

Small Ruminant Biological Control of Amur Honeysuckle and Common Buckthorn: Is it a Viable Option?

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Introduction

Many acres of forests and woodlands in the United States are invaded by non-desirable invasive understory vegetation such as Amur honeysuckle, buckbrush, common buckthorn, and multiflora rose. Amur honeysuckle (AH; *Lonicera maackii* Herder) and common buckthorn (CB; *Rhamnus cathartica* L.) are tall shrubs that are common invaders in forested lands across central and eastern United States. These shrubs grow readily in many soil types, climatic environments, and are often so prolific that they form dense understory thickets, which restrict native plant growth and tree seedling establishment.



Area of paddock along creek in April 2011, showing the understory canopy cover of honeysuckle before the study started.

Katahdin sheep making their way into the Amur honeysuckle understory.



Mechanical and chemical control can be effective methods for controlling these species but are expensive, and generally require many follow-up treatments to be successful. Use of small ruminant animals, particularly sheep and goats, may be increasingly important in areas where herbicides cannot be used, where other means of control are too expensive, or where landowners desire biological control methods. Small ruminants have been used as biological control agents for woody plants such as multiflora rose (Luginbuhl et al., 1999) and gambel oak (Davis et al., 1975). This project will look at the impact on vegetation and the small ruminant animals to determine if good economic returns of animal weight can be demonstrated by grazing AH and CB with small ruminants. If this is the case, then this control method may be appealing to producers.

Methods

On 20 April 2011, 49 pregnant Katahdin hair sheep were brought to the Plant Materials Center (PMC) in Elsberry, Missouri to be rotationally grazed through 19.2 acres that is divided into three paddocks infested with AH and CB. The ewes began lambing about 5 days later. All sheep were removed from the PMC on 13 June, to give the paddocks a re-growth period and so the lambs could be identified and ear tagged. Eight ewes and their 16 lambs were brought back on 22 June and rotationally grazed through the three paddocks. All of the sheep were removed 18 August because the sheep had grazed what they could up to a height of about 4.5 feet (1.4 m). The stocking rate was approximately 1.1 Animal Unit Month/Acre (AUM/ac).

Approximately every 21 days and when they were moved, each animal was evaluated for weight, body condition, FAMACHA[®], and fecal egg count (nematodes and coccidia). The FAMACHA[®] system is a method that estimates the degree of infection of the *Haemonchus contortus* parasite. The score is a range from 1-5, with 1 being that the eyelid membrane color is a dark red and indicates no significant anemia caused by the parasite, while a score of 5 indicates a white eyelid membrane and severe anemia.

Permanent vegetation monitoring points were established in all of the paddocks before the animals were brought in. Before and after the grazing season, pictures were taken and estimates of woody plant overstory basal area, cover, and species present were taken.



Katahdin sheep are able to browse these understory species up to about 4.5 feet.

Katahdin sheep browsing common buckthorn leaves.



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Results

The ewe and lamb results are summarized in tables 1 and 2. There was not an apparent difference in species composition of the understory species at any of the monitoring points within any of the pastures by the end of the 2011 grazing season.

Table 1. Mean results of Katahdin ewes.

	Total Gain (lbs)	Average Daily Gain (ADG) (lbs)	Body Condition Score	FAMACHA Score	Coccidia spp. count (#/g)	Fecal Egg (eggs/g)
Mean	-12.5	-0.37	3	2	-647	485
Standard Error	1.99	0.07	0.12	0.16	877	198

Lincoln University staff weighing the sheep going into a new paddock. The sheep were also tested for parasite loads approximately every 21 days.



Table 2. Mean results of lambs.

	Total Gain (lbs)	Average Daily Gain (ADG) (lbs)	Birth Weight (lbs)	End Weight (lbs)
Mean	16.8	0.4	13.4	30.3
Standard Error	0.93	0.01	0.37	0.92

Discussion

The negative ADG and total gain of the ewes is not unexpected, due to the fact that they lambed, and most ewes lose some weight during that time. The body condition and FAMACHA scores suggest that the Katahdin breed were resilient to the stresses of this study. However, the amount of weight that was lost may be of concern. The lambs gained weight throughout the season which suggests that grazing AH and CB may negatively alter ewe performance but may not negatively impact lamb performance.

Analysis of the vegetation monitoring points suggest that there was little, if any, change in the species composition after one year of browsing. It is expected that it will take at least 3 years of grazing to see a significant impact on the vegetation species composition.

For the 2012 grazing season, we expect to use Spanish goats instead of hair sheep. Spanish goats are touted as being more resistant to parasites and better able to control brush species than Katahdin sheep. Drift fence will also be used within each paddock to better control the intensity of grazing on the target brush species.

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