

# Understanding Pasture Soil Health, Weed Management and Extending the Grazing Season



2015 Tri-State Beef Conference

Johnny R. Rogers M.S. PAS

Amazing Grazing Program Coordinator  
NC State University

# What is Amazing Grazing?



An educational program striving to improve pasture management through a better understanding of Pasture Ecology

- ❧ Training for advisors. Extension agents, conservationists, veterinarians, industry consultants
- ❧ Training for producers
  - ❧ Publications
  - ❧ Hands-on workshops
  - ❧ Demonstrations





# Well managed pasture/range is one of the hidden resources that will be key to the future of the world



Thoughtful pasture management leads to improved:

- ❧ soil health
- ❧ water infiltration
- ❧ animal well-being
- ❧ economic returns
- ❧ lifestyle



# Improving Soil Health in Pasture Based Livestock Systems



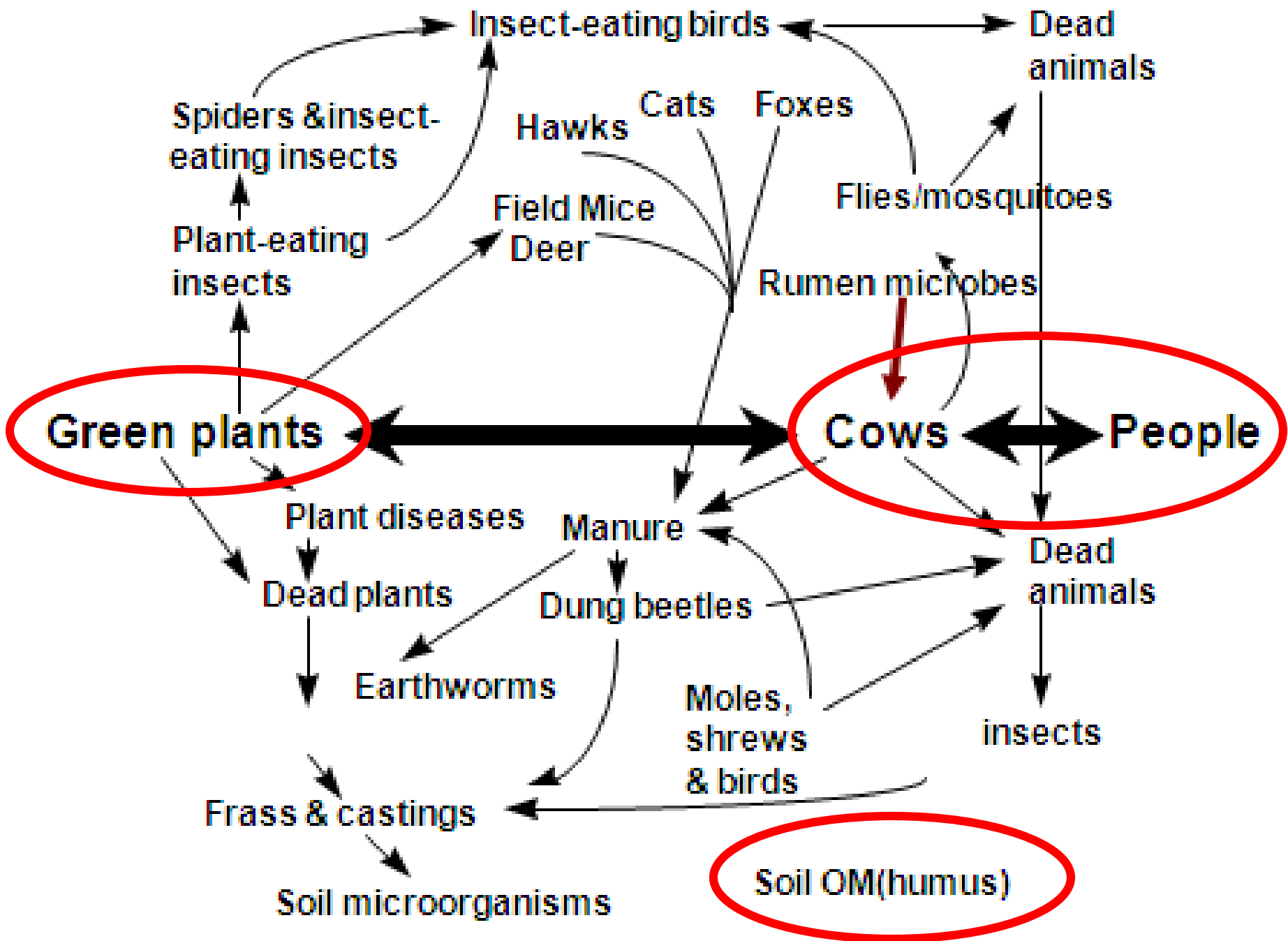
## Conservation Innovation Grant Project

