Determining Potential Hedgerow Species for Sheep Pasture in Vermont.

Vermont Grass Farmers Association Member Innovation Mini-Grant 2010

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1. Our Farm Operation: A Diversified organic market farm, including 7-12 Icelandic and Churro sheep for wool and meat, plus laying hens, on 5-10 acres.

2. Project Summary: During the 2011 grazing season, Bloomfield Farm coordinated and observed the interaction between potential hedgerow species and the above breeds of sheep, as well as cold hardiness of selected species. Based on these observations, compatibility of plant species for future pasture hedgerow for sheep was evaluated.

3. Selected plant species: The following plant species were selected, due to regional adaptability, growth habit, potential for additional farm yield, environmental benefit, benefit for grazing animals, or other desirable qualities.

Species	Qty	Price	Total	Source
Amelanchier alnifolia (Sakatoon)	2	$50	$100	ER
Amelanchier canadensis (Serviceberry)	2	$5	10	WNRCD
Amelanchier spp. (Juneberry)	2	$25	50	EH
Aronia melanocarpa (Black Aronia Berry)	3	$50	150	ER
Cornus sericea (Red Osier Dogwood)	2	$3	6	WNRCD
Crateagus crus-galli (Cockspur Hawthorn)	4	$50	200	ER
Hippophae rhamnoides (Seaberry)	3	$25	75	EH
Ribes spp. (Currant/Gooseberry)	4	$50	200	ER
Robinia pseudoacacia (Black Locust)	2	$5	10	LN
Rosa palustris (Swamp Rose)	1	$50	$50	ER
Rosa rugosa (Rugosa Rose)	2	NC	$0	BF
Rubus occidentalis (Red Raspberry)	4	NC	$0	BF
Salix viminalis (Basket Willow)	4	NC	$0	BF
Shepherdia argentea (Buffaloberry)	3	$25	$75	EH
Syringia vulgaris (Common Lilac)	3	NC	$0	BF
Viburnum prunifolium (Black Haw)	3	$25	$75	EH
Total Cost			$1001	

Plant source list

BF Bloomfield Farm
EH East Hill Tree Farm
ER Elmore Roots Nursery
LN Lawyer Nursery
WNRCD Winooski Natural Resource Conservation District

4. Implementation: In November of 2010, the above species were acquired and planted in the quantities indicated, in two locations along an existing north-south field boundary, to form beginning hedgerows. Ribes and Salix spp. were planted in a separate hedgerow from all other species. An existing hedge of Ribes spp. was also used.

During the 2011 grazing season, the sheep were introduced to each hedgerow for a short duration (1/2-1 hour), in two rotation over the season. The sheep interaction was closely monitored through personal observation, and recorded.

5. Results: The table below indicates browsing dates and character for each plant species.

Table 1: Plant species and date and character of browsing

Species	Date	# Plants	Browsed all repeatedly	Browsed leaf only	Limited or no browse	Notes
Amelanchier alnifolia (Sakatoon)	06/06/11	2	X			
	09/25/11		X			Especially favored
Amelanchier canadensis (Serviceberry)	06/06/11	2	X			
	09/25/11		X			Especially favored
Amelanchier spp. (Juneberry)	06/06/11	2	X			
	09/25/11		X			
Aronia melanocarpa (Black Aronia Berry)	06/06/11	3		X		
	09/25/11			X		
Cornus sericea (Red Osier Dogwood)	06/06/11	2	X			Especially favored
	09/25/11		X			
Crateagus crus-galli (Cockspur Hawthorn)	06/06/11	4		X		
	09/25/11			X		Leaves and new growth

Hippophae rhamnoides (Seaberry)	06/06/11	3			X	End of hedgerow. Passed over?
	09/25/11			X		
Ribes spp. (Currant and Gooseberry)	09/23/11	4	X			Favored leaf and new growth
Robinia pseudoacacia (Black Locust)	06/06/11	2			X	More upright. Some leaves out of reach?
	09/25/11			X		
Rosa palustris (Swamp Rose)	06/06/11	1			X	
	09/25/11			X		
Rosa rugosa (Rugosa Rose)	06/06/11	2			X	
	09/25/11			X		
Rubus occidentalis (Red Raspberry)	06/06/11	4			X	Plants too small, less noticeable?
	08/23/11		X			
Salix viminalis (Basket Willow)	09/23/11	4	X			
Shepherdia argentea (Buffaloberry)	06/06/11	3			X	
	09/25/11		X			
Syringia vulgaris (Common Lilac)	06/06/11	3	X			Especially favored
	09/25/11		X			Especially favored
Viburnum prunifolium (Black Haw)	06/06/11	3	X			Especially favored
	09/25/11		X			

6. Discussion of results: Based on these observations, we recommend that future research focus on evaluating more complete plantings of promising species

for use as hedgerows for small livestock in Vermont, including hawthorn, rugosa and swamp rose, seaberry, and black locust. Aronia may also be worthy of further evaluation. All species would require protection until established and mature.

7. Budget:

a. Plant materials: $1200 estimated (Some in-kind from farm)
b. Project planning, species acquisition and planting, sheep rotation using net fencing: 1 person @ approximately 24 hours
c. Observation and notation: 4 people @ 3 hours each

8. Further considerations:

Plant maturity: While some species may have been browsed heavily, older established plants may tolerate seasonal browsing with no long-term adverse effect. Hawthorn is an example, being browsed primarily at the leaf.

Plant quantity: Including a greater number of any species increases the probability of that species being browsed. Species were planted in various quantities due to costs and availability.

Seasonality: Sheep and other small livestock may browse the same species of plant differently at different times of year, due to changes within the plant chemistry, or due to changes in relative desirability of nearby plant species.

Condition and requirements of individual animals: The nutritional needs may guide the browsing habit of the individual animal, over a season as well as over the animals lifetime, due to changes in maturity, or health and illness.

Toxicity and nutritional value: During the research for this project, we found conflicting and incomplete information regarding the toxicity of plant species for sheep and goats. Much more information is available for cattle and horses, and too frequently toxicity is then generalized to other livestock without any research. This is true for black locust. Other species may be toxic in larger quantities only, or at certain times of year or stages of growth, and otherwise not pose a threat to livestock. Some plants may be toxic, but may also be browsed in combination with other plants that may neutralize toxicity. There is also evidence and suggestion that many animals may have a good sense of which plant is safe or toxic, and have the ability to self-moderate. This could also be related to breed.

Variation among breeds: Some breeds, especially older or pure breeds, may be better adapted to a wider variety of browse.

Individual behavior: Animals develop individual preferences. Individual behavior can also influence grazing and browsing habits of other members in a flock.

Stocking rate/density: Higher rates and densities and shorter durations may encourage more competitive or indiscriminate browsing. Longer durations in each paddock may also encourage more experimental browsing.