

Starting Over: Pasture Establishment and Renovation

Lesson Description

Pastures can serve as a great renewable resource if managed properly. Inefficiently managed pastures can strip the land, increase erosion, and add to ground and surface water contamination. It is not unusual to see pastures that are overstocked and overgrazed in our area. Good management practices will help maximize the productivity of your pastures and minimize any adverse environmental impacts.

Pasture establishment and renovation may be one option to increase productivity and reduce erosion. An added benefit is that healthy pastures are much more aesthetically pleasing. The purpose of this lesson is for pasture owners to understand why establishment and renovation are important in improving their pastures both for animal nutritive value as well as cost efficiency. The techniques used and influencing factors will be discussed. Selection of the forage type(s) is critical in developing a good and productive pasture. Characteristics of forages and their uses will be presented.

Lesson Objectives

1. Learn to identify their pasture needs in reference to pasture establishment and/or renovation.
2. Learn different techniques for pasture establishment.
3. Discuss the costs associated with different methods of pasture establishment.
4. Examine factors that should be considered prior to renovation.
5. Learn about some individual forage plants, their characteristics, advantages and disadvantages.



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Lesson Worksheets

1. Pure Live Seed Calculations Activity Sheet
2. Sample Seed Tags for Pure Live Seed Calculations Information Sheet
3. Cost of Establishment and Renovation Activity Sheet
4. Forage Species Adaptation Information Sheet

Supplemental Resources

Pasture and Hayland Renovation for Western Washington and Oregon, WSU Extension

Endophyte Toxins in Grass Seed Fields and Straw, OSU Extension

Fertilizer Guide – Pastures: Western Oregon and Western Washington, OSU Extension



Pure Live Seed Calculations Activity Sheet

Pure live seed (PLS) = Percent purity x Percent germination

Percent purity is the percentage of seed that is the desired forage seed.

Percent germination is the percentage of seed that germinates when planted.

Seed required to achieve desired seeding rate = Desired seeding rate / PLS

Example: Alfalfa seed
 Desired seeding rate = 12 lbs per acre
 Germination = 85 percent
 Purity = 96 percent

Seed Type	Desired Seeding Rate Per Acre	Germination (percent)	Purity (percent)	Pure Live Seed (PLS) (percent)	Desired Seeding Rate / PLS (percent)	Seed Needed per Acre
Example: Alfalfa	12 lbs	0.85 (85 percent)	0.96 (96 percent)	0.816 (81.6 percent)	$\frac{12 \text{ lbs per acre}}{0.816}$	14.7 lbs



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Sample Seed Tags for Pure Live Seed Calculations Information Sheet

KIND & VARIETY: Red Top

LOT: 54.3174A

PURE: <u>94.88%</u>	GERM & HARD: <u>90%</u>
CROP: <u>10%</u>	GERMINATION: <u> %</u>
INERT: <u>4.56%</u>	HARD: <u> %</u>
WEEDS: <u>0.46%</u>	TESTED: <u>10-92</u>
ORIGIN: <u> ID</u>	NET WT: <u> 2 #</u>
NOXIOUS WEEDS: <u>none</u>	PO#: <u> </u>

A.V. Seeds, INC. 4625 Colorado Blvd
Denver, Colorado 80216

KIND & VARIETY: Big Bluestem

LOT: BR-955B

PURE: <u>59.87%</u>	GERM & HARD: <u>76%</u>
CROP: <u>0.88 %</u>	GERMINATION: <u> %</u>
INERT: <u>39.23%</u>	HARD: <u> %</u>
WEEDS: <u>0.02%</u>	TESTED: <u>8-92</u>
ORIGIN: <u> MO</u>	NET WT: <u> 2 #</u>
NOXIOUS WEEDS: <u>none</u>	PO#: <u> </u>

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Cost of Establishment and Renovation Activity Sheet

Instructor: Estimate the cost of establishment and renovation per acre for your area. Use Doane’s Custom Machinery Rates Guide or local machinery costs. Outline the necessary tillage steps and their cost. Add in the cost of seed and fertilizer. Discuss other costs, such as loss of use of pasture while renovating. Below is a sample calculation:

TILLAGE	
Moldboard plow	\$24.00 / acre
Disk	\$10.00 / acre
Apply fertilizer	\$ 5.00 / acre
Disk (incorporate fertilizer)	\$10.00 / acre
Harrow	\$ 7.00 / acre
Harrow	\$ 7.00 / acre
Planting(conventional)	<u>\$ 9.50 / acre</u>
Tillage cost	<u>\$72.50 / acre</u>

SEED
Alfalfa, \$3.25 / pound @ 15 pounds / acre = \$48.75 / acre

FERTILIZER
80 pounds / acre @ 0.45 / pound = \$36.00 / acre

TOTAL	
Tillage cost	\$72.50 / acre
Seed cost	\$48.75 / acre
Fertilizer cost	<u>\$36.00 / acre</u>
TOTAL COST	\$157.25 / acre

Your Calculation

TILLAGE: _____

SEED: _____

FERTILIZER: _____

OTHER COSTS: _____

TOTAL: _____



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Forage Species Adaptation Information Sheet

