



Lassen

Farm Advisor's Update

A PUBLICATION FOR FARMERS, RANCHERS AND FRIENDS OF AGRICULTURE • COOPERATIVE EXTENSION •

Field Trial: Controlling Scotch Thistle with Fall or Spring Applications of Herbicides

A weed with a will: Scotch thistle, the bane of many landowners in our region. It is a species introduced to North America in the late 19th century from Eurasia. It has beautiful pink flowers, but the flowers might be the only thing pretty about Scotch thistle, as leaves covered in white hairs and spines can stretch over 8 feet tall. It is typically a biennial plant, which grows close to the ground the first year as a basal rosette and in the second growing season bolts skyward to produce flowers and seeds. However, talking with people, and from personal observation, it can also act as an annual plant under certain circumstances. When more desirable forages are not present, livestock will graze it when young, but generally leave it alone as it matures. Scotch can grow in dense patches and, when dry, creates a physical barrier with thick spines that deter livestock and humans alike. Displacement of more desirable species and formation of monocultures is one of the major impacts Scotch thistle has on the landscape.

Legally designated as a noxious weed in all the western states (except Montana), this is a species of high concern. I have been told the first population found in California was right here in Lassen County over 50 years ago. As such, our state has this species listed on the A list, where A doesn't stand for amazing, but instead *aberration* as this plant is legally deemed for eradication, which is more difficult said than done. Scotch thistle can have a soil seed life of up to 30 years, which is the most difficult aspect of control. Once you let an individual plant go to seed, those seeds will be burdens upon the landscape for decades to come. Many of the seeds are innately dormant, so it is ever important the keep the plants from going to seed.

The simplest way to kill a Scotch plant is with a shovel. Severing the root of an individual plant below the soil surface will get the job done, but this method can be burdensome in large patches and does not prevent new seeds from germinating. Spraying can be highly effective at controlling actively growing plants, while some herbicides can also reduce the number of seedlings which germinate the following year. Almost all weeds are more susceptible to control when they are small. Just like

digging a 4-inch plant with a shovel is easier than chopping down a 4-foot Scotch thistle.

All of the literature states that the time to spray Scotch thistle is when it is in the rosette growth stage, however, most studies focus on a spring application timepoint. I decided to test out some new herbicides and some tried and true herbicides at two application time points – in the fall and spring rosette growth stage – in order to gain some insight to which season may be more effective. I was interested in the herbicide Method, as it has a long soil residual activity and has potential to provide Scotch thistle control over a year.



Photo 1: Large Scotch Thistle Patch Located in Long Valley Lassen County, California

A large Scotch thistle patch was located down south of Doyle, California, in Long Valley as a test site for the fall and spring treatments. Fall treatments were applied in the third week of October 2016 and spring treatments were applied in the first week of May 2017. In the fall application, small rosettes were present, but the initial flush of Scotch seedlings had not come up. At the spring application, there was a lot of Scotch up and growing with rosettes ranging from 4-22 inches in diameter. A non-ionic surfactant at 0.25% v/v was added in all spray mixtures. Control was assessed for the fall treatments in March of 2017, and in June, July and August for all treatments. Percent Scotch thistle control is displayed in Figure 1 on the next page.

