Salsola tragus

Prickly Russian thistle
Chenopodiaceae

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OVERVIEW

Salsola tragus, native to Eurasia, is a weedy shrub that is naturalized in various places of the world. It occurs along roadsides and dry disturbed areas. In Hawai'i, *Salsola tragus* was previously known from Waimea, Hawai'i (Wagner et al. 1990). *Salsola tragus* has now also been reported from Maui and Kaho'olawe (Herbst and Wagner 1999, Oppenheimer and Bartlett 2002). On Maui, *Salsola tragus* is established in the Omaopio area and scattered plants have been found in the Pu'u o kali and Olinda areas. Additional surveys in agricultural and ranch lands between Omaopio and Pu'u o kali may help determine the full distribution in this area.

TAXONOMY

Family: Chenopodiaceae (Goosefoot family) (Wagner et al. 1999).
Latin name: *Salsola tragus* L. (Wagner et al. 1997, Wagner et al. 1999).
Synonyms: *Salsola australis* R. Br., *Salsola iberica* (Sennen & Pau) Botsch. ex Czerepanov, *Salsola kali* L. subsp. *ruthenica* (Iljin) Soo, *Salsola kali* L. ssp. *tragus* (L.) Celak., *Salsola kali* L. spp. *tenuifolia* Moq., *Salsola pestifer* A. Nels., and *Salsola ruthenica* Iljin (PLANTS 2003).
Common names: Prickly Russian thistle, Russian thistle, tumbleweed (Wagner et al. 1999, PLANTS 2003).
Taxonomic notes: The genus *Salsola* is made up of about 50-150 species that are cosmopolitan in distribution (Wagner et al. 1999). There has been much taxonomic confusion in Hawai'i and elsewhere over the correct name for this species. Wagner et al. (1990) used the misapplied name *Salsola kali* L. This was corrected by Wagner et al. (1997) who state, "The genus *Salsola* has long been taxonomically difficult with a number of different interpretations adopted at various times, especially for the widely naturalized species often treated as *S. kali*. The correct name for the single species naturalized in the Hawaiian Islands...is *S. tragus* (S. Mosyakin, pers. comm.; Wilken, 1993)."
Nomenclature: The genus name *Salsola* is derived from the Latin word *salsus*, meaning salty, in reference to either the habitat where many of these plants grow or for their salty taste (Wagner et al. 1999).
Related species in Hawai'i: There are currently no other *Salsola* species known from Hawai'i. There are several other *Salsola* species that are also weedy in the United States, including *Salsola collina* (slender Russian thistle), *Salsola kali* (Russian thistle), *Salsola paulsenii* (barbwire Russian thistle), *Salsola soda* (oppositeleaf Russian thistle), and *Salsola vermiculata* (shrubby Russian thistle) (PLANTS 2003).

DESCRIPTION

"Annual herbs; stems 3-10 dm long, intricately many-branched, forming a round, bushy clump, with age breaking off and becoming a tumbleweed, glabrous or sometimes sparsely hirsute. Leaves linear, terete when fresh, somewhat flattened when dry, 3-5 cm long, upper leaves usually only 0.5-0.8 cm long, apex spine-tipped. Calyx with enlarged membranous wings in fruit, 3-6 mm wide when well-developed, those of lowermost flowers often merely carinate. Seed black, shiny 1.5-2 mm in diameter." (Wagner et al. 1999).

BIOLOGY & ECOLOGY

Cultivation: *Salsola tragus* is not commonly cultivated.

Invasiveness: *Salsola tragus* is widely naturalized in North America and Australia, and is sparingly naturalized in the Hawaiian Islands (Wagner et al. 1999). In the United States, these weeds break off at the ground level once mature, tumble across the landscape, and become clogged up against fences and obstructions. Numeous seeds are dispersed during this tumbling motion and readily naturalize in dry disturbed places. *S. tragus* is an alternative host for the beet leafhopper (*Circulifer tenellus*) that can carry curly top virus in sugarbeets, tomatoes, melons, and other crop and native plants (CDFA 2003). In Hawai'i, *S. tragus* was previously reported from near Waimea, Hawai'i (Wagner et al. 1990) who stated that it appeared to not be spreading. *S. tragus* is now apparently spreading in Hawai'i and has been found on Maui and Kaho'olawe (Herbst and Wagner 1999, Oppenheimer and Bartlett 2002). Several *Salsola* species are noxious weeds in several states.

Pollination: *Salsola tragus* is wind pollinated and flowers are out-crossing and self-fertile (CDFA 2003).

