NORTHEAST
EXTENSION
RISK MANAGEMENT
EDUCATION

USDA United States Department of Agriculture National Institute of Food and Agriculture

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Learning from Our Observations of Pastures & Livestock



Preventing Pasture Problems and Pitfalls

Sarah Flack, Sarah Flack Consulting

Don't just do what you are told, Understand why…

- **Understand the needs of pasture plants & Basic Principals of Good Grazing Systems**
- **Understand the needs of grazing livestock**
- **Putting it together so pastures improve & livestock are healthy & productive**
- **Monitoring & Observation of pastures & livestock**

"The management of the pasture is even of more importance than the selection of the seed and the preparation of the land." -1898 Robert H. Elliot

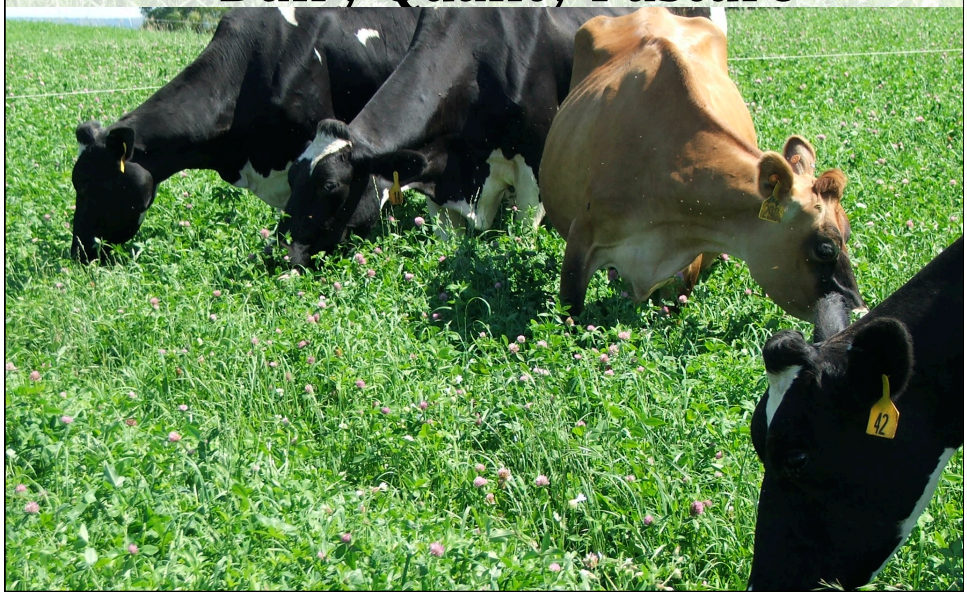






Non grazing adapted species replaced by grazing adapted plants

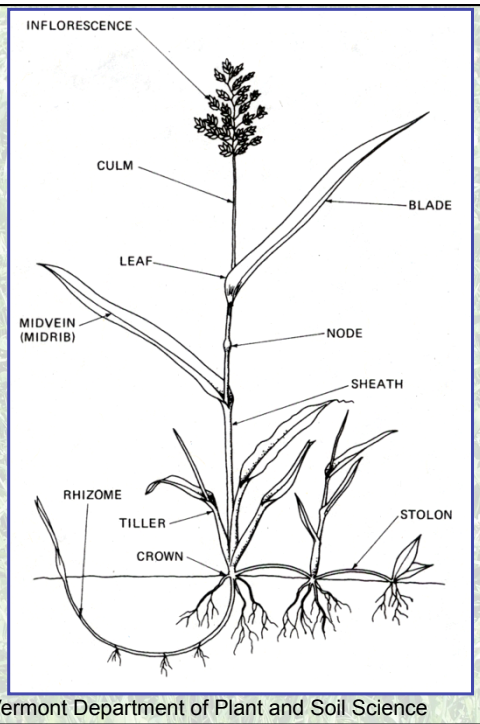
Grazing Adapted Species = Dairy Quality Pasture



