

Noxious Weeds of Nebraska

Saltcedar

Robert Wilson and Stevan Knezevic, Extension Weed Specialists



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Saltcedar

Saltcedar [*Tamarix ramosissima* Ledeb.] and small flower Tamarix [*Tamarix parviflora* DC.] are the newest plant species defined by Nebraska law as noxious weeds. At least nine other states have declared by law that saltcedar is a noxious weed and poses a threat to the economic, social and aesthetic well-being of their residents. In the United States saltcedar is estimated to infest over 1 million acres.

Once saltcedar becomes established, it may impact the local environment in at least four ways:

- 1) It can increase the salinity of the soil which reduces the productivity of native plants and results in the loss of natural habitat.

History

Saltcedar is thought to have been brought from southeastern Europe and eastern Asia into the United States in the mid-1800s for use in landscape plantings and windbreaks and for stabilizing stream banks. Saltcedar is still sold as an ornamental in some areas and can be seen growing in Nebraska lawns. By the late 1800s saltcedar was spreading from its original plantings and started to become an unwanted invasive species in the southwestern United States, especially along the Pecos and Colorado rivers.

- 2) Depending on its density, saltcedar can utilize soil water to such an extent that it may dry up streams and reduce water levels of rivers and lakes.
- 3) As saltcedar plants mature in late summer, leaves and branches dry, increasing the risk of wildfires.
- 4) Dense stands of saltcedar can increase the chance of flooding during high intensity rainfall by impeding stream flow.

Because of the invasive nature of saltcedar, it often replaces willows, cottonwoods and other native vegetation along streams and wetlands. The flowers of

saltcedar can provide a source of pollen and nectar for insects, while some birds will utilize the tree for nesting. However, saltcedar seeds and leaves are not suitable for many browsing animals, causing a detrimental impact on many types of wildlife in riparian habitats.

There is some confusion on the classification of the different species of saltcedar. *Tamarix aphylla* is an evergreen tree that generally does not sexually reproduce in this climate and is not considered invasive. Two other species — small flower tamarisk and saltcedar — spread both by seed and vegetative structures.

Biology

Saltcedar, a member of the Tamaricaceae family, is classified either as a deciduous shrub or small tree that grows along streams or wetlands. It reproduces from seed and by spreading root sprouts or stem fragments. Saltcedar has distinctive small pink to white flowers which appear from late June through August (Figure 1). Seeds are about 1/25 inch in diameter and are contained in a small capsule with a tuft of hair (Figure 2). Seeds can be dispersed by wind and water. Seed viability usually lasts less than a year. Once seeds take up water, they can germinate in one day. After germination, the plant roots must come in contact with moist soil or the seedling will die. It is common for seeds to fall into a stream, float, germinate and then collect along and become rooted in the stream or lake bank.

In dry years, as the water table declines and the stream or lake becomes smaller, saltcedar plants of different ages can be seen growing along the banks



Figure 1. Flowers are small and range in color from white to pink.

(Figure 3). Typically, older plants are found at the high water mark because their long roots can access water from deeper depths while younger plants will be growing closer to the water's edge. Seedlings can grow rapidly, up to 12 inches a month, and flower during the first growing season. Once established, seedlings are tolerant to submergence, salts, drought and fire.

Saltcedar is semi-deciduous with multiple stems rising from the base of



Figure 2. Saltcedar seeds are contained in a small capsule with a tuft of hair which aids in the wind dispersal of seeds.



Figure 3. Saltcedar seeds can germinate in water and accumulate along streambanks or lakes and as the water level declines, a strip of plants can remain along the bank.

the tree (see life cycle, *Figure 12*). A mature tree can reach 25 feet in height, produce over 500,000 seeds and live for more than 75 years (*Figure 4*). The leaves of saltcedar appear as tiny scales, awl-like, and are green in color (*Figure 5*). Branches are numerous, reddish brown, and can grow rapidly during the summer. Roots generally will grow as rapidly as stems (*Figure 6*) with the



Figure 4. Saltcedar trees have multiple stems arising from the plant base and mature trees can reach 25 feet in height.



Figure 5. Saltcedar leaves appear as tiny scales or awl-like leaves that are green in color.



