
RUSSIAN THISTLE

Integrated Pest Management for Professional Horticulturalists and Home Gardeners

Russian thistle, also known as tumbleweed, is in the goosefoot family (Chenopodiaceae). Its scientific name is *Salsola tragus*, but it also has been known as *S. iberica*, *S. kali*, and *S. australis*. It is a summer annual native to southeastern Russia and western Siberia and was first introduced into the United States in 1873 by Russian immigrants as a contaminant in flax seed in South Dakota. After its introduction, it spread by contaminated seed, threshing crews, railroad cars (especially livestock cars), and by its windblown pattern of seed dissemination. In 1895 Russian thistle moved to the Pacific Coast in contaminated railroad cars that transported cattle to Lancaster in California's Antelope Valley. Today it is common throughout the western United States and is particularly well adapted to California's climate of winter rainfall and summer drought.

Russian thistle is primarily a weed in sites where the soil has been disturbed, such as along highways. It is also prevalent in vacant lots and other noncrop areas, in field and vegetable crops, and in poorly tended landscapes. It is rarely a problem in well-managed gardens or turfgrass.

IDENTIFICATION

Russian thistle is a bushy summer annual with numerous slender ascending stems that become quite woody at maturity (Fig. 1). Stems vary from 8 to 36 inches in length and usually have reddish to purplish stripes. Seedlings have very finely dissected leaves that almost look like pine needles. Leaves of young plants are fleshy, dark green, narrow, and about 1 inch in length. Young plants are suitable for livestock forage and are sometimes grazed. As the plant

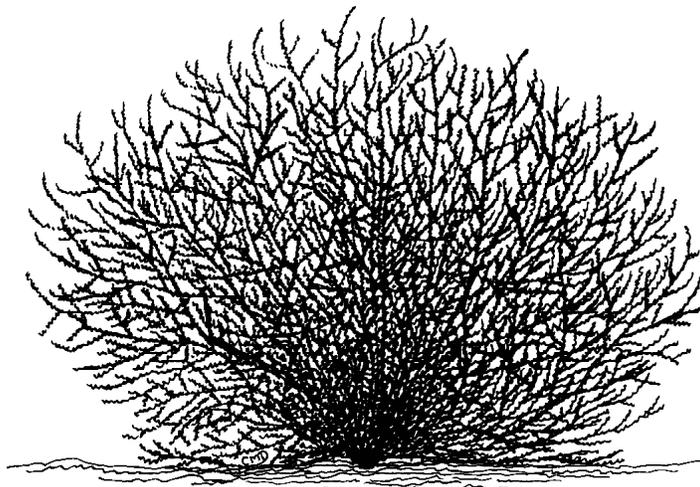


Figure 1. Russian thistle.

matures in July to October the older leaves are short and stiff with a sharp-pointed tip. The single, inconspicuous flowers lack petals and are borne in most leaf axils above a pair of small spine-tipped bracts. The bracts and spiny leaves prevent predation by herbivores as the plant nears maturity. The overall shape of the plant becomes oval to round and may attain a diameter of 18 inches to 6 feet at maturity. After the plant dries, the base of the stem becomes brittle and breaks off at soil level in fall and early winter. These round, thorny plants are capable of dispersing seed for miles as they tumble along in the wind.

IMPACT

In late fall and early winter, this troublesome pest becomes conspicuous as it breaks from the soil and is blown across highways and fields. Although Russian thistle, or tumbleweed, conjures up images of the old west, it can be a serious weed pest. In agricultural

areas, Russian thistle can reduce yield and quality of numerous crops, particularly alfalfa and small grains. It depletes soil moisture, interferes with tillage operations, and serves as a shelter or food source to many insects, vertebrate pests, and crop diseases. Russian thistle can also threaten native plant ecosystems. Large plants can reduce highway safety by obstructing views along right-of-ways and causing drivers to swerve their cars in an attempt to avoid colliding with wind-blown plants. In many areas, plants accumulate along tree rows and fence lines, posing a serious fire hazard that necessitates hours of manual labor for cleanup and disposal. It has been reported that prairie wildfires can spread rapidly when ignited balls of burning Russian thistle blow through grasslands. Russian thistle is a major problem along the California aqueduct where it can interfere with water delivery and pumping systems. Many people are sensitive to Russian thistle



Figure 2. Leaves on young plant.

and exhibit skin rashes and allergic reactions after exposure to the plant. A slight scratch or abrasion from the plant may result in itching or reddened patches of skin. The windblown pollen of Russian thistle can cause an allergic reaction in people during summer.

BIOLOGY

The Russian thistle seed is a naked, coiled embryo that begins to uncoil when it is exposed to the proper temperature (52° to 90°F) and moisture conditions. As it uncoils, the taproot extends into the soil within about 12 hours, making the germination period quite rapid and giving Russian thistle a decided advantage under limited moisture conditions. A minimum amount of moisture, lasting only a few hours, will allow germination and root growth to deeper, subsurface moisture.

Russian thistle normally will not germinate successfully in firm soil: the soil in the site must be loose. Likely sites for germination include vacant lots, abandoned gardens and agricultural fields, roadsides, fence lines—any open site with loosened soil. Germination normally occurs in late winter or early spring when the seed can take advantage of winter moisture. Seed viability is rapidly lost in soil. Over 90% of the seed either germinate or decay in the soil during the first year.

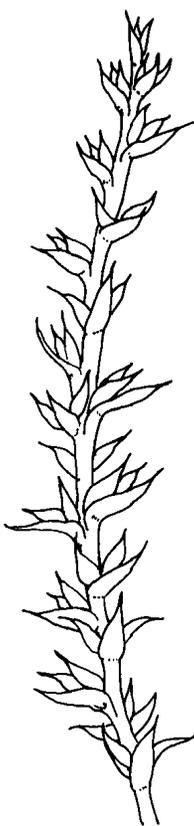


Figure 3. Leaves on mature plant.