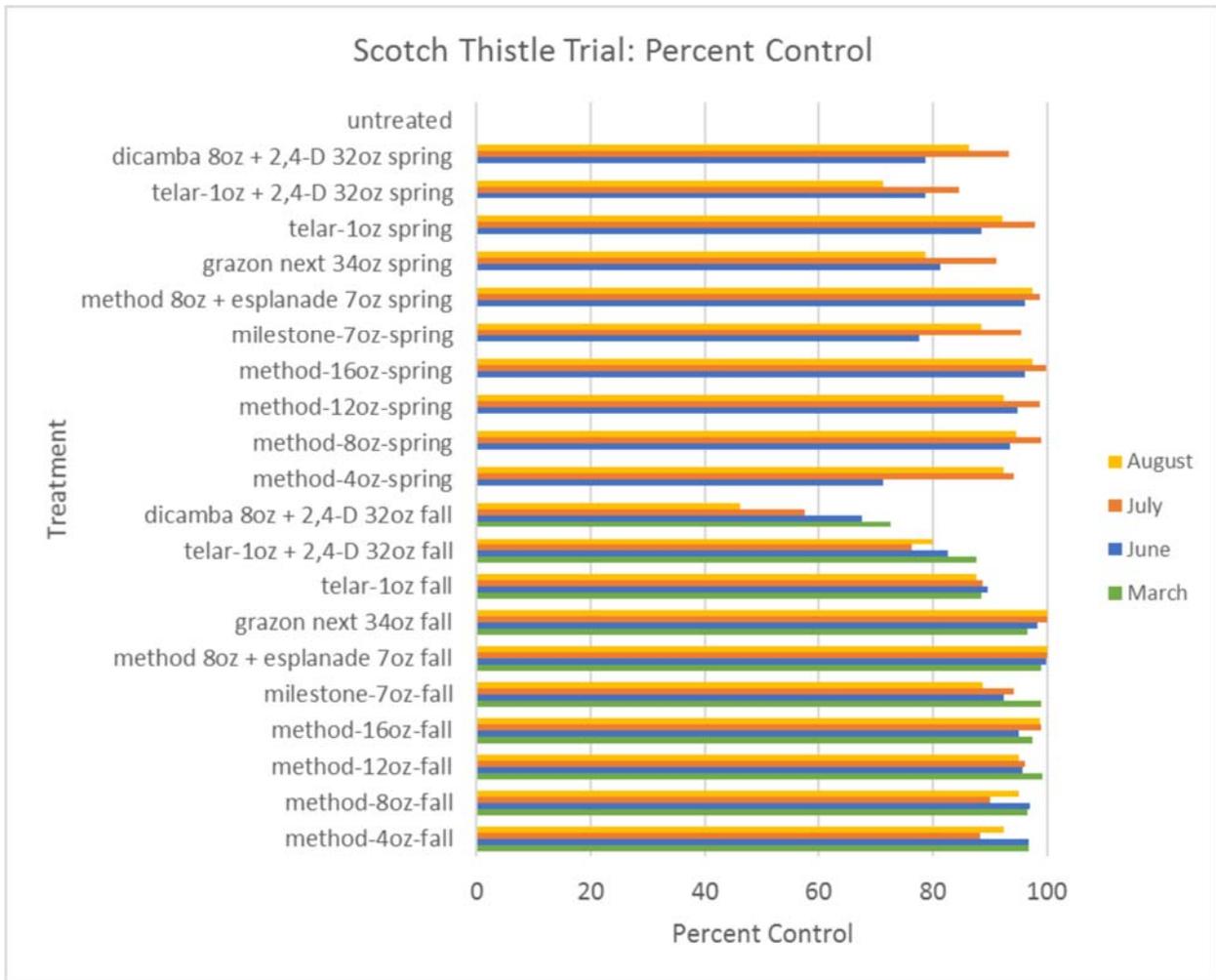


Figure 1: Treatments applied in the fall of 2016 and spring of 2017. Percent control ratings taken in March, June, July and August of 2017. Plots will continue to be monitored through the 2018 growing season.

Generally, Scotch thistle control was good with fall applications where only Telar+2,4-D and Dicambia+2,4-D offered less than 80 percent control by 2017. The 8, 12, and 16 oz. rates of Method offered good control, where Method+Esplanade and GrazonNext were the top two treatments. Most spring applications also offered good control. At the June assessment, some plants treated in the spring hadn't burned back completely, where by July most burndown had occurred. Interestingly, at the August assessment, generally there appeared to be individual Scotch thistle plants growing in the spring treatments which were not noticeable during the July assessment. By August, it was clear that no spring treatment offered 100 percent control, however, all treatments which contained Method offered at least 90 percent control.

Treatments that offered good Scotch thistle control were often dominated by the annual grasses cheatgrass and foxtails. With non-desirable vegetation removed, bare ground was present within some of the plots. Results dis-

playing bare ground and remaining species composition will be available in the complete research report later this year.

Preliminary results from this study site indicate a fall application time can be just as effective as a spring application. However, control for an individual growing season is nothing to get excited about. Stay tuned as long-term control data will be collected in the coming years, and hopefully multi-year control of Scotch thistle can be achieved for multiple years with a single application.

*Method and Esplanade do not currently have a label for grazing.

*Any product mentioned is not an endorsement by the University of that product over any other products which could be selected.



Photo 2: Picture taken in July 2017. Untreated Scotch thistle plot to the right of photo, spring treatment of GrazonNext with dying Scotch thistle on the left.