Principle Investigator: Dr. Matt Poore

Project Coordinator: Johnny R. Rogers

**AmazingGrazing**  
NC STATE UNIVERSITY'S  
Pasture-Based Livestock Education Program







# Soil Health Principles



Keep plants  
growing  
throughout  
the year to  
feed the soil



Use plant  
diversity to  
increase  
diversity in  
the soil

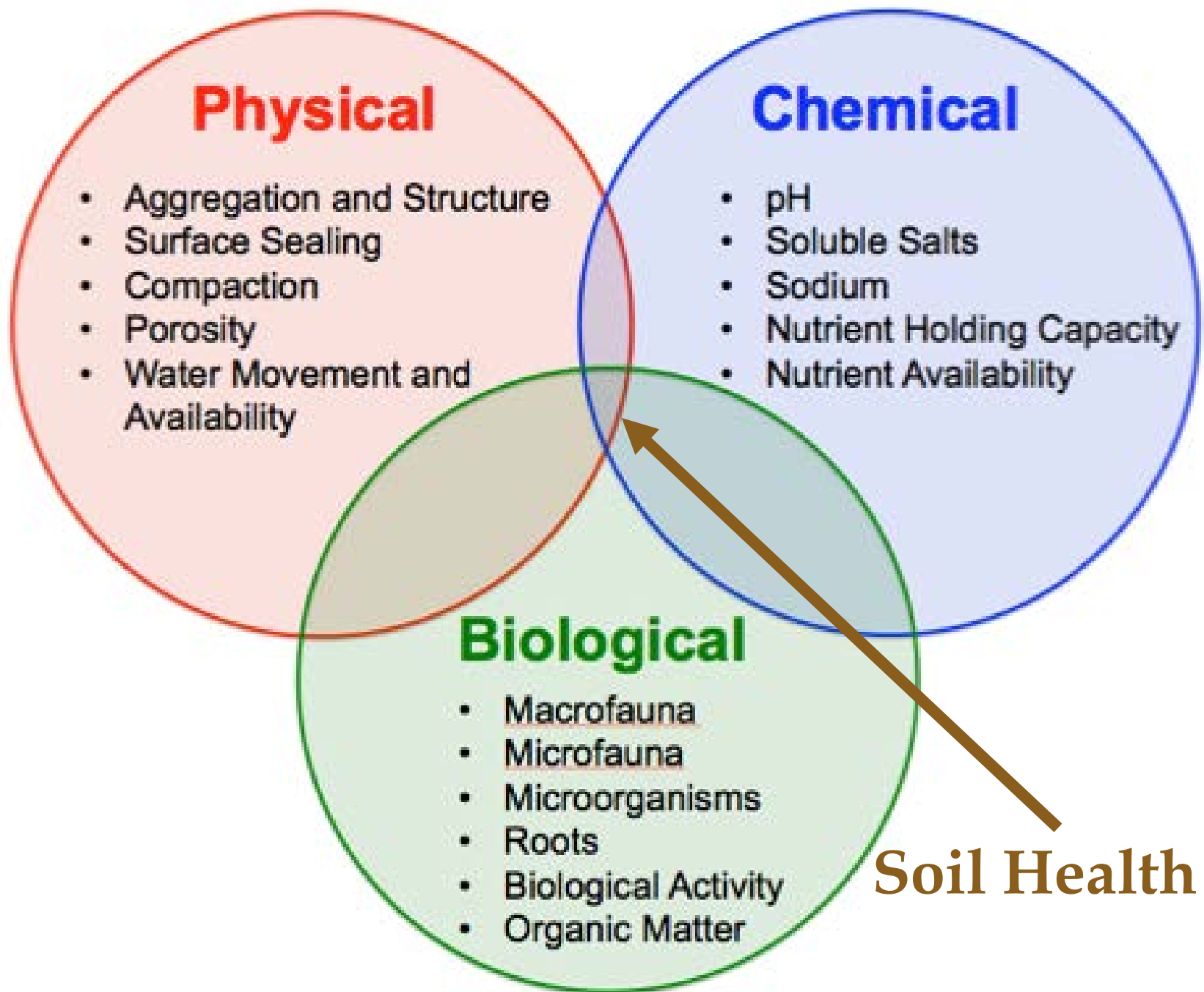


Keep the soil  
covered as  
much as  
possible

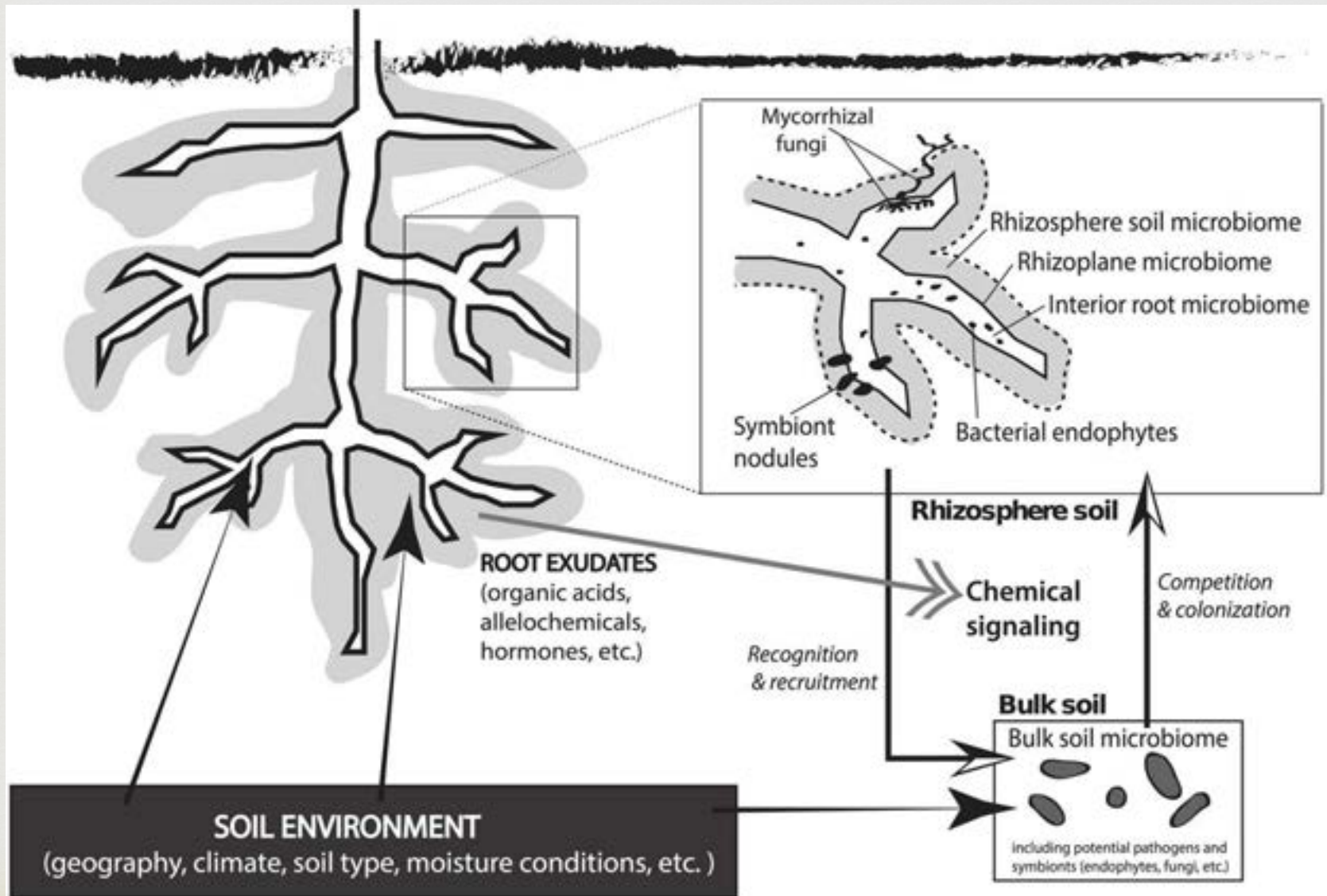


Manage soils  
