

Management and restoration of areas infested with Russian thistle and Kochia in southern New Mexico

Mark J. Renz
New Mexico State University
Extension Weed Specialist

Russian thistle (*Salsola tragus*), barbwire Russian thistle (*Salsola paulsenii*), spineless Russian thistle (*Salsola collinea*) and kochia (*Kochia scoparia*) are common annual broadleaf weeds found in the southwestern United States. These plants can be problematic in a wide range of areas, including agricultural, roadside, pastures, urban, and residential areas. They pose several threats to land owners, including increased fire hazard, harboring harmful insects and pathogens, and competing with desirable plants for limiting resources. Russian thistle and kochia thrive in areas of high disturbance and are common along roadsides, construction sites, and other areas where soil is frequently disturbed. Prevention or reduction of disturbance is critical in preventing establishment of these weeds!

These plants germinate in the spring through the summer and can produce thousands of seeds per plant. Not all seeds in the soil germinate every year; consequently management of infested areas needs to continue until the seeds present in the soil have been depleted. The seeds from these plants are also transported long distances by seeds contained in shoots that are blown and tumble across the land (tumbleweeds). This source of seed also needs to be eliminated to prevent reinvasion. Revegetating areas with desirable species that are well adapted to the area can improve success dramatically and is recommended. Various management techniques are discussed below followed by revegetation methods that can be incorporated in conjunction with weed management.

MANAGEMENT

Several management practices are available for these species. If populations are intensively managed for 2-3 years where no seed production occurs local eradication can result. Several mechanical methods are effective in controlling these plants as they do not have perennial tissue that will resprout. Mowing can be effective on smaller plants, if all above ground tissue is removed. Tillage, hand hoeing, or any other method that disrupts the contact between the plant roots and soil is also effective at controlling both seedling and larger plants. Both Russian thistle and kochia can also be controlled by grazing animals on the plants if they are young. Care must be taken to supplement the diet of animals if these plants are the sole source of forage in the area or poisoning may result. Several herbicides are available that can successfully manage these plants. Pre-emergent herbicides (applied BEFORE the seedlings emerge) can provide season long control of these weeds if applied before plants germinate. Post-emergent applications (applied AFTER the seedlings emerge) are also effective, but applications should be made when plants are small (< 4 inches in diameter) for effective control. Often pre and post-emergent herbicides are mixed together to provide control of established weeds and continual control of repeated flushes of seed germination later in the season. Table 1 provides a brief summary of effective herbicides for Russian thistle and kochia control available to the homeowner. Consult the label for application rates and restrictions.

Table 1. Common homeowner herbicides that are effective in controlling Russian thistle and kochia.

Active Ingredient	Product	Herbicide type	Comments ¹
2,4-D	MANY	Post-emergent	Selective herbicide Soil activity for days
Dicamba	Banvel, Clarity	Post-emergent	Selective herbicide Soil activity for days
Glyphosate	MANY	Post-emergent	Nonselective No soil activity
Triclopyr	Garlon 3A	Post-emergent	Selective herbicide Soil activity for weeks
Isoxaben	Snapshot	Pre-emergent	Selective herbicide Soil activity for months
Oryzalin	Surflan	Pre-emergent	Nonselective Soil activity for weeks to months
Pendimethalin	Prowl, Pendulum	Pre-emergent	Nonselective herbicide Soil activity for weeks to months
Trifluralin	Preen, Treflan	Pre-emergent	Nonselective herbicide Soil activity for weeks to months

REVEGETATION

While control of existing undesirable plants is typically the initial reason for management, the long-term goal of minimizing or even eliminating the need to manage these plants is often the desired result. This can be accomplished by creating a plant community/environment that is resistant to invasion by these plants. This can be very difficult and expensive to do, especially in the southwestern United States where weather and precipitation are highly variable. Below several important concepts are highlighted to help increase the success of revegetation programs.

Site evaluation

Before initiating any revegetation project a site evaluation is necessary. Each site tends to be unique and vary widely in environmental characteristics. Soil type, soil fertility, current plant species present, depth to groundwater, historical precipitation amount, and timing of predominant precipitation should all be documented before beginning any revegetation project. Knowledge of this information will help in the selection of appropriate species. Information on soil properties and available water are usually the two most important issues that need to be considered when selecting species for any revegetation effort.

Planting methods

Many aspects should be considered before planting such as time of year, planting method, and availability of water for irrigation. If possible selection of plant species that are locally adapted to the growing conditions are preferred as they will have a better chance of survival. Plants can be established from direct seeding or from containers. Containers of plants typically have higher survival rates if planted in the fall, especially in lower elevations as this timing provides excellent growing conditions for root growth and establishment. Species can be

¹ The soil persistence of herbicides can vary to due the rate applied, soil type, soil moisture as well as a host of other environmental conditions. The range presented is an average of how long the herbicide will persist, but large variations can occur.

planted at other times, but will have higher mortality rates, unless intensively irrigated. The majority of the revegetation projects for Russian thistle and kochia directly seed desirable species as these plants tend to be better competitors. Reseeding efforts should be timed to take advantage of anticipated summer rains. Several techniques for plants can be utilized including drilling, broadcasting, and hydro-mulching. Whichever method is selected, it is critical to incorporate the seed into the soil. This will protect it from predation, being blown off site, and desiccation. Seeding rates vary between sites and species, but typically range between 1-2 lbs/A (20-40 lbs/1000 ft²). Utilizing a range of plant species in your seed mix is recommended as specific environmental microclimates may benefit one species over another and allow for establishment of plants throughout the area. A wide range of species are available, see table 2 for a partial list recommended for New Mexico. For more detailed information of plant species in your area, contact your local NRCS office.