Photo 3: Untreated Scotch thistle plot in August of 2017 surrounded by successful herbicide treatments. Dominant vegetation in the treated plots consisted of the winter annual grass species cheatgrass and foxtail.

Myrtle Spurge

I want to bring to your attention a weed which has just started to gain a foothold here in our county. The common name of the weed is myrtle spurge, or if you prefer your plant name using the dead language, *Euphorbia Myrsinites*. Earlier this year a resident of Stone's Landing noticed one of his neighbor's ornamental plants spreading out of the beds it was planted in. Pockets of the plants were strewn throughout the neighborhood, along roadsides, and even creeping into BLM sagebrush land. The weed specialist from the BLM Eagle Lake field office identified the plant as myrtle spurge, which is an A rated noxious weed in Colorado. He quickly contacted the Lassen County Ag Department, who sent one of their biologists up to take a sample. The sample was sent down to the California Department of Food and Agriculture, or CDFA, where the identification was confirmed. Indeed, myrtle spurge was growing. constant

Myrtle spurge is a low growing perennial plant with fleshy leaves. The vegetation is typically a greenish blue color with leaves in an alternate formation. Another common name for it is "donkey tail." The flowers are yellow, and it was in full bloom when I stopped by to check it out in the beginning of May. In all honesty, it is a beautiful drought tolerant plant, and it is a bummer it is invasive. In areas of Colorado and Utah, the plant has really taken off, forming monocultures crowding out desirable plants that support wildlife and feed livestock. It is a creeping perennial, which can spread by roots, or seed, and it can launch up to 15 feet when ripe. Be careful handling it, as the sap is milky white, and can cause contact dermatitis. Seriously, use gloves, and do not get the sap on exposed skin. Not everyone is sensitive, but I wouldn't take the risk to find out!

Now is the time to act while the population is small, so it doesn't get a permanent foothold in Lassen County. Early detection rapid response is the way to handle weeds, before the population explodes! If you think you have seen this plant, we want to know about it! Even if it is in your garden, it could escape and threaten our rangelands and natural ecosystems.

Initially the CDFA listed myrtle spurge as a quarantine species, and currently they are considering listing it as an A list species. A list species are legally required to be eradicated from the state because of the potential economic and ecological harm imposed by this species. More information can be found from the CDFA's website at: <http://blogs.cdfa.ca.gov/Section3162/?p=3849>.

Fall and spring are good times to target myrtle spurge for control. As myrtle spurge is a creeping perennial weed, controlling the roots are important. Grubbing or digging can be effective to control myrtle spurge with persistent CONSTANT VIGILANCE. Multiple years of digging up the plants (getting at least 4 inches of the root below the soil) can reduce the population. It is important to dig them up before they set seed. As this species is deemed for eradication, chemical control is another option. Literature from other states indicate Glyphosate or 2,4-D* or 2,4-D + Dicamba* can be effective chemicals for control. Applications should be made in the fall for greatest effectiveness. Spring applications can also be effective. Regardless what control method is used, a single control effort will unlikely be successful. Multiple diggings or herbicide applications will be needed over multiple growing seasons to ensure eradication. These herbicides do not have soil residual activity, so scouting will be necessary to prevent new seedlings from becoming established each year.



Photo 4: Myrtle Spurge at Stone's Landing

If you have this plant and would like to report a location or get more information, please feel free to contact me at 251-2650. Help the county out, so we can get rid of myrtle spurge, before it spreads like whitetop or Scotch thistle.

*2,4-D and Dicamba are restricted use pesticides in the state of California. Use of restricted material requires an applicators license and permit from the Agricultural Commissioner's Department. Always read and follow the entire label when using pesticides.

Low Lignin Alfalfa: Is It Right For You?

Considering putting in a new stand of alfalfa? Choosing a variety can be difficult, and there are many factors to take into consideration: yield, dormancy, winter hardiness, pest resistance, seed cost, Roundup Ready, and stand persistence.

There are numerous articles regarding variety selection. One which I like is from the 2012 Alfalfa Symposium titled "Variety Selection - Choosing the Best for Your Field" which I encourage you to check out!

http://alfalfa.ucdavis.edu/+symposium/2012f/files/talks/12CAS-4_Frate_Variety%20Selection.pdf

Within the past few years an additional option has been laid on the table by the forage seed industry – low lignin alfalfa. Now you might be asking yourself a few questions, such as: "What is lignin, and why does it matter?" or "Why would I want to plant a low lignin variety?"