more by  
disturbing  
them less



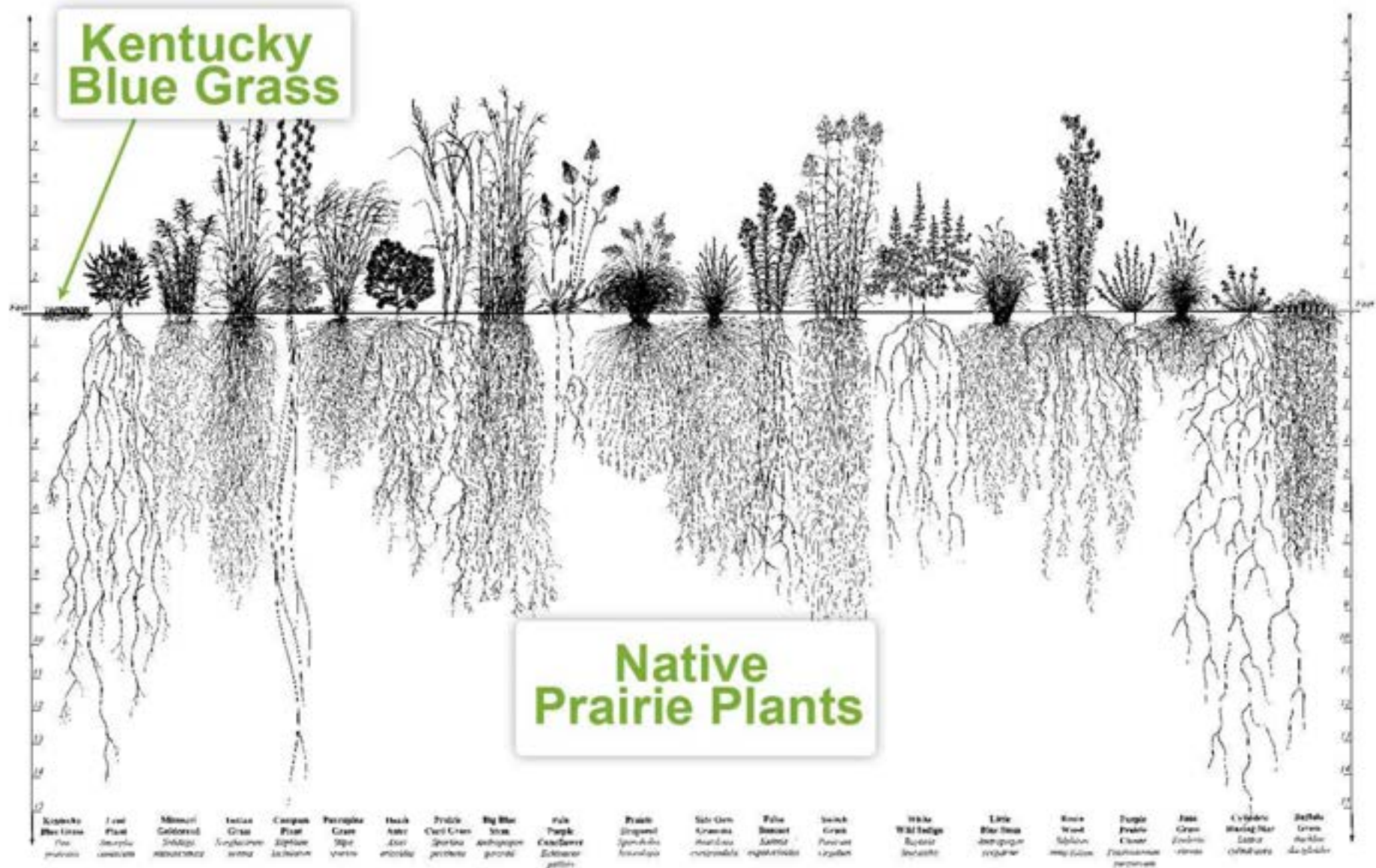


# Keep Plants Growing Throughout the Year to Feed the Soil





# Plant Diversity leads to Root Diversity



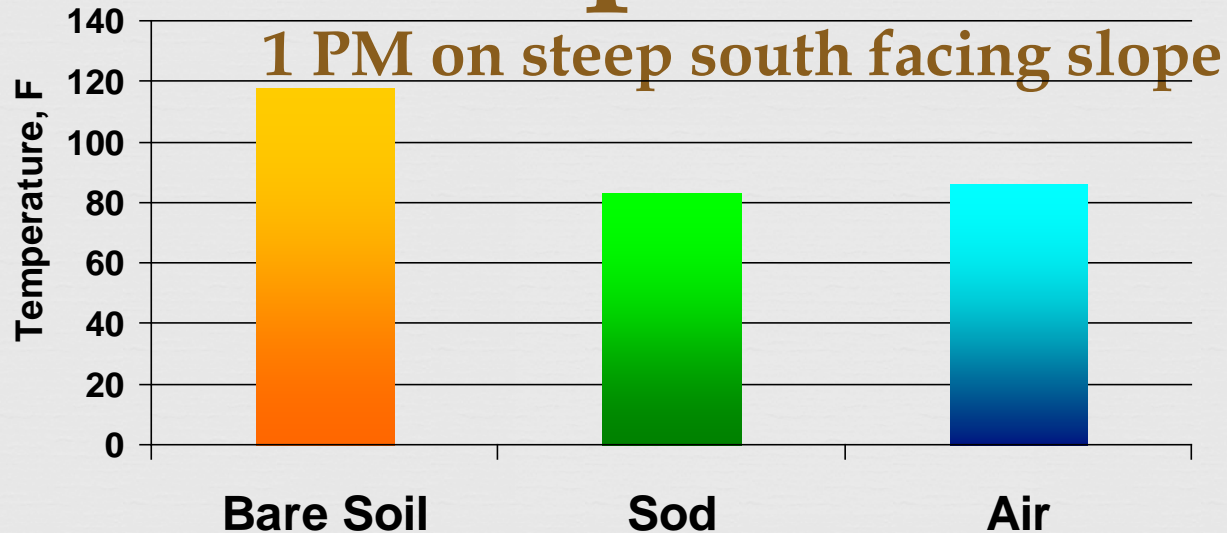
# Keep the Soil Covered as Much as Possible



- ❧ Proper stock density tramples residue onto soil surface
- ❧ Keeps the soil cool for optimal microbial activity
- ❧ Water infiltration
  - ❧ Effective rainfall
- ❧ Evaporation/transpiration