Grass Parts

Stems
Leaves
Flowers
Roots

Tiller
Stolon
Rhizome
Crown

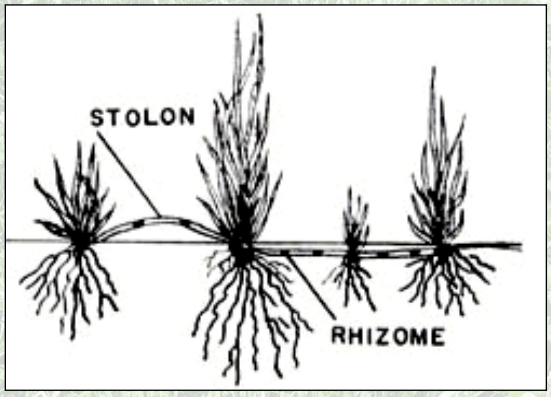


Slide credit: Sidney Bosworth, University of Vermont Department of Plant and Soil Science

Growth Habit



Bunch grasses

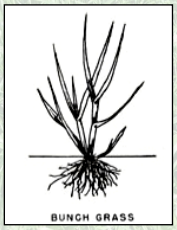


Sod-forming grasses

Slide credit: Sidney Bosworth, University of Vermont Department of Plant and Soil Science

Bunch Grasses

Grasses with basal tillers but no lateral stems are considered *bunch grasses*.



- Timothy
- Orchardgrass
- Tall and meadow fescue
- Ryegrasses
- Festulolium





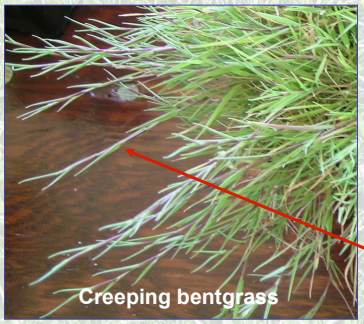


Slide credit: Sidney Bosworth, University of Vermont Department of Plant and Soil Science

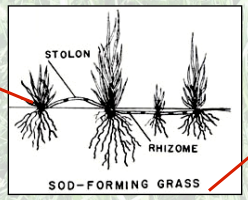
Sod-Forming Grasses

Grasses with lateral stems are considered *sod-forming grasses*.

- Kentucky bluegrass
- Smooth bromegrass
- Reed canarygrass
- Quackgrass
- Bentgrasses

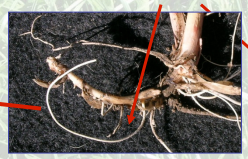








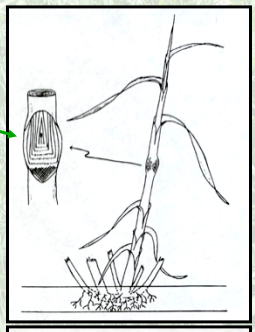




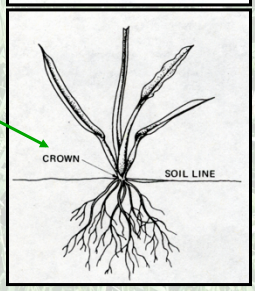
Slide credit: Sidney Bosworth, University of Vermont Department of Plant and Soil Science

Regrowth Characteristics

- **Jointing grasses:**
  (Growing point elevates at regrowth)
  - Timothy
  - Smooth bromegrass
  - Reed canarygrass



- **Non-jointing grasses:**
  (Growing point stays at crown)
  - Orchardgrass
  - Tall fescue
  - Perennial ryegrass/festuloliums
  - Ky bluegrass



Slide credit: Sidney Bosworth, UVM Dept of Plant and Soil Science



Photo "Poa pratensis" credit: Veldbeemdgras under a Creative Commons Attribution-Noncommercial license. Available at: http://commons.wikimedia.org/wiki/File:Veldbeemdgras_Poa_pratensis.jpg



Legume Growth Habits



White clover has a creeping growth habit using stolons. Note the adventitious roots initiated from stolon nodes.







