1997

G97-1319 Management of Smooth Sumac on Grasslands

John Ortmann
University of Nebraska - Lincoln

Katherine L. Miles
University of Nebraska - Lincoln

James L. Stubbendieck
University of Nebraska - Lincoln, jstubbendieck@unl.edu

Walter H. Schacht
University of Nebraska - Lincoln, wschacht1@unl.edu

G97-1319-A

NebGuide

Published by Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln

Management of Smooth Sumac on Grasslands

The herbicide 2,4-D LV4 ester provides excellent low-cost smooth sumac control. Prescribed burning before herbicide application does not substantially improve sumac control, but may ease herbicide application and provide other benefits.

John Ortmann, Graduate Research Assistant, Agronomy
Katherine L. Miles, Graduate Research Assistant, Agronomy
James Stubbendieck, Professor, Range Ecology, Agronomy
Walter H. Schacht, Assistant Professor, Range Science, Agronomy

Figure 1. New sumac sprout following prescribed burn.

Smooth sumac (*Rhus glabra* L.) is a native deciduous shrub that forms dense thickets from widely spreading roots. It is found in the Sandhills, mixed-grass, and tallgrass areas throughout Nebraska. Introduced cool-season grasses, such as Kentucky bluegrass (*Poa pratensis* L.), invade the thickets, and production of desirable forage species is reduced below the dense canopies. Trees and other shrubs readily establish in aging sumac thickets, accelerating the conversion of grassland to woodland. Small amounts of smooth sumac may be desirable because it provides wildlife habitat and food and has attractive fall foliage.

Unlike many woody species, smooth sumac is not controlled by fire. It resprouts vigorously after defoliation, drawing on abundant energy reserves stored in the extensive root system. Improper grazing promotes the spread of thickets because new stems sprouting at the peripheries of thickets can out-compete the grazed grasses.

Seed is dispersed by several species of birds and mammals. These animals eat the fruits, especially in winter, and may deposit the seeds at some distance from the parent plants. Passage through an animal's digestive system increases seed germination. Establishment of new thickets from seed probably is not common. However, once a new plant is established, it can quickly spread vegetatively to

Figure 2. Sumac plants one month after prescribed burn.

produce an expanding thicket. Smooth sumac roots grow laterally at a depth of four to eight inches. The roots may extend 20 feet from the edge of a thicket, but normally new stems arise each year within two to six feet of the existing stems. The number of stems may double each year in the first years of a thicket's life. The rate of spread around the circumference is not uniform, so that older thickets become irregularly shaped.

Control of Smooth Sumac

Several management practices have been studied for control of smooth sumac. These include mowing or cutting, prescribed burning, herbicide application, and various combinations of these methods.

Cutting and mowing

Mechanical treatments are ineffective unless repeated treatments over many years are used to control the abundant resprouts. The sharp stumps resulting from cutting are another drawback and may be a hazard to animals or vehicle tires.

Prescribed burning

Like cutting, prescribed burning is ineffective. Single spring fires can result in nearly 100 percent topkill of stems, but vigorous resprouting can lead to stem densities higher than those before the fire. Because fire topkills sumac, canopy height and cover is reduced in the short term. Late-spring prescribed fire does suppress cool-season grasses in the understory of thickets and can invigorate warm-season grasses. Frequent burning, even annually in tallgrass areas, can be used to maintain a low canopy and improve growing conditions for warm-season grasses.

Biological control

Smooth sumac is a North American native species, and there are no known biological pathogens that would cause widespread mortality. Some insects do feed on smooth sumac and perhaps restrict its spread and numbers.

Herbicides

Many herbicides are very effective against smooth sumac. They can be applied to the foliage, stem bases, or to the soil. Approved herbicides include 2,4-D, Crossbow, Spike, Tordon, and Velpar[1]. All are effective on a range of broadleaf plants, but are likely to damage desirable forbs. In addition, Spike and Velpar may harm grasses, especially when pelleted formulations are applied to the soil.

Research conducted in 1994 and 1995 in north-central Nebraska tested the effectiveness of prescribed fire alone, foliar-applied herbicides alone, and fire and herbicides together for controlling smooth sumac. The herbicides evaluated were 2,4-D LV4 ester at 2 lb. active ingredient (a.i.) or two quarts per acre, Tordon 22K at 0.5 lb. a.i. or one pint per acre, and 2,4-D LV4 ester plus Banvel at 0.5 lbs. plus 0.5 lb. a.i. or 1 pint plus 1 pint per acre.

All of the herbicides were equally effective. Fire alone caused an increase in stem density. Fire plus herbicide was not better than herbicide alone as measured seven weeks after treatment. However, there was evidence that control as measured one year after treatment was better with fire plus herbicide than with herbicide alone. Both herbicides alone and fire plus herbicides resulted in nearly 100 percent control in this study.

Estimated herbicide costs for 2,4-D LV4 ester, 2,4-D LV4 ester plus Banvel, and Tordon 22K were $6.76, $20.30, and $22.81 per acre, respectively, based on 1997 published herbicide prices. The least expensive herbicide, 2,4-D, provided control equal to the more expensive ones. Application costs would be in addition

to product costs, but would be similar regardless of herbicide. Long-term effects over several years were not studied, and it is possible that additional treatment with 2,4-D may be necessary to control surviving plants.

Although fire provides little direct benefit in controlling smooth sumac it can play an important role in sumac management. In the Nebraska study, the production of undesirable cool-season grasses such as Kentucky bluegrass, which flourishes in low-light conditions under the sumac canopy, was much reduced after fire. At the same time, production of native warm-season grasses was increased several fold. This not only increased current year forage production, but helped long-term recovery of desirable native grasses that had declined under the sumac canopy. If applied to the entire pasture, fire can provide general benefits beyond sumac control. These include rejuvenation of native grasses and reduction of undesirable cool-season species, improved animal performance, and reduction of other species of woody invaders, including eastern redcedar (*Juniperus virginiana* L.). Furthermore, in the Nebraska study the smooth sumac canopy height was greatly reduced. Because dead stems remained standing there were no sharp stumps produced as with cutting. In thickets where the standing dead stems are short, this will permit over-the-top foliar herbicide application with conventional boom-type sprayers. If the standing dead stems are tall, spraying from the edges of the thickets with a hand boom may be necessary. Aerial application also is an option if smooth sumac is widespread.

The estimated cost of conducting a prescribed fire is about $2 per acre, which would be in addition to herbicide and application costs. Any use of prescribed fire should be carefully considered and done in compliance with Nebraska open-burning law. Two other Cooperative Extension publications provide information on the use and conduct of prescribed fires. They are NebGuide *G96-1308, Management of Eastern Redcedar on Grassland*, and Extension Circular *90-121, Conducting a Prescribed Burn*.

General Recommendations

If fire is to be used, burn in spring around May 1. Apply 2,4-D LV4 ester at 2 quarts per acre to the resprouting sumac canopy after significant regrowth occurs, in mid- to late June. If fire is used, delay grazing until grasses have made substantial growth. If fire is not used, apply 2,4-D LV4 ester at 2 quarts per acre when sumac is flowering in mid- to late June. Sumac thickets should be monitored, and stems surviving after one year should be spot treated with 2,4-D.

[1]Use of tradenames is not an endorsement by the authors or the University of Nebraska-Lincoln.

File G1319 under: RANGE AND FORAGE RESOURCES
B-7, Pasture Management
Issued April 1997; 5,000 printed.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.