Figure 6. Saltcedar roots can penetrate the soil to depths of 20 to 30 feet.

primary taproot growing to a depth of 30 feet in search of moisture. Once the water table is reached, secondary root branching becomes profuse, allowing roots to extract water and salts from both saturated and unsaturated soils. Salts are translocated with water to the leaves and as water evaporates, salts form deposits on the surface of the leaves. Rain and leaf drop in the fall deposit these salts under the drip-line of the shrub. The increased salinity under the tree reduces the survival and growth of grasses and other desirable plants.

Since saltcedar can extract water deeper in the soil than willows and cottonwoods, it has a competitive advantage. As saltcedar density increases, the amount of water used per unit area also increases and may cause a reduction of ground-water levels. A mature tree can use up to 200 gallons of water per day. Saltcedar transpiration rates are similar to cottonwood, willow and Russian Olive. One acre of saltcedar-infested river bank has been estimated to use 4 acre feet of water per year.

Identification

Saltcedar is easily identified in mid summer during the flowering period. The tree will be covered with pinkish to white flowers in clusters 1 to 1.5 inches long and will stand out compared to other trees and shrubs (*Figure 1*). Saltcedar has alternate pale green leaves

that are less than 1/16 inch long and appear scalelike (*Figure 7*). Saltcedar leaves turn yellow in the fall and drop to the soil surface during winter. The branches of saltcedar are reddish brown but may turn white when coated with salt deposits.



Figure 7. Comparison of saltcedar leaves on the left and western red cedar leaves on the right.

Control Methods

Saltcedar can be managed through a combination of cultural, mechanical, biological and chemical control methods. The most sustainable management programs integrate several methods. Infested areas must be identified and mapped. Treatments should begin early, preferably before the weed has a chance to increase in density. Once treatments have been initiated, land managers need to be diligent and recheck treated areas for several months to monitor plant regrowth or new seedling development.

Cultural

Cultural treatments such as fire and flooding have been used to suppress saltcedar. Unfortunately, saltcedar is somewhat fire-adapted and even though topgrowth can be destroyed by fire, plants quickly resprout and topgrowth is regenerated, requiring additional control methods. However, fire can be used to remove taller trees and herbicides can

be used to treat the resprouts. Fire also can be used to remove the dead biomass a year or two after successful chemical treatment, as part of site preparation for revegetation.

Flooding has been used to control saltcedar seedlings growing in flood plains; however, the duration of flooding required for control is not well understood. Some studies have shown that submerging root crowns for three months reduced saltcedar density. Other studies have shown that plants submerged for 24 months were killed.

Mechanical

It is difficult to control saltcedar solely with mechanical techniques because of saltcedar's ability to resprout from roots. In the seedling stage, saltcedar can be hand pulled from the soil, which is fairly effective if most of the root is removed. On larger plants, root plowing with a fin-shaped blade at a depth of 14 to 25 inches

can bring roots to the surface where they can desiccate and die. Because not all roots are brought to the surface, resprouting can still occur. Bulldozing followed by root plowing is generally considered more effective than plowing alone. Both methods are energy intensive and expensive and destroy other vegetation.

Mechanical methods can be used effectively when followed by chemical



Figure 8. Utilizing goats to feed on saltcedar in an integrated control program.



Figure 9. Control of saltcedar one year after treatment with the herbicide Habitat.



Figure 10. Saltcedar control utilizing the cut-stump method.

control. For example, larger trees (over 10 feet tall) can be cut, while the shorter ones (less than 6 feet tall) can be mowed, and then new sprouts can be treated with herbicides as part of broadcast or spot spraying.

Biological

Biological control is the use of natural enemies to reduce weed populations to economically acceptable levels. Grazing by cattle, goats or insects reduces above ground biomass of saltcedar plants. For example, goats are well-known browsers with diets consisting of up to 70 percent non-grassy species. Concentrating goats on patches of saltcedar and intensively grazing the plants during the growing season can reduce topgrowth (Figure 8). Goats can effectively defoliate bottom branches and strip bark from branches and trunks; however, grazing does not directly affect saltcedar roots. This method must be combined with other control methods (i.e. herbicides) since saltcedar can recover 70 percent of the original biomass within a year.