Many forage legumes regrow from a crown and are simple perennials that do not creep. They usually have taproots.

Slide credit: Sidney Bosworth, University of Vermont Department of Plant and Soil Science

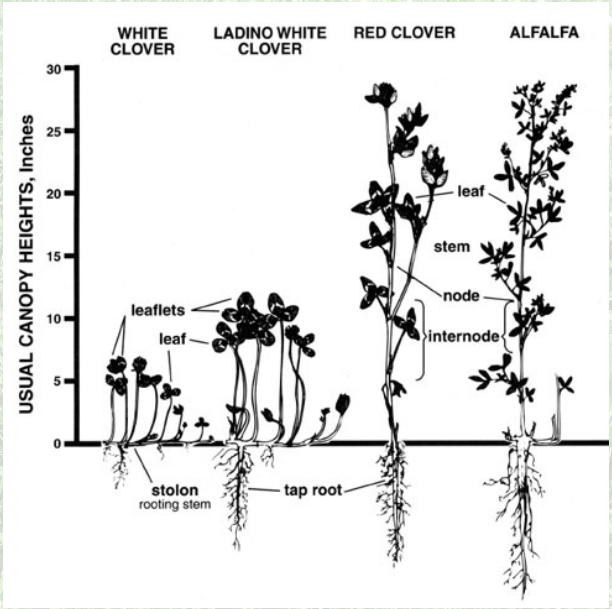


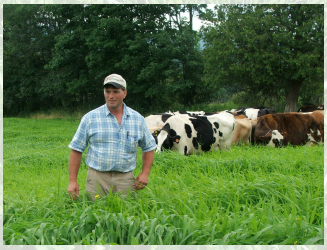
Figure credit: White, Harlan E. and Dale D. Wolf. 2009. Controlled Grazing of Virginia's Pastures. Virginia Cooperative Extension, Virginia Tech, and Virginia State University.

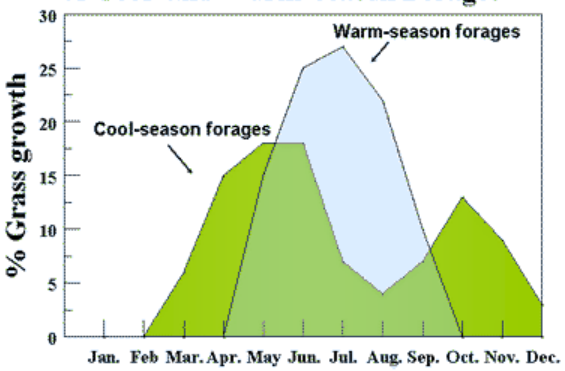
Grazing Guidelines

- Variable recovery periods based on speed of plant growth.
- Short periods of occupation to prevent re-grazing of plants.

Dealing with Forage Gaps and avoiding overgrazing damage







Top: forage brassica, Photo credit: Cindy Daley.
Bottom: Japanese millet, Photo credit: Sarah Flack

Source: http://www.aragriculture.org/ forage_pasture/ Management_Guides/Forages_Self_Help_Guide1.htm