Well, I am going to shed a bit of light on these questions by picking pieces out of a couple of presentations given at the Alfalfa Symposium this past year. (For more detailed information, I encourage you to check out the documents or video links listed at the end of this article.)

So, what is lignin and why does it matter? To answer that question, two aspects need to be addressed: 1) what is the role of lignin in the plant? and 2) what are the plant materials being used for? The second part is pretty self-explanatory, the forage being grown will be used to provide food/energy for animal growth and eventual meat or milk production. The first question isn't always as well known. Lignin is an important fiber in the cell walls of plants, which provides mechanical structural support essentially keeping plants standing upright in the face of wind and rain. Unfortunately, while lignin offers much structural support for plant growth, it is essentially indigestible by the microbes of ruminant animals unlike some other cell wall fibers.

The quantity of lignin is a driving factor when it comes to alfalfa quality. Acid Detergent Fiber (ADF) is a test that measures the parts of the cell wall which are not very digestible, mainly lignin, cellulose and cutin. Total Digestible Nutrients (TDN) is an estimation of the energy in forage (protein, carbohydrates, fat, etc.) but is calculated from ADF as there is a relatively linear relationship between the two. High ADF means high fiber and low TDN.

% ADF		% TDN	
100% DM	90% DM	100% DM	90% DM
20.0	18.0	67.4	60.7
21.0	18.9	66.6	59.9
22.0	19.8	65.8	59.2
23.0	20.7	65.1	58.6
24.0	21.6	64.3	57.9
25.0	22.5	63.6	57.2
26.0	23.4	62.8	56.5
27.0	24.3	62.1	55.9
28.0	25.2	61.3	55.2
29.0	26.1	60.6	54.5
30.0	27.0	59.8	53.8
31.0	27.9	59.1	53.2
32.0	28.8	58.3	52.5
33.0	29.7	57.6	51.8
34.0	30.6	56.8	51.1
35.0	31.5	56.1	50.5
36.0	32.4	55.3	49.8
37.0	33.3	54.6	49.1
38.0	34.2	53.8	48.4
39.0	35.1	53.1	47.8
40.0	36.0	52.3	47.1

Table 1: Courtesy of Steve Orloff, adapted from the Intermountain Alfalfa Management Manual. Displays the relationship between ADF and TDN at 100% and 90% dry matter (DM).

Most of the lignin is located in the stems of alfalfa plants, with lower quantities of lignin in the leaves. Likewise, the most digestible and nutritious parts of the alfalfa plant are the leaves. As alfalfa grows in the spring, or after cutting, there is a decrease in forage quality as the plants grow taller. Because as alfalfa grows taller there is a larger increase in stem biomass, compared to leaf biomass. This is why cutting early increases forage quality, because there is a lower stem to leaf ratio and less fiber in the forage. High quality forage is demanded by the dairy market but can be tough on the hay producer. It is a balancing act of maintaining alfalfa quality while maximizing yield. If hay is harvested too early, quality will be high, but yields will be low. Likewise, if hay is harvested too late, yields may be high, but forage quality may be too low to make the grade. The price between hay grades can be dramatic in certain years, so cutting schedule matters depending on your market.

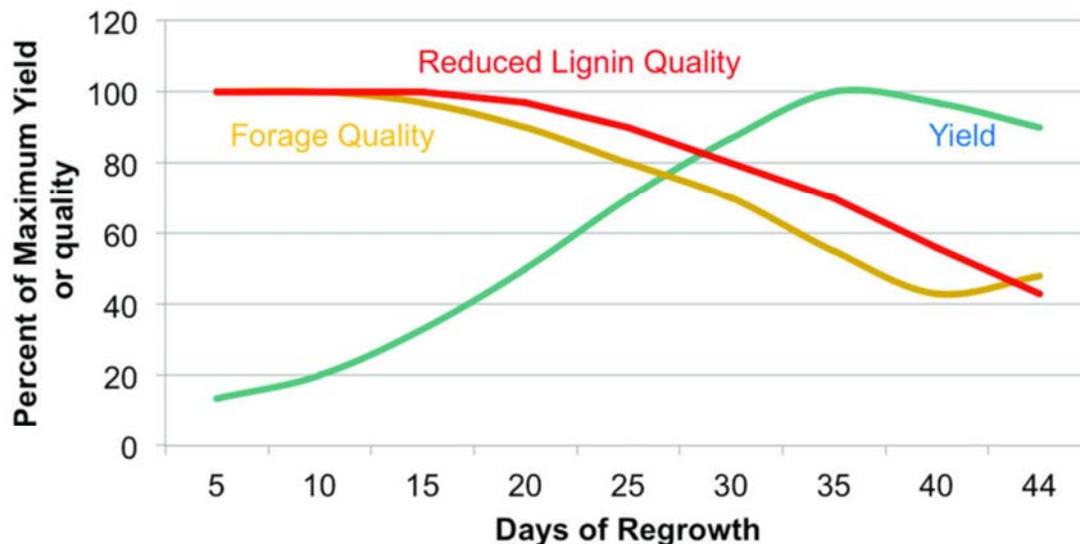
Why would I want to plant a “low lignin” variety? There are multiple reasons you might want to plant a low lignin variety. Generally lower lignin can mean higher forage quality. This can be managed one of two ways to maximize productivity by the producer. If the same cutting schedule is kept by a producer, low lignin alfalfa harvested at the same time will have higher forage quality than the normal variety. Alternatively, the cutting schedule can be extended so the alfalfa has a longer time to grow between cuts. This strategy allows greater yield to be achieved while maintaining forage quality of the hay for the dairy markets. By delaying harvest, the number of cuttings can be reduced, lessening impact of traffic across the field.