# Soil surface Temperatures



**Temperature impacts plant tissue survival, soil organisms and animal comfort**

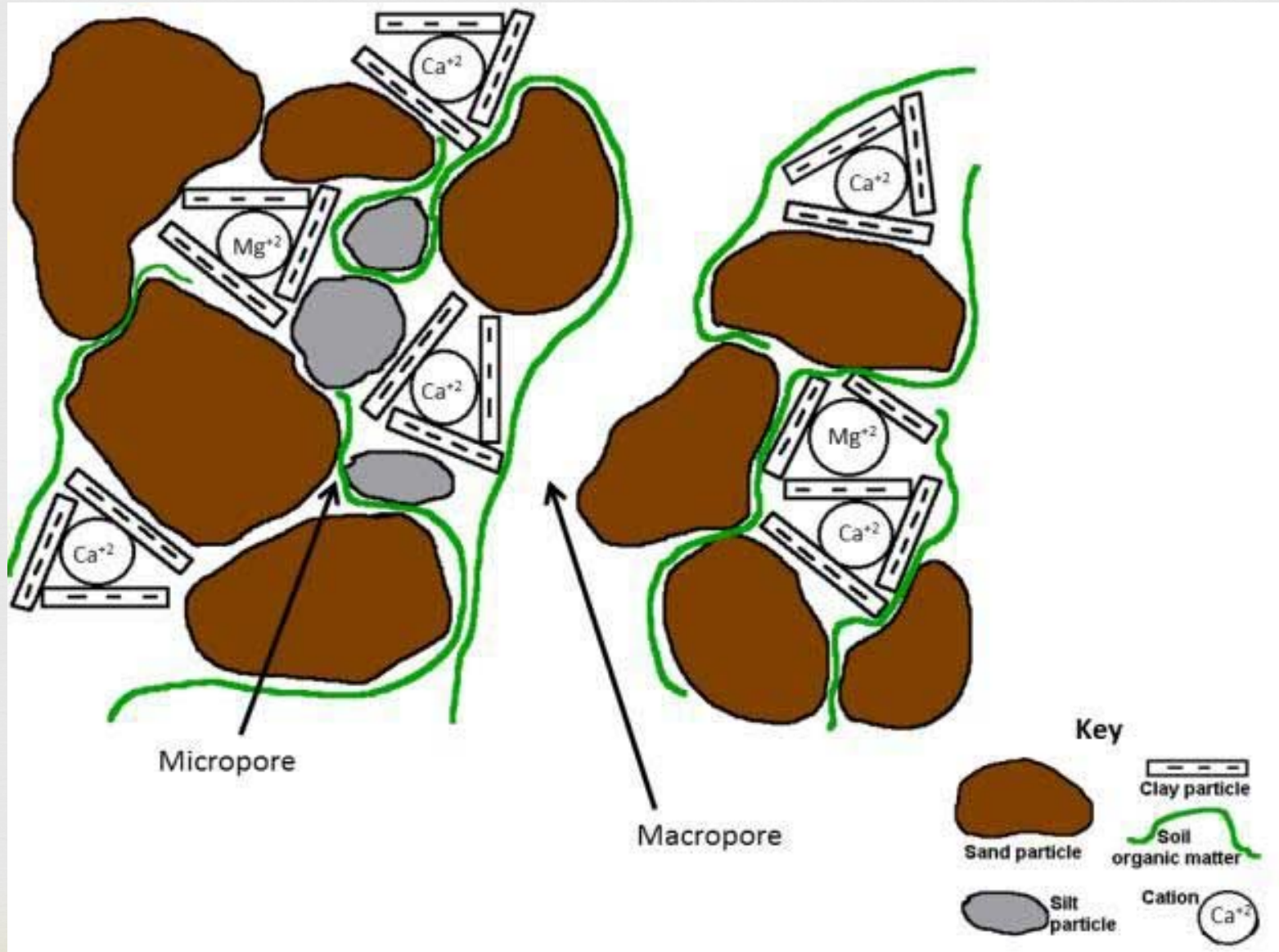






# Manage soils more by disturbing them less

## “The Importance Soil Structure”



# How can we disturb the soil in grazing systems?

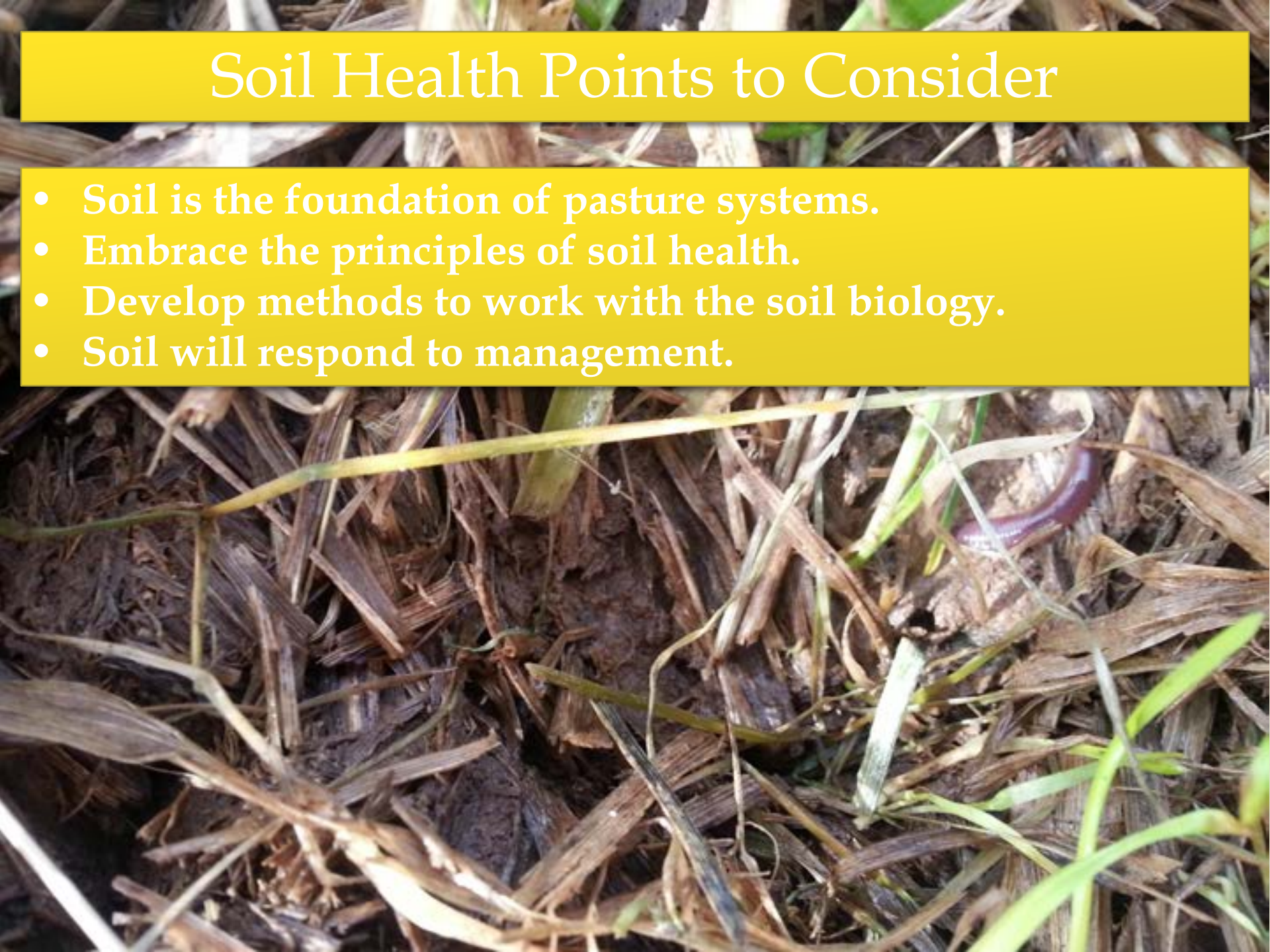
- ❧ Grazing
- ❧ Equipment traffic
- ❧ Mowing
- ❧ Fertilizer/manure
- ❧ Herbicides
- ❧ Parasite/fly control





# Soil Health Points to Consider

- Soil is the foundation of pasture systems.
- Embrace the principles of soil health.
- Develop methods to work with the soil biology.
- Soil will respond to management.





