this century. Cottonwood/willow no longer naturally regenerates due to altered flood regimes caused by the extensive damming of the Lower Colorado. Fremont cottonwood has a low salt tolerance (but better than Goodding willow) and needs to be very close to the water table to become established. It should be noted that even aged stand plantings, a common restoration technique due to limited funds and a short term planning strategy, do not provide any understory once trees are mature.

Propagation/Success

Trim lower branch "whip" cuttings from 2 to 6 year-old trees from November through January. Whips should be 0.5 to 2 inches in diameter. These whips are a limited resource in our area, and there are different cottonwood phenotypes that have radically different bloom times. Trim off all side branches/leaves and cut whips down to 12 inch lengths. Keep in water. Can be held for up to two weeks. Dip end in 0.1% IBA powder and push pole into 1 gallon pot about three-fourths of the way down. Firm soil around pole and keep very wet. Plant 20% over required quantity. We have an approximately 15% failure rate. Poles should root within three weeks. Leaf out depends on particular phenotype and occurs anytime from January to March. Fertilize with slow release fertilizer. We use Best Tabs 20-10-5. Ready to outplant by April 15th. This process has been accomplished successfully in the summer as well.

Goodding and Sandbar Willow

Goodding willow is a large tree originally found growing in mixed stands with Fremont cottonwood. Currently very limited on the reservation. Sandbar willow is a 15-foot-tall shrub, creating dense stands due to root suckering. It is a

great understory for a mature Goodding willow/cottonwood canopy.

Propagation/Success

Process is identical to Fremont Cottonwood, and takes place at the same time of year. Sandbar willow has an extremely high rooting rate from 1-year-old wood cuttings (in other words, >95%). Is IBA really necessary? We don't know but why risk it? Finding a source for cuttings is sometimes quite difficult. Over 30,000 Fremont cottonwood and Goodding and sandbar willow have been propagated at our nursery.

Propagation of Willow and Cottonwood from Seed

Goodding willow was successfully grown from seed in the summer 2000. Fresh seeds were mixed with damp sand and spread over a plug tray. Seedlings were transplanted when they had two true leaves. Ready to be outplanted the following spring.

Advantages/Disadvantages of Propagation from Seed

Advantages: Increased genetic diversity of a particular phenotype. Easy to propagate large numbers of seedlings. Ensured ratio of male to female trees. Disadvantages: Short seed viability. Longer grow out period. Seeding and transplanting takes place in the heat of the summer, a distinct disadvantage when it's 115 °F in the shade.

THE FUTURE:

Coming to an ecosystem near you...

Saltcedar and other noxious weeds will continue to spread. The natural flood regime will NOT be restored to the Lower Colorado River, thus ensuring ongoing revegetation efforts into perpetuity. Federal, State and Local governments and Tribal entities will continue with efforts at restoration/revegetation. Native plants will continue to increase in demand.

The Colorado River Indian Tribes will make a decision.

Because of the way that the 'Ahakhav Native Plant Nursery came about, almost as an afterthought, it has received very little support from the CRIT. All nursery expansions have been paid for from nursery profits, the Nursery Director position has no benefits, and equipment is limited. Early profits were based on highly inflated plant prices (attainable since we were buying the plants from

ourselves, or because we were the only available option to other organizations). The growth of the nursery has not gone unnoticed by other tribes and outside enterprises. The CRIT will soon have to make a decision. They will either fully recognize the 'Ahakhav Native Plant Nursery as an important and viable tribal enterprise and support it financially and politically, or increased competition from outside nurseries including competing tribal enterprises will make the nursery a losing financial proposition and it will not continue.

REFERENCES

journal articles dealing with the 'Ahakhav Tribal Preserve and Restoration work there.

- Anderson, B, Barrows, C. 1998. The Debate over Tamarisk. Restoration and Management Notes 16(2):129.
- Baker, Joe 2000. Environmental Recovery; Colorado River Indian Tribes. Native Peoples 14(1):56.
- Caylor, A. 2000. A Promise Long Deferred: Federal Reclamation on the Colorado River Indian Reservation. Pacific Historical Review 69(2):193.
- Phillips, F. 1998. The 'Ahakhav Tribal Preserve. Restoration and Management Notes. 16(2): 140.
- Thompson, J. W. 2000. Desert Passage. Landscape Architecture. 90(3): 56.

People doing work on Southwest riparian restoration.

- Julie Stromberg, Arizona State University. Many published pieces. Good information on natural regeneration of cottonwood/willow at the Nature Conservancy's Hassayampa River Preserve in Arizona.
- Contact Imperial and Cibola National Wildlife Refuges in Arizona, and the Bosque del Apache National Wildlife Refuge in New Mexico to learn about their ongoing restoration projects.
- Contact Dr. Bertin Anderson of Revegetation and Wildlife Management Center, Inc., 203 South Palm Drive, Blythe, CA 92225 (760) 922-2541. Dr. Anderson has been doing work in the Southwest for over 20 years. He is a bit prickly to deal with at times, but probably knows more than just about

anyone about southwest riparian restoration issues. Just resign yourself to getting some stories to go along with the facts you are looking for. Try looking up his journal articles first.

Further details on these and other plant protocols for the 'Ahakhav Native Plant Nursery can be found at the *Native Plants Journal* website hosted at the University of Idaho.

[http: / www.nativeplantnetwork.org](http://www.nativeplantnetwork.org).