

CADES COVE SERICEA LESPEDEZA STUDY

Sericea lespedeza (*Lespedeza cuneata*) is an exotic shrubby deciduous perennial that can reduce or eliminate competing vegetation. It is an opportunistic and extremely competitive plant that can completely colonize fields. Its establishment is also enhanced by the use of prescribed fire. Fire can not only break the dormancy of lespedeza seed in the soil, but it will also create the perfect conditions for the germination of the lespedeza. *Sericea lespedeza* is found in various locations in Cades Cove and has become the dominant species in a number of fields. As lespedeza becomes the more dominant species in a field the diversity of that particular field will decrease.

Every year more prescribed burning is conducted in the cove in some of these fields that contain *sericea lespedeza*. There is some concern about the already observed increase in lespedeza numbers in these fields and the possibility of the spread of the population to even more fields. The fire monitoring transects have indicated that there has been an increase in *sericea lespedeza* particularly in field 14 of the Cades Cove hay lease plan.

The vegetation division decided to conduct a quick and dirty experiment to try to discover a method or herbicide that would effectively control lespedeza. Information from other land managers indicated that the herbicide Escort might be useful in the control of lespedeza. It was decided to test this herbicide and others.

The study site is located at meadow site 2 in Cades Cove, or in the field just east of the Elijah Oliver parking lot. This field has been burned for three consecutive years, 1997-1999. Over that time period the lespedeza has increased to the point where some areas of the field are basically a thicket of lespedeza. The actual study site was located so that the amount of lespedeza in each of the plots was similar, at least as much as possible.

Site Installation

The study site was installed on 8/10 and 8/15. It consists of 24, 10m X 10m plots laid out in a grid pattern as seen below. There is a 2m travel lane between the four rows of plots. These plots were installed with the use of only a compass and meter tape so the lines may be off a little. Rebar was installed in each corner of the plots and an identifying metal tag with the plot number was attached to the rebar in the southeast corner.

60 meters						
4 6 m e t e r s	1	2	3	4	5	6
	7	8	9	10	11	12
	13	14	15	16	17	18
	19	20	21	22	23	24

Monitoring

The monitoring method that was used for the 1995-1997 meadow restoration project was adapted for this project. The amount of time available to do the actual data collection was limited so we had to change the procedure a little to save time. The sampling frame was a meter frame with two nested plots at 10cm and 33cm. Data would be collected from two of these sampling frames randomly located in each plot. The presence of each species was recorded according to where it was located in the sampling frame in order to obtain frequency data. For example, a species that was found in the 10cm portion of the frame would be more frequent so that species was given a 3, while the species in the 33cm portion were given a 2 and so on.

In order to save time it was decided to only concentrate on 13 particular species, including the more common native and exotic species found in this particular field. The following is a list of those species.

Plantago sp.
Festuca elatior
Andropogon virginicus
Chrysanthemum leucanthemum
Trifolium sp.

Panicum anceps
Lespedeza cuneata
Setaria geniculata
Achillea millefolium
Tridens flavus

Paspalum sp.
Unidentified mint

Digitaria sp.

For each plot meter tapes were set up with the zero end for both tapes in the south east corner. These were used to locate the sampling frame points. A random numbers table was used to choose the coordinates for each sampling frame location. After the random point was found the sampling frame was placed at that point in the same position each time. Before taking the data at each sampling frame a lespedeza cover class was chosen using the following scale:

Class number	Percentage cover
1	0 - .1%
2	.1 - 1%
3	1 - 2%
4	2 - 5%
5	5 - 10%
6	10 - 25%
7	25 - 50%
8	50 - 75%
9	75 - 95%
10	95 - 100%

Then a lespedeza cover class was also given for the entire plot. The data for these plots was recorded on four different days: 8/15, 8/21, 8/24, and 9/5. See the excel file for actual data.

Lespedeza Spray Day

The 24 plots were divided into six different treatments, so there would be four replications of each treatment. The six treatments are as follows:

2% Accord	2% Garlon
0.5% Transline	1/2 oz./acre Escort
Mow	Control

The plots were sprayed on 9/6/00 by J. Beeler, M. Kloster, and J. Dumyahn. The day started out cloudy with temperatures in the 70's.

The backpack sprayers were filled before going to the field and extra supplies for mixing were also taken to refill the sprayers as necessary. One ounce of surfactant and 1/2 oz. of dye was added to each herbicide mixture. A representative of the herbicide company suggested that we use 1.1 grams of Escort to 4 gallons of water to make a mixture that is close to the 1/2 oz./acre prescription. It should be noted that it is important to be very careful with this herbicide and get the exact amount and no more since it is so potent.

We arrived at the site around 11:30. First M. Kloster took pictures of each plot looking from the southeast corner to the northwest corner. A sign with the plot number and treatment was held in the photo for each plot.

The treatments for the plots were also randomly chosen. See the following plot map for the treatment locations and amounts of herbicide used for each plot. It is important to note a couple things. First the amounts of herbicide applied might vary due to how much lespedeza was actually in the plot and also the amount may vary by how thoroughly each individual sprayed the lespedeza.

60 meters						
4 6 m e t e r s	Mow 1	Control 2	Garlon 12 L 3	Control 4	Escort 7.5 L 5	Mow 6
	Control 7	Accord 12 L 8	Accord 14 L 9	Escort 7.5 L 10	Control 11	Escort 7.5 L 12
	Transline 10 L 13	Garlon 16 L 14	Escort 7.5 L 15	Transline 8 L 16	Mow 17	Transline 7 L 18
	Transline 5 L 19	Mow 20	Garlon 11 L 21	Accord 12 L 22	Accord 12 L 23	Garlon 9 L 24

The spraying started around 1:30 and continued until 4:15. M. Kloster sprayed the 2% Accord, J. Beeler sprayed the 2% Garlon, and J. Dumyahn sprayed the 0.5% Transline and the Escort. In each plot only the lespedeza was sprayed, in order to mimic how the spraying would be done in the future if a concerted effort was made to begin killing the lespedeza. However, we did try to thoroughly spray the lespedeza. Right away we discovered that the 1/2 oz. of dye in the mixture was not enough to actually see which plants had already been sprayed. Since it was hard to tell which ones had been sprayed some of the plants either may have been sprayed twice or not at all in the beginning.

Therefore, the remainder of the herbicide mixtures that were mixed that day were made with at least 2 oz. of the dye. By the end of the day it had become only partly cloudy. We ran out of time to do the 4 plots that needed to be mowed that day. J. Dumyahn completed the mowing the next day, 9/7 by using a weed eater with a brush blade.

Follow-up visit

The site was visited on 10/18/00 after the treatments had been completed. Since it was fall most of the vegetation was already brown from the fall dieback. We looked at each of the treatments and recorded what was obvious at the time. The most common species that were still green at the time were fescue and wild onion.

Observations:

Accord - the fescue was brown as expected, but the wild onion and *Salvia lyrata*? were still green.

Garlon - as expected the fescue is still green

Transline - the fescue is still green

Escort - the fescue is still alive BUT yellowing. The fescue in the escort plots was not as green as the fescue in the control plots!!

NOTES:

+ Plot #9 is an accord treatment, but it looks like a 1.5mX1.5m area may have been missed - because the fescue is still really green.

+ Something to remember - since the lespedeza is so thick in patches the herbicide may not have made it below the lespedeza layer or only occasionally. So the vegetation below may have been protected in the really thick lespedeza areas.

+ These plots will be monitored next year to determine the effectiveness of each treatment in controlling the lespedeza.