Irrigation

Water is essential for the establishment of plants. Species selection is critical if supplemental water will not be provided throughout the life of the plant. Timing plantings with traditional rainfall patterns will reduce the potential requirement of irrigation, but if adequate rainfall does not occur, additional water will be required to establish plants.

Containers of plants should be watered at the time of installation. Successful establishment of these plants will require several irrigations depending on the size, soil moisture conditions, and watering method. In the arid southwest when irrigating, a large quantity of water must be used to wet the soil deep into the profile. This will promote deep root development, which will allow this plant to survive during the summer months. Watering will also promote weed growth and these weeds need to be removed to allow these plants to establish and grow. Several methods are available to suppress growth with containerized plants including mulching, mechanical methods, hand removal, and herbicides.

Reseeding efforts should be timed to take advantage of anticipated summer rains. Early planting will greatly reduce effectiveness unless irrigated. Irrigation can be utilized to enhance establishment of species, as water is typically the limiting resource, but populations may decline to lower densities if irrigation is not continued. Areas can be irrigated by drip, sprinkle or even flood irrigation and successfully establish.

Effect of weed competition on revegetation

Establishing desirable plant species can be difficult as they will likely compete directly with weeds for sunlight and water. Management of these species needs to continue until the desired plants have fully established and have a competitive advantage. Since Russian thistle and kochia seeds do not survive long in the soil, it is recommended to continue to manage these weeds for 2-3 years after establishment. If a large-scale revegetation project is being conducted, consider establishing desirable grasses into the area first. Grass species are very competitive and allow for selective management methods like mowing or specific herbicides (e.g. 2,4-D) that do not harm grasses. These methods, if used correctly, will control the tumbleweeds while not harming the grasses. If these methods are used for several years, weed populations will dramatically decline. Then other species (wildflowers, shrubs, trees) can be planted into the landscape. If all species are planted into the landscape at the same time it prevents large-scale management of the weeds in the future as unacceptable injury of desirable species results. After

several years, desirable plants die from direct competition from tumbleweeds and return to pretreatment conditions.

Table 2. Species recommended for use in revegetation in New Mexico.

Common name	Scientific name	Cultivar	Type of plant
Blue grama	<i>Bouteloua gracilis</i>	Hachita / Lovington	Grass
Indian ricegrass	<i>Achnatherum hymenoides</i>	Paloma	Grass
Alkali sacaton	<i>Sporobolus airoides</i>	Salado	Grass
Sideoats grama	<i>Bouteloua curtipendula</i>	Vaughn / Niner	Grass
Gaeta (grass)	<i>Pleuraphis jamesii</i>	Viva	Grass
Western wheatgrass	<i>Elymus smithii</i>	Arriba	Grass
Cane bluestem	<i>Bouteloua barbinodis</i>		Grass
Black grama	<i>Bouteloua eriopoda</i>	Nogal	Grass
Purple threeawn	<i>Aristida purpurea</i>		Grass
Green sprangletop	<i>Leptochloa dubia</i>		Grass
Plains bristlegrass	<i>Setaria leucopila</i>		Grass
Needle grama	<i>Bouteloua aristidoides</i>		Grass
Rothrock's grama	<i>Bouteloua rothrockii</i>		Grass
Longleaf squirreltail	<i>Elymus longifolius</i>		Grass
Sand dropseed	<i>Sporobolus cryptandrus</i>		Grass
Four-wing saltbush	<i>Atriplex canescens</i>		Shrub
Honey mesquite	<i>Prosopis glandulosa</i>		Shrub
Desert-willow	<i>Chilopsis linearis</i>		Shrub
Rubber rabbitbrush	<i>Ericameria nauseosus</i>		Shrub
Apache Plume	<i>Fallugia paradoxa</i>		Shrub
False indigo-bush	<i>Amorpha fruticosa</i>		Shrub
Wolfberry	<i>Lycium spp.</i>		Shrub
Desert marigold	<i>Baileya multiradiata</i>		Wildflower
Chocolate flower	<i>Berlandiera lyrata</i>		Wildflower
Mexican poppy	<i>Eschscholtzia californica</i> <i>subsp. Mexicana</i>		Wildflower
Firewheel	<i>Gaillardia pulchella</i>		Wildflower
Prairie flax	<i>Linum lewisii</i>	Appar	Wildflower
Palmer's beardtongue	<i>Penstemon palmeri</i>		Wildflower
Rocky Mt. Beardtongue	<i>Penstemon strictus</i>		Wildflower
Mexican-hat	<i>Ratibida columnifera</i>		Wildflower
Plains zinnia	<i>Zinnia grandiflora</i>	Bandera	Wildflower
wooly paper-flower	<i>Psilostrophe tagetina</i>		Wildflower
Purple aster	<i>Symphyotrichum adscendens</i>		Wildflower
Tufted evening primrose	<i>Oenothera caespitosa</i>		Wildflower
Thurber's beardtongue	<i>Penstemon thurberi</i>		Wildflower