Propagation: *S. tragus* is propagated from seeds. Apparently, the seeds require an after-ripening period and germinate the spring after maturation (CDFA 2003). Seeds require loose soil to germinate and do not need much moisture (CDFA 2003). Seeds do not germinate in firm soil and remain viable for 1-2 yrs (CDFA 2003). Small *Salsola tragus* plants can produce up to 2000 seeds and large plants may produce up to 100,000 seeds (CDFA 2003).

Dispersal: Once mature, *S. tragus* plants become gray to brown, then break from their main stem at ground level under windy conditions allowing plants to disperse numerous seeds as they tumble.

Pests and diseases: None known.

DISTRIBUTION

Native range: *Salsola tragus* is native to Eurasia (Wagner et al. 1997, Wagner et al. 1999).

Global distribution: *Salsola tragus* is widely naturalized throughout the world. In the United States, *Salsola tragus* was first introduced to South Dakota around 1874 as a contaminant in flax seed that came from Russia (CDFA 2003). It is now known from most of the United States (PLANTS 2003). In the United States, *Salsola tragus* typically invades sandy soils in disturbed areas, waste places, roadsides, cultivated and abandoned fields, disturbed natural and semi-natural plant communities (CDFA 2003). *Salsola tragus* is common throughout California, with the largest infestations occurring in the southern region of the state to eastern North America and Mexico, at elevations up to 2,700 m (8,860 ft) (CDFA 2003).

State of Hawai'i distribution: *Salsola tragus* was first collected in 1959 and was reported (as *Salsola kali*) by Wagner et al. (1990) from near Waimea, Hawai'i where it was sparingly naturalized along roadsides and in other disturbed areas. They reported that it was not readily spreading at the time. *Salsola tragus* is now established in the Waimea area and has also been reported from the islands of Maui (Oppenheimer and Bartlett 2002) and Kaho'olawe (Wagner et al. 1999). On Kaho'olawe, *Salsola tragus* was collected from the S.E. quadrant, slightly south of Beck's Cove, 244 m (801 ft) elevation (Wagner et al. 1999).

Island of Maui distribution: On Maui, *Salsola tragus* was first documented from the Omaopio area, 274 m (899 ft) elevation (Oppenheimer and Bartlett 2002). In this area, plants are naturalized along the road which is bordered by agriculture (pineapple) fields. The climate is relatively dry and the habitat is disturbed. Numerous plants are observed here lining the roadsides. *Salsola tragus* has also been sparingly observed in disturbed semi-native areas of Pu'u o kali. Plants have also been observed in Olinda (Pat Bily pers. comm.).

CONTROL METHODS

Physical control: *Salsola tragus* seedlings can be greatly reduced by mowing (CDFA 2003). Large plants are tough to pull out and require protection from the spines (CDFA 2003). Mature plants should be contained so they don't spread to new areas.

Chemical control: Herbicide applications are effective, especially when plants are in a growing stage (CDFA 2003). Pre-emergent herbicides are used to control roadside populations (CDFA 2003). In parts of the United States, several *Salsola* species have developed resistance to herbicides. An integrated management plan is suggested to avoid resistance to herbicides and provide the best control (CDFA 2003).

Biological control: Efforts are currently underway to search for biological control agents on *Salsola tragus* in Europe and Asia (CDFA 2003). The following potential biological control agents have been found: *Lixus salolae* (a weevil), *Aceria salsoli* (a mite), *Gymnancella* sp. (a moth), *Piesma salsolae* (a plant bug), and *Uromyces salsolae* (a rust fungus) (CDFA 2003).

Cultural control: Prevention seems to be the best practice to contain infestations.

Noxious weed acts: *Salsola tragus* (sometimes under synonym names) is considered noxious in several states including California, Colorado, Hawai'i, and Ohio (PLANTS 2003, HDOA 1992). It is also considered noxious in parts of Canada (USDA-ARS 2003).

MANAGEMENT RECOMMENDATIONS

Salsola tragus is widely naturalized in various parts of the world. In Hawai'i, *Salsola tragus* is known from Hawai'i, Maui, and Kaho'olawe (Herbst and Wagner 1999, Wagner et al. 1999, Oppenheimer and Bartlett 2002). On Maui, *Salsola tragus* is established in the Omaopio area and scattered plants have been found in the Pu'u o kali and Olinda areas. Additional surveys in agricultural and ranch lands between Omaopio and Pu'u o kali may help determine the full distribution in this area. Other similar disturbed agriculture and ranch land are places where *Salsola tragus* is likely to be found. Early detection will be key to preventing infestations in new areas.

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