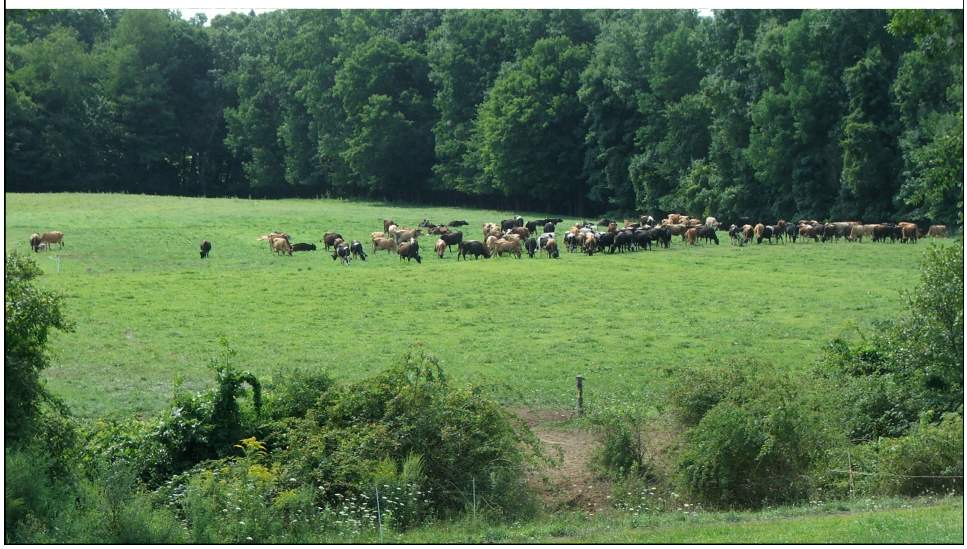


Managing the forage gap to avoid overgrazing damage





Graziers tools: stocking density, pre grazing height, residue, regrowth period

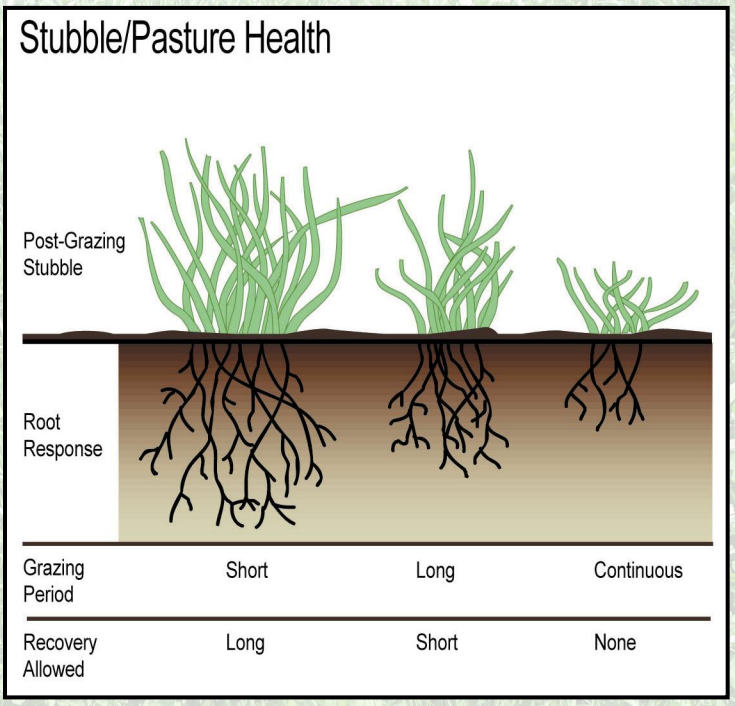


Graziers tools: Trampling, manure distribution – herd effect



The worst is a long period of occupation combined with short recovery period.

Photo credit: Graphic adapted by A. Miller Black Dog Miller, from Grass: The Stockman's Crop by H. E. Deitz.



Short period of occupation
Long (enough) regrowth period



Short period of occupation
Long (enough) regrowth period



From the animals perspective, we want to maximize bite size & quality to increase DMI

Cows can only take a limited number of bites/day



How to maximize Pasture DMI?

Short periods of occupation.

Long enough regrowth time to allow ideal pre grazing height.

How to improve pastures?

Short period of occupation.

Long enough regrowth time to allow plants to fully recover.

The goal: Tall enough for the plants to be fully recovered but not so over-mature that they have become too high fiber/low digestibility for the livestock.

