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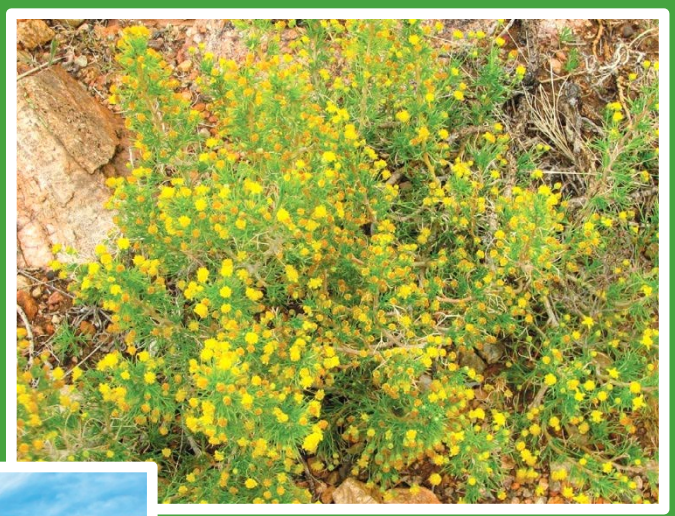
Field Guide for Managing Sweet Resinbush in the Southwest



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Sweet Resinbush (*Euryops multifidus*, synonym: *E. subcarnosus* ssp. *vulgaris*)

Sunflower family (Asteraceae), Senecioneae tribe

Sweet resinbush is currently listed as a noxious weed in Arizona. This field guide serves as the U.S. Forest Service's recommendations for management of sweet resinbush in forests, woodlands, and rangelands associated with its Southwestern Region. The Southwestern Region covers Arizona and New Mexico, which together have 11 national forests. The Region also administers 4 national grasslands located in northeastern New Mexico, western Oklahoma, and the Texas panhandle.

Description

Sweet resinbush (synonym: hawk's eye) is a low-growing shrub with whitish stems and linear leaves divided into 3 to 6 lobes at the tip. This invasive weed is very drought tolerant and was introduced into southern Arizona from South Africa in the 1930s as a potential forage plant and for erosion control.

As its name implies, a sweet, yet slightly foul-smelling resin exudes from the woody stems. Leaves feel sticky and have tufts of hair in the leaf axils. Prolific flowers also smell sweet but are disagreeable. Animals typically avoid eating resinbush, likely because of its foul smell and taste.

Growth Characteristics

- Perennial shrub/subshrub with whitish-colored stems; typically grows to 3 feet tall although some may grow over 5 feet.
- Bright green linear leaves are divided into 3 to 6 lobes at the tip; turkey foot-like; 1-inch long. Leaf axils have tufts of whitish hairs; may drop leaves during particularly dry seasons.
- Numerous yellow daisy-like flowers are borne singly on 1 to 1.5-inch long, thread-like peduncles along the stem and are interspersed among the green leaves. Both disk and ray flowers are yellow with partially fused phyllaries at the base. Flowers bloom in late winter or early spring; may bloom and produce seed twice in 1 year if adequate soil moisture is available.
- Reproduces mainly by seed. Fruit is achene-like with a pappus of soft, white-barbed bristles; the fine hairs readily attach to fleece, fur, and clothing. Fruit occurs in star-shaped clusters of 10.

Ecology

Impacts/Threats

Sweet resinbush has a tendency to form monocultures over time. The species has the ability to invade both intact and disturbed natural areas; it can out-compete desirable rangeland grasses and forbs for soil moisture, sunlight, and nutrients. Despite being planted originally as potential forage, sweet resinbush may possibly be toxic to wildlife and livestock. Neither does the species serve well for erosion control due to its ability to form monocultural stands interspersed with extensive patches of bare ground.

Site/Distribution

Sweet resinbush thrives in granitic soils and commonly grows in sandy loam to clay loam sites. Elevation preference is from 2,300 to 4,900 feet.

Currently, sweet resinbush is known to be present only in Arizona. Ten separate populations have been identified south of the Mogollon Rim. Most populations are reportedly found nearby (within 6 to 7 miles) where they were intentionally planted in the 1930s.