Russian thistle is extremely drought tolerant. The taproot can extend several feet into the soil to reach subsurface moisture. Early leaves are linear and fleshy (Fig. 2), much like pine needles, but as the plant matures, later leaves are short and spiny and much more capable of conserving moisture (Fig. 3). Russian thistle normally matures in late summer. An abscission layer forms in the stem near the soil surface that allows the shoot to break off from the taproot in fall and early winter. The seed (Fig. 4) is spread when mature plants are blown along by the wind. A large Russian thistle plant may produce more than 200,000 seed. In spring, months after their dissemination, it is possible to trace the paths of tumbleweeds across plowed fields by the green trails of germinating Russian thistle seedlings.

Russian thistle can tolerate alkaline soil conditions. It is very competitive when

moisture is a limiting factor to the growth of other vegetation, when soils are disturbed, or when competing vegetation is suppressed by overgrazing or poor crop establishment. If moisture is not limiting, Russian thistle is less competitive with other species. Seedlings of Russian thistle (Fig. 5) are suppressed when other plants become established first and shade out the sunlight.

MANAGEMENT

Control of Russian thistle is difficult. There have been numerous attempts through the years to import biological control agents, but none have been successful. Normally the best place to look for a biological control agent is the native habitat of the species. Unfortunately, Russian thistle's native habitat is thought to be at the site of major military installations in Russia. Until recently, it was impossible to collect potential biological control organisms in these areas.

Management in the Home Landscape

Cultural control practices such as mowing or destroying young plants can prevent seed production. Avoid discing or loosening the soil in abandoned areas because loose soil is necessary for Russian thistle germination. Burning is sometimes used to destroy accumulated Russian thistle plants. While this may eliminate the accumulated organic debris and some seed, much of the seed will already have been disseminated. Planting competitive, more desirable species can be an effective method of preventing Russian thistle establishment in most noncrop environments. Russian thistle competes poorly in situations with firm, regularly irrigated soil, and it is rarely a problem in managed gardens, turfgrass, or landscapes. Herbicides are rarely necessary in home gardens and landscapes for Russian thistle control.

Management in Commercial and Roadside Areas

Cultural practices such as those recommended for home landscapes can help control this plant. In addition, there are many herbicides that will control Rus-

sian thistle in agricultural crops and noncrop areas. Aim treatments at controlling the immature plants to prevent them from reaching the seed production stage. The selection of an appropriate herbicide depends on the site or the crop.

Preemergent herbicides are applied to the soil before the weed seed germinates and are usually incorporated into the soil with irrigation or rainfall. The most effective preemergent herbicides are Aatrex (atrazine), Velpar (hexazinone), Devrinol (napropamide), Telar (chlorsulfuron), Oust (sulfometuron), Princep (simazine) and Hyvar (bromacil). Other preemergent herbicides that are registered but only moderately effective in controlling Russian thistle are Surflan (oryzalin), Treflan (trifluralin), Prowl (pendimethalin), Endurance (proflam), Lasso (alachlor), Predict (norflurazon), and Kerb (pronamide).

Herbicide-resistant biotypes of Russian thistle have evolved in only a couple of years following treatment with Telar (chlorsulfuron) or Oust (sulfometuron). Avoid repeated use of a single herbicide or of herbicides that have the same mode of action to prevent the evolution of herbicide-resistant populations.

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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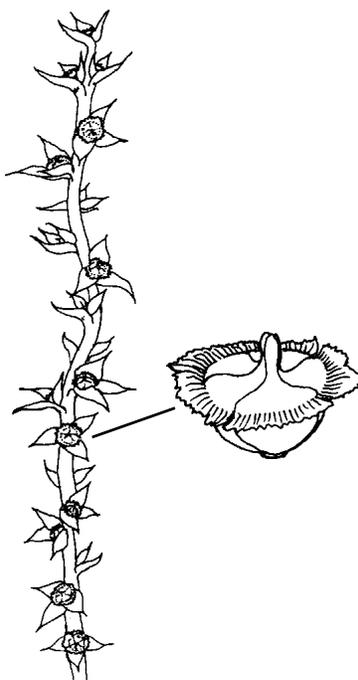


Figure 4. Mature plant in seed; closeup of seed.

Postemergent herbicides are applied to plants, but timing is critical. For best results, these herbicides must be applied while the weed is in its early growth stages, preferably the early seedling stage, before it becomes hardened and starts producing its spiny branches. Do not use postemergent herbicides to try to control the mature seed (either on the plant or on the ground) as they are not effective for this purpose. Also, the later spiny

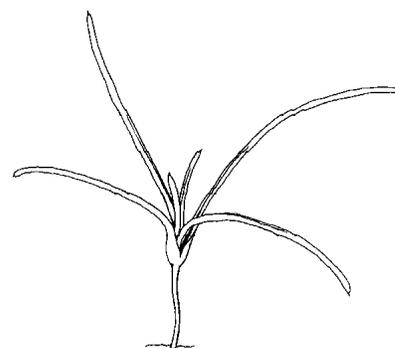


Figure 5. Russian thistle seedling.

stage of Russian thistle is not readily controlled by any postemergent herbicide. If rain or irrigation occurs after a postemergent application, additional seedlings may emerge and require future treatments. Postemergent herbicides that are effective when properly applied include Banvel or Vanquish (dicamba), Roundup (glyphosate), 2,4-D and Gramoxone (paraquat).

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- Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, and R. Parker. 1996. *Weeds of the West*, 5th ed. Jackson: Univ. Wyoming.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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