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ARUNDO DONAX

Giant Reed Invades Southern Nevada

Maria Ryan
Area Extension Specialist

A giant reed is invading the rivers and streams of Southern Nevada. *Arundo donax,* or Giant Reed, is a tall, perennial reed-like grass (Poaceae family) that is used as a landscaping plant for shade, privacy, and a windbreak. Recently it has been found along riparian areas (areas along rivers and streams) outcompeting the native vegetation, altering the natural physical and biological processes of these riparian ecosystems, and forming pure stands of this invasive plant. *Arundo donax* threatens streams, rivers, and the habitats of animals that use these important areas.

History

Arundo is a genus of very tall reeds that resemble bamboo. Arundo species are native to tropical, subtropical, and warm temperate climates and *Arundo donax* is probably native to the Indian sub-continent. *Arundo donax*, the tallest of six species, was probably first introduced into the United States in California from Eastern Asia (Fornell 1990.) It has been widely cultivated around the world for centuries for a multitude of purposes, including measuring rods, walking sticks, fishing poles, musical instruments, baskets, mats, roof thatching, paper and recently, in the manufacturing of rayon for garments (Duke 1983.) It easily reproduces and has very high production rates which makes it a very useful plant throughout the year.

Arundo donax has been used as a folk medicine to treat dropsy and various other conditions (Duke and Wain 1981.) It has also been analyzed as a potential energy source because of its tremendous production potential (Duke 1983.) It has little use as livestock forage as its leaves mature quickly and become unpalatable quickly.

Biology

Arundo donax is a tall (6 to 30 feet), perennial reed that grows well in warm climates with wet soils. It reproduces mainly from its branching, knotty, thick rhizomes or roots. It has long (12 to 27 inches), broad, linear leaf blades and has two cultivated varieties that show variegations (striping) or are glaucous (bluish-gray.) Its stems are 3/4" to 1-1/2" wide, smooth and hollow with many nodes. It produces a tall, plume-like flower that is whitish brown or whitish with a purple hue (Hitchcock 1950.) Its seeds are most likely sterile.

Concerns

What concerns ecologists most about the spread of *Arundo donax* in Southern Nevada, is that the plant is very competitive and can crowd out native plants in their natural environments. Arundo quickly becomes the dominant plant species in riparian areas, replacing native plant communities of willows, cottonwoods and mesquite (*Salix, Populus, Prosopsis*) (Bell 1997). In a very short time, Arundo forms thick, dense monocultures (stands of only Arundo plants) and has displaced large percentages of the native riparian plant communities in California. For example, *Arundo donax* was estimated to dominate 68 percent of the riparian vegetation along the Santa Ana River (Douthit 1994). These stands of the Giant Reed have little or no value for wildlife species that are dependent on these riparian areas for protection, feeding, nesting, and burrowing habitat. There are a number of bird species of concern that are negatively affected by Arundo stands because they rely on native plant communities (Frandsen and Jackson 1994). *Arundo donax* uses large amounts of water causing reduced groundwater availability (Iverson 1994). The upright growth form of Arundo provides little shading and subsequent cooling of the in-stream habitats necessary for many native fish and invertebrate animals.

Arundo has enormous production potential (8000 lbs/ac.). The Giant Reed is highly flammable most of the year and may be adapted to extreme fires (Scott 1994). The high productivity rates and increased flammability throughout the year increases the probability of unseasonable and higher intensity fires. Arundo is adapted to fire in that it sprouts quickly after a fire and leaves little opportunity for the native plants to be established. This sets up the undesirable situation where Arundo outcompetes the native plants, then forms very thick stands of only *Arundo donax* plants (monoculture), decreasing overall biological diversity (Bell 1997).

These thick stands of Arundo that become established are alter the regular flows of the streams and rivers because of its very thick root masses that hold the banks and terraces more so than native plant communities. This inhibits the movement of the water and sediments that naturally move and change in the flood plain area and invertebrates. This decreases the chances for native populations to survive as well as decreases overall biological diversity.

Control

An integrated approach that considers use and efficacy of mechanical, chemical, and biological control is best when determining timing and methods. It is important to consider the density of the *Arundo donax* plants in a given area as well as the presence or absence of desired native plants. Age of the Arundo and its height are important as well as the terrain and season (Bell 1997).

Since *Arundo donax* can reproduce from pieces of roots and stem nodes, it is important to consider that any mechanical methods of removal might cause more plants to appear with stem and root material that is dropped or left behind. Mechanical removal is an effective way to begin control of very large, solid stands of Arundo. Harvesting or chopping to remove large vegetation is appropriate if the material will not present a threat of debris-damming downstream and if the material can be removed or burned. Chipping of cut material presents a problem of regrowth from broken stems and roots and is not recommended. Subsequent application of herbicides after the cut material has been removed is most effective after about three to six weeks so the plants have a chance to regrow to about three feet in height.

The most effective herbicide treatment on the market today is Rodeo® (glyphosate), as it is the only herbicide that is labeled for use in wetland and aquatic areas. However, this systemic herbicide that translocates to the roots is labeled for control of both monocots (grasses like *Arundo donax*) and dicots (broadleaf plants). Care should be used and the herbicide targeted only at Arundo plants, unless there are other undesirable plants in the area such as Tamarix species. Other herbicides are available that will target grass species, however they are currently not labeled for use in wetland areas.

The most effective treatment using Rodeo® is by foliar application of a two-to-five percent (2-5%) solution that is applied after flowering and before dormancy (Monsanto 1989), which is the time when the plants are actively moving nutrients into their roots to prepare for winter. A preliminary trial on the Santa Margarita River in California resulted in an almost 100 percent control (Omori 1996).

Another method is the cut stem treatment that requires mechanical removal of the top portion of the plant followed by herbicide application within one or two minutes of the cutting to ensure adequate uptake of the chemical (Monsanto 1989). This method is most effective after flowering and is highly effective, but is labor intensive and the cut stem pieces that are left behind can regrow.

Summary

The giant reed *Arundo donax* is a non-native plant to the United States and has invaded many rivers and streams in California and now Southern Nevada. This plant is very aggressive and can easily outcompete the native, more desirable plants that live along these waterways. *Arundo donax* forms dense stands that are highly flammable with roots systems that can change the natural water course and affect the ecological balance of these riparian systems. It spreads quickly through a tremendous root system that can resprout from a small piece of root or stem. These stands crowd out all desirable vegetation and provide little useful habitat for the native animals, birds and fishes that make these river systems home for at least part of their life cycle. The most effective control of *Arundo donax* is by application of herbicide after flowering and before dormancy. *Arundo donax* must be controlled in Southern Nevada as it poses a serious threat to the physical and biological functioning of our riparian ecosystems.

Photographs courtesy of J. Giessow, Santa Margarita and San Luis Rey Weed Management Area

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