Spread

Reproduces from seed that is covered with fine, barbed hairs; the hairs exude a resinous substance to aid attachment. New plants mostly establish below or near the parent plants; however, seed is readily carried by fleece, fur, clothing (especially socks), and vehicles. Seed is also easily transported overland by water, and new populations often establish in washes and rills. Specific seed longevity is unknown, although they probably remain viable in the seed bank for at least 3 years.

Invasive Features

Sweet resinbush is extremely efficient at obtaining soil moisture, thereby making it very drought tolerant. Sweet resinbush has moist, sticky seed hairs, which may allow germination to occur at lower levels of soil moisture than those necessary for native plants. When the plant is cut or burned, it re-sprouts from axillary buds above the crown; its fragments can also produce a new plant. The species appears to inhibit establishment of native plants, although allelopathic effects have not yet been confirmed or refuted.

Management

Sweet resinbush can penetrate healthy rangeland plant communities, and encroaching infestations will eventually establish a monoculture if overlooked. However, the species is often inconspicuous within the shrub and pinyon-juniper communities it occupies, especially when not in bloom. Physical control methods (including fire) can be limited because of the unsuitable terrain where it is often found. Grazing is not an option for control since sweet resinbush foliage is not highly palatable or preferred. There are no classical biological controls at this time. Herbicide control is the main option for sweet resinbush control, but care is needed not to impact desirable plants.

The following actions should be considered to contain and reduce sweet resinbush populations:

- Educate and involve the public in active control efforts to stretch available resources and aid in eradication of sweet resinbush.
- Detect and eradicate new plants as early as possible, especially along roadways, vehicle turnout areas, waterways, and ditches.
- Hand removal by pulling, digging, or hoeing is difficult but can be an effective means of eliminating isolated populations.
- Use foliar active or soil active herbicides at recommended rates for effective control of widespread populations of sweet resinbush. Since many of the herbicides available for use on sweet resinbush are nonselective, consider using an individual plant treatment (IPT) application method to limit exposure to non-target species.

Table 1 summarizes some management options for common situations involving sweet resinbush. Further details on these management options are explained below. Choice of control method(s) for sweet resinbush depends on the land use and current site conditions (accessibility, terrain, soil and air temperature, weather, density and extent of infestation, other flora and fauna present, etc.). Other considerations include treatment effectiveness, cost, and the time needed to achieve control. Combining control methods and using more than one control method for each site may increase effectiveness.

Physical Control

Because of rough terrain, sweet resinbush is generally difficult to control by solely using mechanical techniques. It is more practical and economical to use physical methods in combination with chemical treatments to obtain effective long-term control.

Manual Methods

Hand Removal – Grub, pull, dig, or hoe plants. Hand removal treatments need to ensure that plants are cut below the crown; otherwise, remove both the root and aboveground portions of the plant when possible. Monitor for seedlings and continue hand removal of seedlings and young plants year after year until seed is depleted from the soil. Involving the public to help with control can make this method more feasible.

Mechanical Methods

Mowing – Cutting or regular mowing will suppress top growth but may stimulate regrowth and increase crown density if not done continuously. *If using machinery to manage sweet resinbush, the equipment should be cleaned after use to prevent movement of seed into un-infested areas.*

Prescribed Fire

Using a broad-scale burn in areas occupied by sweet resinbush is usually impractical because fine fuels

Table 1. Management options*

Site	Physical Control	Cultural Control	Biological Control	Chemical Control
Roadsides	Hand extraction, digging, or hoeing can be used to target individual plants. For plants in large patches, combine suppression methods (e.g., mowing) with a chemical treatment.	Limit disturbances along roadsides near resinbush infestations. Implement requirements for vehicle operations and for reporting of infestations along roads.	None known at this time.	Use truck or tractor spraying equipment. Wash underneath to prevent spread.
Ditches and waterways	Hand extraction, digging, or hoeing can be used to target individual plants.	Limit disturbances along waterways and ditches near resinbush infestations. Increase public awareness and reporting of plant presence along ditches and roadways.	Same as above.	Use herbicide with approved aquatic labeling for use near or in water.
Rangeland	Hand extraction, digging, or hoeing can be used for smaller infestations and to target seedlings.	Inspect animals, clothing, and vehicles after moving livestock or vehicles through infested areas. Remove any seeds (including any seed-bearing mud) before entering un-infested areas.	Same as above.	When plants are widely scattered in rough terrain, consider individual plant treatment with a backpack sprayer.
Wilderness or other natural areas	Hand extraction, digging, or hoeing with follow-up monitoring to detect seedlings.	Post signs warning visitors to remove seeds.	Same as above.	Same as above.