Goats help suppress many plant species, including several noxious weeds (eg. leafy spurge, thistles, shorter redcedar) and can be an effective component in an integrated weed management program. Important factors in managing goats include the use of appropriate stocking rates, quality fencing and protection from predators. For more information on use of goats visit the ATTRA — National Sustainable Agriculture Information Service Web site and the page “Goats: Sustainable Production Overview,

Livestock Production Guide” at <http://www.attra.org/attra-pub/goatoverview.html>.

Studies are underway to identify insects that will feed on saltcedar but not harm surrounding beneficial plants. The most promising insect identified so far is the saltcedar leaf beetle (*Diorhabda elongata*), which has been released on a trial basis in several southern and western states (Texas, Nebraska, New Mexico and Colorado). The leaf beetle feeds on saltcedar leaves and partially defoliates the plant. However, plants can recover when the insect is not active, suggesting that this method should be combined with other control methods.

Chemical

Herbicides are an important component of any integrated management program for saltcedar control. Depending on the application method and herbicide, chemical control can be time consuming and expensive, especially when used on denser saltcedar infestations or large tracts of land. Effectiveness also varies depending on tree size and herbicide.

Herbicide application should be timed toward the later part of the growing season. Treatments in August or September are much more effective than treatments in May, June or October. Broadcast treatments can be done using

Distribution

Saltcedar is officially listed as a noxious weed in at least nine states. Saltcedar can be found along the North Platte River in western Nebraska, the Missouri River in northeast Nebraska and the Republican River in the southern part of the state. It is estimated to infest over 13,000 acres (Figure 11).