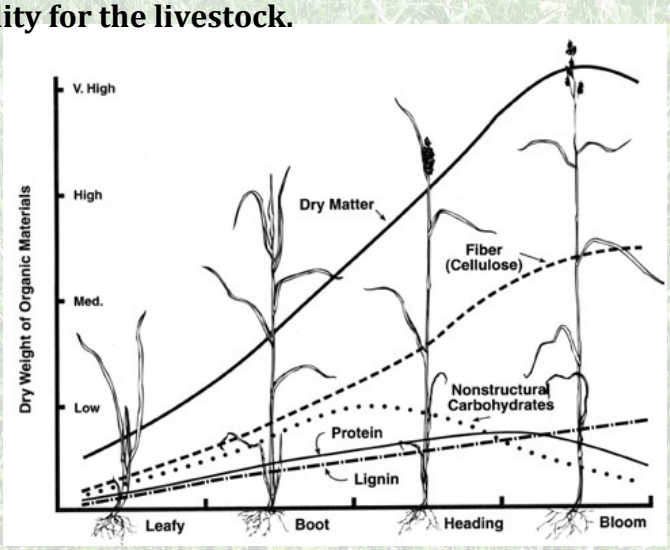


Figure credit: White, Harlan E. and Dale D. Wolf. 2009. Controlled Grazing of Virginia's Pastures. Virginia Cooperative Extension, Virginia Tech, and Virginia State University.

- NDF increases as plants mature
- NDF predicts "rumen fill" or DMI
- As the fiber component is reduced, cows can eat more (faster rates of passage, more feed throughput)

As NDF goes down
DMI goes up



High protein without enough energy?

- Excess protein converted into ammonia
- Absorbed into bloodstream creating high BUN/MUN's – results in compromised health
- Excess nitrogen excreted in urine (lost)



Observation Tools: What is the cow telling us?



Rumen Fill

Body Cond.

Rate of Gain

Milk Prod.

Reproduction

Observation Tools: What is the manure telling us?



Manure Scoring



Score 1
Photo credit: Robert DeClue, USDA NRCS



Score 2
Photo credit: Robert DeClue, USDA NRCS



Score 3
Photo credit: USDA NRCS Photo Gallery



Score 4
Photo credit: Robert DeClue, USDA NRCS



Score 5
Photo credit: Robert DeClue, USDA NRCS

Refer to "Managing Dairy Nutrition for the Organic Herd: Assessing the Feeding Program by Karen Hoffman: www.extension.org/pages/68571

Observation Tools: What are the plants telling us?



Understanding Over Grazing

- Over grazing occurs when livestock graze a plant while it is still growing from carbohydrate reserves, rather than from active photosynthesis
- Over grazing commonly occurs when animals stay in a paddock for too long, or are returned to a paddock too soon.

The most critical time to NOT graze



Common Over Grazing Situations

- Taking down all the interior fences when pasture growth slows to let livestock "clean up" the pastures.
- Having a fixed "rotational" grazing system.
- Leaving animals in a pasture for more than 3 days.
- Clipping after regrowth has started.

Obvious overgrazing…





Still fairly obvious overgrazing…



But this is also overgrazing…



Different management systems 10 years later…



Pasture Monitoring

Weeds?
Vigor?
Density?
Diversity?
Thatch?
Biological activity?
Bare soil?
Soil crust/ capping?
Erosion?





Observation Skills







Signs the Pasture is Not Improving:

- Fewer plant species or lower species diversity
- Increasing numbers of annual plant species
- More bare soil visible between the plants
- Slower plant growth
- Shorter season of productive growth
- Low biological activity of decomposing organisms - manure doesn't decompose rapidly

An Improving Pasture will have:

- Closer plant spacing/ higher plant density
- Less bare soil visible
- More rapid plant growth
- Plants growing over a longer growing period
- High soil biological activity - manure decomposes more rapidly
- More plant species - high diversity
- More Perennial plant species

Understanding the fundamental principals of good grazing management

It is still possible to do poor grazing management even in a well designed system!

Resources

- eOrganic dairy articles:
  - www.extension.org/pages/18624
- Grazing articles available:
  - www.sarahflackconsulting.com
- Pasture/ecosystem monitoring:
  - http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044243.pdf
  - http://holisticmanagement.org/