* Choice of a particular management option must be in compliance with existing regulations for the land resource.

needed to sustain a fire are often limited. Sweet resinbush will quickly regrow when fire temperatures are not hot enough to completely damage growing buds. In some situations, a planned fire might be considered when there is an abundance of dried fine fuels such as those produced when annuals thrive during a wet spring.

Cultural Control

Early detection and plant removal, especially seedlings and young plants, are critical for preventing sweet resinbush establishment and spread. Land managers, road crews, and the local public should be educated on identification so they can report suspected populations. Vehicles, humans, and livestock should be discouraged from traveling through infested areas. Hay, straw mulch, planting seeds, and other related products should be certified to be weed free before use in areas undergoing treatment.

Biological Control

Grazing

Grazing with livestock as a means to control sweet resinbush is impractical. Sweet resinbush produces chemicals to defend itself from being grazed; therefore, cattle, sheep, and goats typically avoid eating the shrub. In addition to its foul smell, some of the chemical defense compounds may be toxic to livestock and wildlife.

Classical Biological Control

There are no biocontrol agents (insects, pathogens, etc.) known for sweet resinbush at this time.

Chemical Control

Field trials conducted jointly by the USDA Natural Resources Conservation Service (NRCS), DuPont Agricultural Chemical Co., and the Univ. of Arizona Coop. Extension Service have shown that metsulfuron-methyl

can be used as a selective, systemic herbicide option for sweet resinbush that provides effective long-term control. Tebuthiuron and hexazinone are other reliable herbicides for control; however, they are nonselective and may cause injury to nearby desirable species.

Herbicides listed in table 2 have specific requirements and restrictions. Therefore, it is important to read the label carefully and follow all instructions when mixing and spraying.

Herbicide Application

General considerations for applying herbicide to sweet resinbush include:

- **Plant condition and growth stage** at the time of herbicide application is critical for control success. When using a foliar spray, treating sweet resinbush that is healthy and robust in pre-bloom to bloom stage (early to mid-February) is optimal. Treatments made in the post-bloom stage in the fall have also been effective. Metsulfuron-methyl activity is poor when applied to plants stressed by drought, disease, insects, or other causes that have resulted in die-back, yellowing, or other evidence of plant damage.
- **Weather conditions** at the time of herbicide application are very important. Foliar-applied herbicide coverage is best with low wind speeds (3 to 8 m.p.h.). Do not spray if a rainstorm is expected within 6 hours of application. While metsulfuron-methyl is selective, it may cause temporary damage or discoloration to grasses if it is applied after prolonged cold temperatures, when there are extreme temperature variations between night and day or following very heavy rainfall.
- **Soil type and pH** should be determined before applying any herbicide. Metsulfuron-methyl is less effective in soils with pH greater than 7.9. Tebuthiuron performs best in sandy-loamy soils and is not effective in tight clays or soils high in organic matter. Hexazinone is best applied in loam to sandy-loam soils and should not be applied if soil texture exceeds 85 percent sand.
- **Plant communities** involved with a sweet resinbush population should be closely evaluated before and after treating an area. Anticipate that nonselective herbicides may damage nearby vegetation.
- **Time required to gain initial control** may be slow, especially when soil active herbicides are applied. Follow-up monitoring and spot treating seedlings are important for long-term sweet resinbush control.