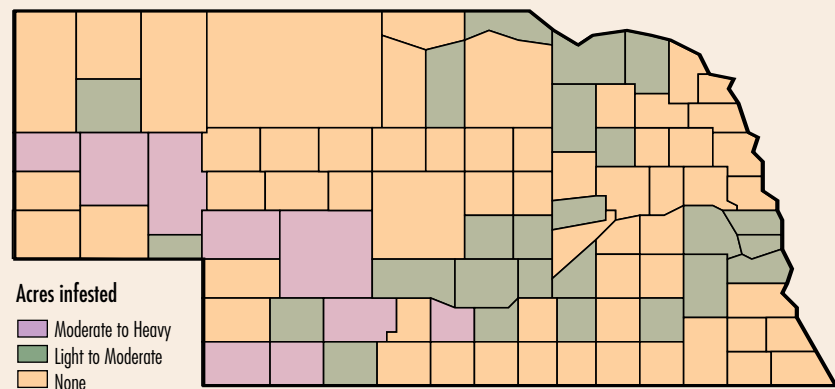
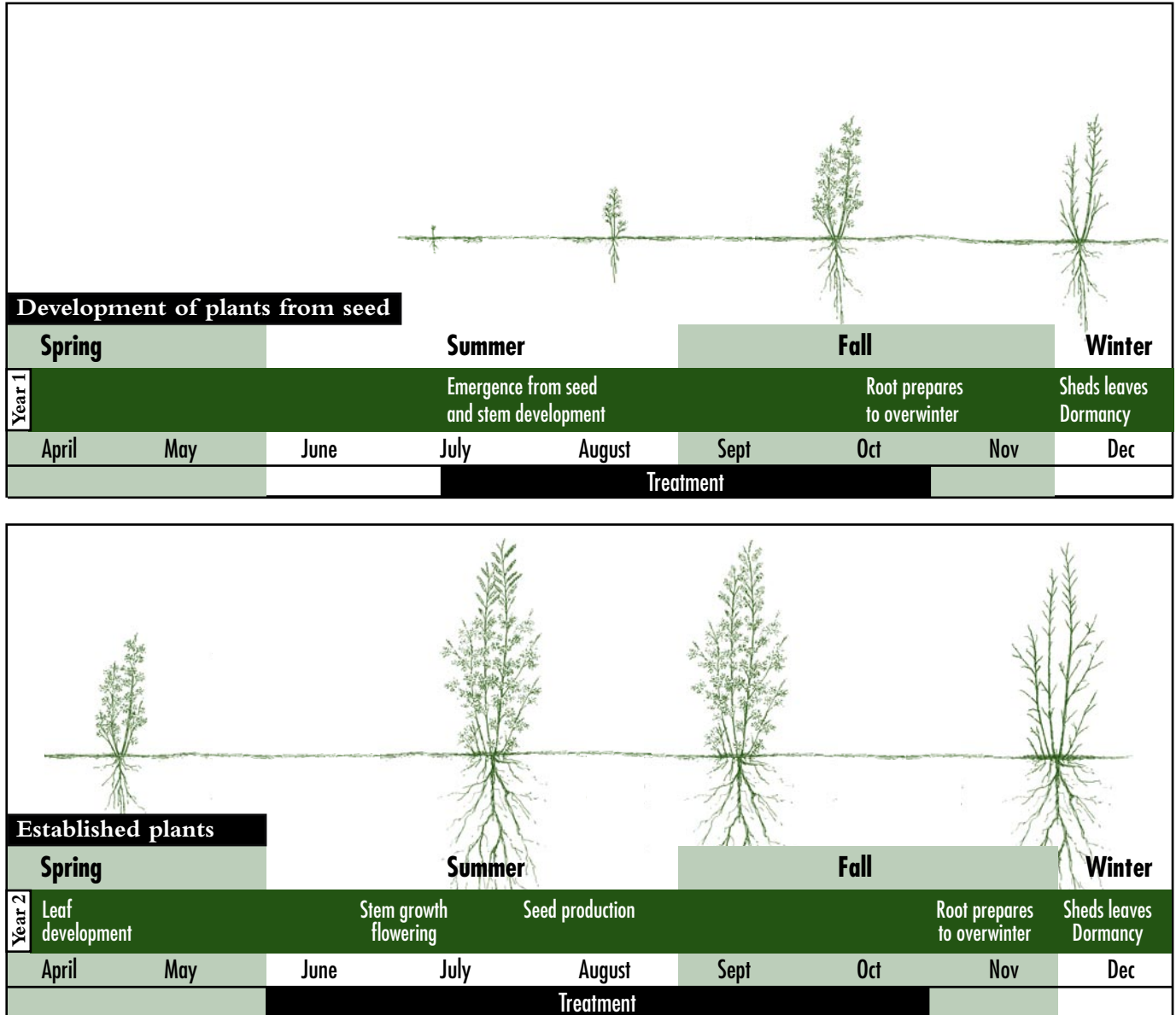


Figure 11. Distribution of saltcedar in Nebraska in 2006.

Figure 12. Perennial life cycle of saltcedar in Nebraska.



airplanes, helicopters or high-clearance sprayers. Increase spray volume for better penetration and coverage of foliage. Using a global positioning spray system matched with survey maps allows applicators to locate saltcedar sites and exclude sensitive areas such as cottonwood groves and other desirable vegetation.

Several herbicides are effective at controlling saltcedar (Table 1). Habitat, which contains the active ingredient imazapyr, can be sprayed on actively growing foliage during the flowering stage at a rate of 2 quarts per acre, with the addition of 0.25 percent v/v of nonionic surfactant (NIS). A 1 percent

solution of Habitat plus surfactant can be used for spot spraying. Spray Habitat to completely wet foliage. The herbicide solution must be applied in a manner to evenly cover all saltcedar foliage, or regrowth may occur the year after treatment (Figure 9). Wait at least two years before disturbing treated plants. Care should be taken to not apply Habitat near water that will be used for irrigation. Habitat also will injure or kill vegetation growing under or near saltcedar trees for several years after treatment. Any saltcedar management plan needs to be designed to revegetate treated areas after saltcedar has been controlled.

The cut-stump/herbicide method involves cutting saltcedar as close to the soil surface as possible, then applying the herbicide Garlon 4 (active ingredient — triclopyr) in a mixture with basal spray oil (one part Garlon to two parts spray oil) to the stump. The Garlon-spray oil mixture should be sprayed on the fresh cut stump, collar area and side of stump until it is thoroughly wet (Figure 10). The cut-stump method is effective for treating isolated plants or small infestations and can be used to avoid injury to desirable grassy vegetation.