Species	Partial Flooding	Severe Flooding	Moderate Salinity	Severe Salinity	Moderate Acidity	Moderate Alkalinity	Good Moisture, Poor Drainage	Good Moisture, Good Drainage	Semi-moist	Semi-dry	Dry	Very Dry	Winter* Hardiness	Shade Tolerance
Cool-season Grasses														
Basin wildrye	X		X		X	X		X	X	X	X		XXX	
Crested wheatgrass	X		X		X	X				X	X		XXX	
Intermediate wheatgrass	X		X		X			X	X	X	X		XXX	
Kentucky bluegrass	X				X		X	X	X				XXX	
Meadow brome					X			X	X	X	X		XXX	X
Orchardgrass					X			X	X				XX	X
Perennial ryegrass	X		X		X	X		X	X					
Reed canarygrass	X	X	X		X	X	X	X					XXX	
Russian wildrye			X	X		X				X	X	X	XXX	
Siberian wheatgrass	X		X			X				X	X	X	XXX	
Slender wheatgrass			X	X		X		X	X	X			XX	X
Smooth brome	X		X		X	X		X	X	X			XX	
Tall fescue	X		X	X	X	X	X	X	X				XXX	
Tall wheatgrass			X	X	X	X	X	X					X	
Timothy	X				X	X	X	X	X				XXX	X
Western wheatgrass	X		X			X	X	X	X	X	X		XXX	X

* X = moderate winter hardiness; XX = good winter hardiness; XXX = excellent winter hardiness



Forage Species Adaptation Information Sheet

Species	Partial Flooding	Severe Flooding	Moderate Salinity	Severe Salinity	Moderate Acidity	Moderate Alkalinity	Good Moisture, Poor Drainage	Good Moisture, Good Drainage	Semi-moist	Semi-dry	Dry	Very Dry	Winter* Hardiness	Shade Tolerance
Warm-season Grasses														
Alkali sacaton	X	X	X	X		X			X	X	X		X	
Big bluestem					X			X	X	X			X	
Indiangrass			X		X	X	X	X	X	X	X		X	
Little bluestem					X	X		X	X	X	X	X	X	X
Sideoats gramma			X		X	X		X	X	X			X	
Switchgrass	X		X		X	X		X	X	X	X		XX	X
Sudan			X		X	X		X			X			
Legumes														
Alfalfa			X	X		X		X	X	X	X	X	XX	
Alsike clover	X	X			X		X	X	X				X	
Birdsfoot trefoil		X			X		X	X	X	X			X	
Cicer milkvetch	X	X	X			X				X	X		XXX	
Red clover	X		X		X	X		X	X	X			XX	
Sainfoin			X		X	X	X	X	X	X	X		XX	
Strawberry clover	X		X	X	X	X	X	X	X				X	
Subterranean clover	X	X			X		X	X	X	X	X		XX	X
Sweetclover	X	X	X		X	X		X	X	X	X		XX	
White clover	X		X		X	X	X	X	X				XX	

* X = moderate winter hardiness; XX = good winter hardiness; XXX = excellent winter hardiness



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Starting Over: Pasture Establishment and Renovation Glossary

Annual: Plant that completes its life cycle, growing from a seed to producing seed, in one growing season.

Biennial: A plant that completes its life cycle in two years. First year growth consists of low growing leaves; the second year growth includes flowers and seeds.

Bloat: Swelling of the abdomen in grazing animals, most commonly caused by animals consuming too much high quality, lush legumes or lush young grasses.

Bunchgrass: Grass that propagates by seed and basal tillering only (no rhizomes); forms clumps, not sod.

Cool-season grass: Grass species adapted to rapid growth during the cool, moist period of the year; this type of grass is usually dormant during the hot weather.

Cultivar: Refers to a specific variety within a plant species.

Establishment: Planting a pasture where there is no existing pasture.

Frost seeding: Seeding in winter directly on the soil surface; freeze-thaw action will cover the seed to about the right depth.

Germination: The physical and chemical changes that take place as a seed starts to grow and develop into a plant.

Legume: Plant of the pea family, generally has the ability to fix nitrogen from the atmosphere into the soil, where it becomes available to plants.

Pasture: Ground or field suitable for grazing.

Perennial: Plant that lives for three or more years, even though some perennials die down to the ground each year..

Pure live seed (PLS): Term used to express the percentage of desired plant species that will actually germinate in a given sample of seed.

Renovation: Series of actions that lead to a long-term change in the botanical composition of a pasture.

Rhizome: Underground stem, usually horizontal, capable of producing new shoots and roots at the nodes.

Sod: Top few centimeters of soil permeated by and held together with plant roots.

Sod-forming grass: Grass that propagates by seed and vegetatively by rhizomes and/or stolons to form a sod.

Species: Refers to the type of plant or animal.

Stolon: Trailing or lateral stem forming at or below the soil surface, capable of rooting and sending up new shoots at the nodes.

Warm-season grass: Grass species that makes its major growth during the warmer part of the year.



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Web sites for further information

Washington State University Small Farm Team: Pastures and Forages,
<http://smallfarms.wsu.edu/crops/pastureforage/>

Oregon State University Small Farms: Pasture Management
<http://smallfarms.oregonstate.edu/pastures>

Forage Information Systems, <http://forages.oregonstate.edu/index.cfm>

Purdue University Forage Information Service: <http://www.agry.purdue.edu/Ext/forages/index.html>

Purdue University Pasture Establishment Page
<https://www.agry.purdue.edu/ext/forages/publications/ay251.htm>

Kansas Wildflowers and Grasses, <http://www.kswildflower.org>

National Forage and Grasslands Curriculum, <http://forages.oregonstate.edu/nfgc/references>

NRCS Grazing Lands, <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/rangepasture/>

NRCS Plant Characteristics and Plant Guide Service, <http://plants.usda.gov/gallery.html>

Oklahoma Forages Home Page, <http://www.forageandpasture.okstate.edu/>