A foliar-applied herbicide like metsulfuron-methyl may be applied by backpack or handheld-sprayers or by ATV or UTV sprayers. Any equipment used to spray herbicide should be calibrated. The herbicide is absorbed through the leaf surface. Solid-type herbicides such as granules or pellets may be hand cast or broadcast onto the soil surface using a powered applicator. The granules or pellets remain intact until dissolved by rainfall, and the chemical is then moved from the surface into the root zone. To mitigate impacts from these nonselective herbicides, an individual plant treatment (IPT) method may be used to target isolated sweet resinbush plants.

Management Strategies

The most crucial element for sweet resinbush control is to eradicate whenever possible or least attempt containment. Early detection and control of new sweet resinbush populations, especially those that are escaping near waterways and ditches, are important in slowing the spread of this noxious weed. Based on research and practical experience, hand removal or treating plants with a foliar or soil-applied herbicide are the quickest and easiest ways to stop sweet resinbush.

Consider using a combination of control practices that meet the needs of each situation. For example, application of hexazinone on Frye Mesa in Arizona was initially successful in greatly reducing sweet resinbush. Annual applications of tebuthiuron combined with hand grubbing were then made on surviving resinbush plants. Controlled burning was also used to remove plants on the mesa. Infested areas have been monitored, and grass growth has been encouraged to minimize the return of sweet resinbush. Ongoing control measures are outlined in the site plan for Frye Mesa (McReynolds 2003-04, 2005, 2006, 2008, 2010).

Table 2. Herbicide recommendations

Common Chemical Name (active ingredient)	Product Example[1]	Broadcast Treatment (rate per acre)	Spot Treatment (spray solution, granules, or pellets)[2]	Time of Application	Remarks
Metsulfuron-methyl	Escort XP	1.66 ounces per acre + 0.25–0.5 percent v/v non-ionic surfactant (NIS)	1 ounce in 100 gallons	Late summer	Selective; foliar applied. Effectively controls sweet resinbush as long as not applied to soils with pH greater than 7.9. No grazing or haying restrictions. Grasses may be damaged temporarily or discolored if applied after or immediately before very heavy rainfall, prolonged cold weather, or when day/night temperatures vary widely. Add 2,4-D or MCPA when treating sweet resinbush located in wheel tracks and dry, dusty conditions exist.
Tebuthiuron	Spike 20P	10 pounds of pellets	See label	August, ideally just before a rain event.	Nonselective; will likely damage associated vegetation. Apply only on sandy or coarse soils. Consider applying following use of a physical method since best results are obtained when woody plants are less than 18 inches in height or diameter.
Hexazinone	Pronone 10G, Pronone Power Pellets	25 pounds per acre for granular formulations; up to 600 pellets per acre per season for pelleted formulations	See label	August, ideally just before a rain event.	Nonselective; requires adequate rain to activate and carry it into root zone. In soils with 85 percent sand or more, hexazinone may pass through the root zone too rapidly to be effective. In densely infested areas where sweet resinbush is in a monoculture, consider broadcast application. Grazing is restricted for 30 days following application.

[1] Trade names for products are provided for example purposes only, and other products with the same active ingredient(s) may be available. Individual product labels should be examined for specific mixing information and appropriate use with sweet resinbush.

[2] Spray solution is the herbicide/water ratio in a spray mix that may be used for spot treatment with backpack or hand-held sprayers. The amount of product applied during an annual growing season must not exceed the maximum application rate per acre as specified by the product label – refer to the product label for the site type and application.

Always perform follow-up control for at least 2 years after initial treatment and continue monitoring for at least 10 years. Since it is ordinarily useless to treat an area only one time without retreatment, sufficient resources must be allocated for the area where control is attempted. After initial treatment, it is especially important that resources are also available to respray or retreat the treated area as necessary.

References and Further Information

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Suggested Web Sites

For information on invasive species:

http://www.invasive.org/weedus/index.html

For information about calibrating spray equipment: NMSU Cooperative Extension Service Guide A-613, *Sprayer Calibration*. Available at http://aces.nmsu.edu/pubs/_a/A-613.pdf

For more information or other field guides, contact:

USDA Forest Service
Southwestern Region
Forest Health
333 Broadway Blvd., SE
Albuquerque, NM 87102

Or visit the Southwestern Region's website for invasive species:

http://www.fs.usda.gov/goto/r3/invasivespecies