

Managing Silverleaf and Carolina Horsenettles

Jessica Graham, Undergraduate Research Assistant, University of Nevada, Reno

Wayne S Johnson; Associate Professor, Applied Economics and Statistics, College of Agriculture Biotechnology and Natural Resources; IPM Specialist, University of Nevada Cooperative Extension

Silverleaf horsenettle, also known as white nightshade, is a perennial native to the central United States that has rapidly spread to other areas, including Clark County, Nevada. It grows under a variety of environmental conditions, and is almost impossible to eradicate once it is established. Its berries and foliage are poisonous to livestock and humans, as are those of many other horsenettles including Carolina horsenettle also described herein. Humans that contact these plants may suffer dermatitis.

Identification

Silverleaf horsenettle (*Solanum elaeagnifolium* Cav.) is a member of the Solanaceae (nightshade) family that grows up to 4 feet tall (Fig. 1). Its stems are branching and have a few short yellow thorns (Fig. 2). Both the stems and leaves are covered with dense short hairs that give the plant a gray or silvery appearance. Its narrow, lance-shaped leaves are alternate and have smooth to wavy margins.



Figure 1. Silverleaf (left) and Carolina (right) horsenettles grow 3½ to 4 feet tall.

The flowers are ¾ to 1 inch wide with 5 violet to light blue (sometimes white) petals and 5 bright yellow anthers in the center (Fig. 3). The fruit is a round, green berry when immature that becomes yellow or dull orange with maturity (Fig. 3). Each fruit contains about 60 (24-149) smooth shiny seeds that can be spread by water, machinery, animals, and birds. The seeds can remain viable in the ground for up to 15 years. Silverleaf horsenettle also spreads by extensive horizontal rhizomes (underground stems) that grow out from the crown or base of the plant.



Figure 2. Silverleaf horsenettle stems have yellow thorns (arrow) and are covered with short hairs.

Carolina horsenettle (*Solanum carolinense* L.) is also of the nightshade family and produces three-foot long stems (Fig. 1). The UNR Herbarium has no record of this plant in Nevada, but it is found in states surrounding the Great Basin and is designated a noxious weed in Nevada and California. Its alternate leaves have short stalks, and release a potato odor when crushed. They are covered with hairs on both sides, and have prominent spines on the midvein and stalks. Though similar to silverleaf horsenettle, Carolina horsenettle lacks a dense



Figure 3. Silverleaf horsetettle flowers are blue to violet with yellow anthers in the center. The mature seeds are yellow (top). Carolina horsetettle flowers also have a yellow center, but have white to violet petals (bottom).

silvery covering of hairs and has broader, more toothed leaves, and more prominent spines. The stems, angled at the nodes, also have hairs and spines and become woody with maturation.

The star-shaped flowers occur in clusters with 5 white to violet petals, each with a yellow center (Fig. 3). Like silverleaf horsetettle, the fruit is a berry that changes from green to yellow with maturity. Animals rarely consume Carolina horsetettle because of its prickly stems and leaves, but all parts of the plant are poisonous if a sufficient amount is consumed. Both Carolina and silverleaf horsetattles develop colonies from extensive systems of creeping horizontal and deep vertical roots that produce new shoots.

Habitat

These plants usually grow in places disturbed by people or livestock, especially those with summer moisture or irrigation such as native or improved pastures and rangeland associated with waterways. However, their

deep root systems enable them to endure considerable drought and out survive shallow-rooted vegetation.

Silverleaf horsetettle grows under a variety of environmental conditions, and is adapted to semi-arid regions with 12 to 23 inches of annual rainfall. This plant usually occurs on coarse-textured, sandy soils. It can be found on rangeland, in pastures, waste areas, and cropland. Carolina horsetettle is distributed in the northern Sierra Nevada in California.

Threat

These horsetattles lower crop yield through competition. The food reserves in their root systems allow them to grow in the early spring, and the roots grow deeper than those of most crops, especially during summer dry periods. This gives them an advantage over agricultural species. Their spiny leaves and rough stems lower the quality of hay taken from infested fields.

All parts of these horsetattles can be toxic to animals, but the green ripe fruit is the most poisonous. Livestock will generally avoid eating it unless other forage is unavailable. Symptoms of poisoning include bloating, trembling, nasal discharge, salivation, and breathing difficulties. Cattle, which are more susceptible than sheep, have died after consuming silverleaf horsetettle. Goats and horses do not seem to be affected.

Weed Management Options

Prevention: Established silverleaf and Carolina horsetattles are extremely difficult to eradicate, and therefore it is imperative to prevent their distribution. Both species are spread by seed and root fragments.

Seed may be spread by tillage or harvesting equipment, by animals, or in contaminated hay. Clean equipment after being in an area of infestation, apply sanitation procedures, and control individual or small infestations. Checking hay for berries before feeding it to cattle will prevent livestock poisoning and introduction of the seed into new areas. It is recommended that both private and public lands be monitored annually for invasions. Eliminate the plant where it is found, and then revisit the site each year to ensure no new plants have germinated.

Mechanical Control: The extensive root system makes hand-pulling and other

mechanical methods difficult. These methods can be used for small infestations, but must be repeated several times during the growing season. Clipping and mowing are ineffective because the plants can grow back from the roots. Cultivation is ineffective, and in fact spreads horsenettles by distributing root pieces. Frequently removing above ground parts all season long may prevent flowering, seed production, and energy reserves in the roots, thus reducing its spread. Any root material that is dug should be dried and burned.

Cultural Control: Livestock will favor these plants by overgrazing the surrounding palatable vegetation, thus reducing or eliminating competition for resources. Livestock should be removed from infested areas until control is obtained because of the toxicity of horsenettles, particularly their fruit.