Both Habitat and Garlon have aquatic labels, which means they are

Table I.

Herbicide treatments for saltcedar control.

Herbicide	Rate/acre	Time of Treatment	Notes
Garlon 3A	5 pt	Late summer or early fall	Do not apply near irrigation ditches or water for domestic use. Do not disturb areas after they have been sprayed with Habitat.
Habitat	4 pt (broadcast)		
Habitat	1% (spot spray)		
Habitat ¹	2 pt		
+ glyphosate*	1 qt		
Garlon 4/Remedy	33% (spot spray)	Basal treatment. Apply directly to 18-inch length of lower trunk or fresh cut stump.	

¹This tank mix is not supported by BASF

*Glyphosate rates provided on this page are based on a 4 lb ai or 3 lb ae formulation.

Note: Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by UNL Extension is implied.

approved for use in riparian areas near streams, lakes and wetlands. Please read the herbicide label before using any herbicide to ensure that all label restrictions are followed carefully. Herbicide information on control of troublesome plant species, including saltcedar, is updated annually in the *Guide for Weed Management in Nebraska* (EC130).

Saltcedar is difficult to control using a single control method; however, herbicides seem essential and the best option for control. If mechanical, cultural and biological methods are implemented in a systematic manner, significant advances in saltcedar control can be achieved. Develop a site specific control program and adhere to it. Persistence is the key

to successful control. Recheck treated areas regularly for the appearance of new seedlings and resprouting plants. Plan to introduce desirable competitive plant species into treated areas to provide ground cover as saltcedar is controlled. Otherwise different noxious or invasive weeds may infest the land if left to revegetate on its own.

A Message From the Nebraska Department of Agriculture

The State of Nebraska has had a noxious weed law for many years. Over the years, the Nebraska Legislature has revised this law.

The term “noxious” means to be harmful or destructive. In its current usage “noxious” is a legal term used to denote a destructive or harmful pest for purposes of regulation. When a specific pest (in this case, a weed) is determined to pose a serious threat to the economic, social, or aesthetic well-being of the residents of the state, it may be declared noxious.

Noxious weeds compete with crops, rangeland and pastures, reducing yields substantially. Some noxious weeds are directly poisonous or injurious to man, livestock and wildlife. The losses from noxious weed infestations can be staggering, costing residents millions of dollars due to lost production. This not only directly affects the landowner, but erodes the tax base for all residents of the state. The control of noxious weeds is everyone’s concern and their control is to everyone’s benefit. The support of all individuals within the state is needed and vital for the control of noxious weeds within Nebraska.

It is the duty of each person who owns or controls land in Nebraska to effectively control noxious weeds on their land. County boards or control authorities are responsible for administration of noxious weed control laws at the county level. This system provides the citizens of Nebraska with “local control.” Each county is required to implement a coordinated noxious weed program. When landowners fail to control

noxious weeds on their property, the county can serve them with a notice to comply. This notice gives specific instructions and methods on when and how certain noxious weeds are to be controlled.

The Director of Agriculture determines which plants are to be deemed as “noxious” and the control measures to be used in preventing their spread. In Nebraska, the following weeds have been designated as noxious:

- Canada thistle (*Cirsium arvense* (L.) Scop.)
- Leafy spurge (*Euphorbia esula* L.)
- Musk thistle (*Carduus nutans* L.)
- Plumeless thistle (*Carduus acanthoides* L.)
- Purple loosestrife (*Lythrum salicaria* L. and *L. virgatum* — including any cultivars and hybrids)
- Knapweed (spotted and diffuse) (*Centaurea maculosa* Lam. and *C. diffusa* Lam.)
- Saltcedar (*Tamarix ramosissima* Ledeb.) and small flower Tamarix (*Tamarix parviflora* DC.)

Whether farmer or rancher, landowner or landscaper, it’s everyone’s responsibility and everyone’s benefit to aid in controlling these noxious weeds. If you have questions or concerns regarding noxious weeds in Nebraska, please contact your local county noxious weed control authority or the Nebraska Department of Agriculture.



Illustration by Gary Goodding.

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