The chart below (courtesy of Dan Undersander and the University of Wisconsin Extension) shows the relation-

ship between alfalfa quality, yield and time of regrowth. The yellow line shows how forage quality decreases with time, and the green line shows how yield increases over time. The red line indicates the theoretical forage quality for the new low lignin alfalfa varieties. Looking at the figure can demonstrate how higher quality can be achieved by harvesting low lignin alfalfa on the same cutting schedule, or how delayed harvest can increase yields while maintaining quality.

Currently there are two types of low lignin alfalfa being marketed. One was conventionally bred by Alforex Seeds and is marketed as Hi-Gest. The other is a genetically modified crop from Forage Genetics marketed as HarvExtra. Currently, testing is still needed to evaluate the performance of both of these traits across the country, however, some initial testing has been done.

Research was conducted by six universities, headed by Mark Sulc at Ohio State University, to investigate the quality differences between low lignin alfalfa and conventional lines. Two studies were implemented, one to look at the change in forage values over time, and the second to look at cutting schedule on yield effect. All six study locations had HarvExtra where only two sites tested had Hi-Gest. Looking across all sites, the numbers supported that HarvExtra had higher quality than the conventional lines tested. On average it had the same nutritive quality as the standard alfalfa 10 days later. In other words, HarvExtra had the same forage quality 37 days after regrowth as the conventional line had 27 days after regrowth (metrics analyzed were ADL, NDFD, NDF, FFQ and CP). Little forage quality difference was observed between HiGest and the normal alfalfa. Trials were continued in 2017, and second year results will be presented this year in Reno at the Alfalfa Symposium.



If you would like more complete information on the trials conducted last year on low lignin alfalfa, I would encourage you to check out the following links:

Low Lignin Alfalfa - Wide Area Field Test Results - Mark Sulc, et. al.

- Paper: <http://alfalfa.ucdavis.edu/+symposium/2016/PDFfiles/16%20Sulc%20Mark.pdf>
- Video: <https://lecture.ucanr.edu/Mediasite/Play/47b07da582a14e108578c34358b495061d>

Defining and Redefining Forage Quality - David Combs

- Paper: <http://alfalfa.ucdavis.edu/+symposium/2016/PDFfiles/11%20Combs%20Dave.pdf>
- Video: <https://lecture.ucanr.edu/Mediasite/Play/dff2f67c46364b95992970e078ea538f1d>

Low lignin alfalfa still needs to undergo more testing, but has potential to give growers more options when it comes to cutting schedules while maximizing yields and forage quality.

*The University of California is not endorsing low lignin alfalfa or any specific varieties or traits.

Upcoming Events

Don't forget to register for the California Alfalfa and Forage symposium for 2017. It will be held November 28th to 30th, 2017, at the Grand Sierra Resort in Reno, Nevada. Registration needs to be completed online at <http://calhay.org/symposium/>, where the agenda can be found. The Tuesday workshop this year will be a full day focused on alfalfa and hay quality!

U.S. Department of Agriculture, University of California, and Lassen County Cooperating.

Farm Advisor's Update

is a occasional publication
distributed by the University of California
Lassen County Cooperative Extension

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