Shade from crop canopies can be an effective management method for silverleaf horsenettle, but it must be controlled another way until sufficient crop canopy is produced or else the weed will grow rapidly, mature first, and be less affected by shade. Shade levels between 63% and 92% are needed to prevent seed production. This will decrease the plant's photosynthetic rate, making it a less forceful competitor.

The use of strong, competitive crops or vegetation in pastures will provide some control. Quarantine infestations from livestock and prevent seed production where possible. Sheep can carry the seed in their digestive tract for seven days or more without affecting its germination capability. Consequently, animals should be purged with clean forage before they are moved to an uninfested area.

Biological Control: Several biological control agents have been considered for silverleaf horsenettle control, but none have established in the United States. The foliar nematode (*Orrina phyllobia*) is host specific for silverleaf horsenettle and has the most potential. It causes leaf and stem galling. No biological control agents have yet been examined for Carolina horsenettle.

Chemical Control: The use of herbicides on established plants is generally ineffective because the chemicals do not reach the widespread roots. Some studies have shown

that glyphosate and picloram provide steady control. Glyphosate, however, is nonselective. Clopyralid has proven to be ineffective. Soil fumigation has also been used to eradicate small infestations. Regrowth will occur with any herbicide treatments of these plants, so reapplication will be necessary.

Conclusion

Both Carolina and silverleaf horsenettles are poisonous and difficult to control. Small infestations are much easier to control, so an effort to stop the spread of their seeds and root fragments must be made. Since herbicides are usually ineffective, already established colonies of these plants are very difficult to eradicate. Therefore, prevention is the best method available for control of silverleaf and Carolina horsenettles.

References

1. Whitson, T.D., ed., L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee, and R. Parker. *Weeds of the West*. Jackson, Wyoming: Pioneer of Jackson Hole, 1992. Pp. 572-573.
2. *Silverleaf Nightshade*. Washington State Noxious Weed Control. 20 June 2003. <www.nwcb.wa.gov/weed_info/sleafnightshade.html>.
3. *Solanum Genus*. Noxious Weed Index. CDFA. 24 June 2003. <pi.cdffa.ca.gov/weedinfo/SOLANUMC2.htm>.

Silverleaf horsenettle photographs courtesy *Weeds of the West*. Carolina horsenettle photographs courtesy the California Department of Food and Agriculture <<http://pi.cdffa.ca.gov/weedinfo/photogalleryframeset.html>>.

Information herein is offered with no discrimination. Listing a product does not imply endorsement by the authors, University of Nevada Cooperative Extension (UNCE) or its personnel. Likewise criticism of products or equipment not listed is neither implied nor intended. UNCE and its authorized agents do not assume liability for suggested use(s) of chemical or other pest control measures suggested herein. Pesticides must be applied according to the label directions to be lawfully and effectively applied.

Cooperative Extension Office Locations

Battle Mountain

815 N. 2nd St., 89820
(775) 635-5565, FAX (775) 635-8309

Caliente

360 Lincoln St., P.O. Box 728, 89008-0728
(775) 726-3109, FAX (775) 726-3332

Carson City/Storey County

2621 Northgate Ln., Ste. 15, 89706
(775) 887-2252, FAX (775) 887-2065

Elko

701 Walnut Street, 89801
(775) 738-7291, FAX (775) 753-7843

Ely

995 Campton St., 89301
(775) 289-4459, FAX (775) 289-1462

Eureka

701 S. Main St., P.O. Box 613, 89316
(775) 237-5326, FAX (775) 237-5164

Fallon

111 Sheckler Rd., 89406
(775) 423-5121, FAX (775) 423-7594

Hawthorne

(775) 945-3444

Incline Village

865 Tahoe Blvd., Ste. 110
P.O. Box 8208, 89452
(775) 832-4150, FAX (775) 832-4139

Las Vegas

2345 Red Rock St., Ste. 100, 89146
(702) 222-3130, FAX (702) 222-3100

Logandale

1897 N. Moapa Valley Blvd.,
P.O. Box 126, 89021
(702) 397-2604, FAX (702) 397-8301

Lovelock

810 6th St., P.O. Box 239, 89419
(775) 273-2923, FAX (775) 273-7647

Administration:

Karen Hinton
Dean & Director
hinton@scs.unr.edu

Central/Northeast Area

Jerry Buk, Area Director
40 E. Center Street #14, Fallon 89406
(775) 426-2844
FAX (775) 423-1901

Minden/Gardnerville

1329 Waterloo Lane, P.O. Box 338, 89423
(775) 782-9960, FAX (775) 782-9968

Pahrump

1651 E. Calvada Blvd., 89041-1090
(775) 727-5532, FAX (775) 727-6199

Reno

5305 Mill St., P.O. Box 11130, 89520
(775) 784-4848, FAX (775) 784-4881

Campus Office

National Judicial College, Suite 118
UNR/404, Reno 89557
(775) 784-7070
FAX (775) 784-7079

Southern Area

Dixie Allsbrook, Area Director
2345 Red Rock St., Ste. 100, Las Vegas 89146
(702) 222-3130
FAX (702) 222-3101

Tonopah

1 Frankee St., P.O. Box 231, 89049
(775) 482-6794, FAX (775) 482-5396

Winnemucca

1085 Fairgrounds Rd., 89445
(775) 623-6304, FAX (775) 623-6307

Yerington

504 S. Main St., P.O. Box 811, 89447
(775) 463-6541, FAX (775) 463-6545

Las Vegas Office

2345 Red Rock St., Ste. 330
Las Vegas 89146
(702) 251-7531
FAX (702) 251-7536

Western Area

Mary Spoon, Acting Area Director
5305 Mill St., P.O. Box 11130, Reno 89520
(775) 784-4848
FAX (775) 784-4881



Visit our web site: www.unce.unr.edu