# My Perspective on Weeds in Pasture Systems



# What is a Weed?

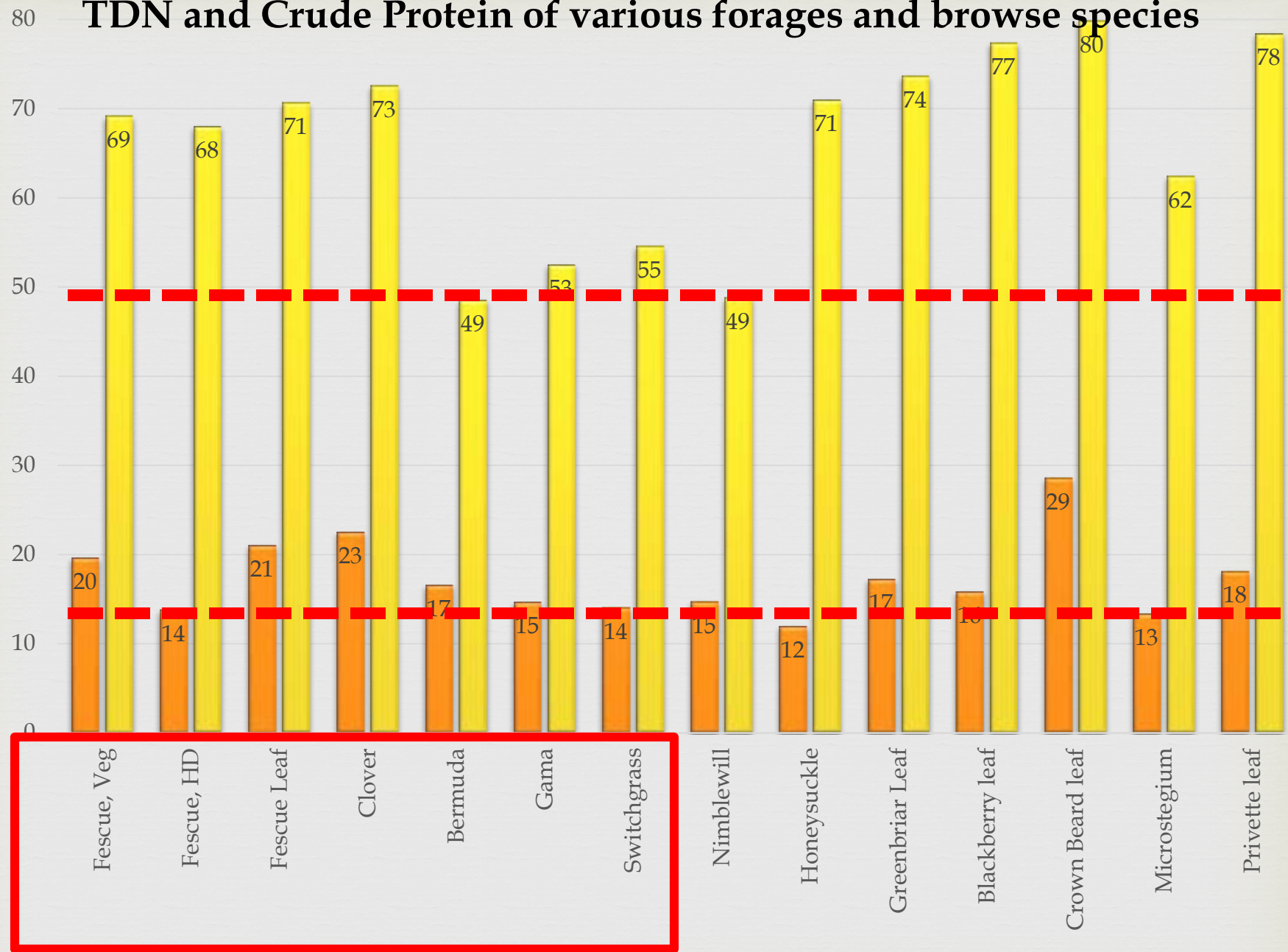


A weed is a plant considered undesirable in a particular situation, "a plant in the wrong place". Examples commonly are plants unwanted in human-controlled settings, such as farm fields, gardens, lawns, and parks. Taxonomically, the term "weed" has no botanical significance, because a plant that is a weed in one context is not a weed when growing in a situation where it is in fact wanted, and where one species of plant is a valuable crop plant, another species in the same genus might be a serious weed, such as a wild bramble growing among cultivated loganberries.



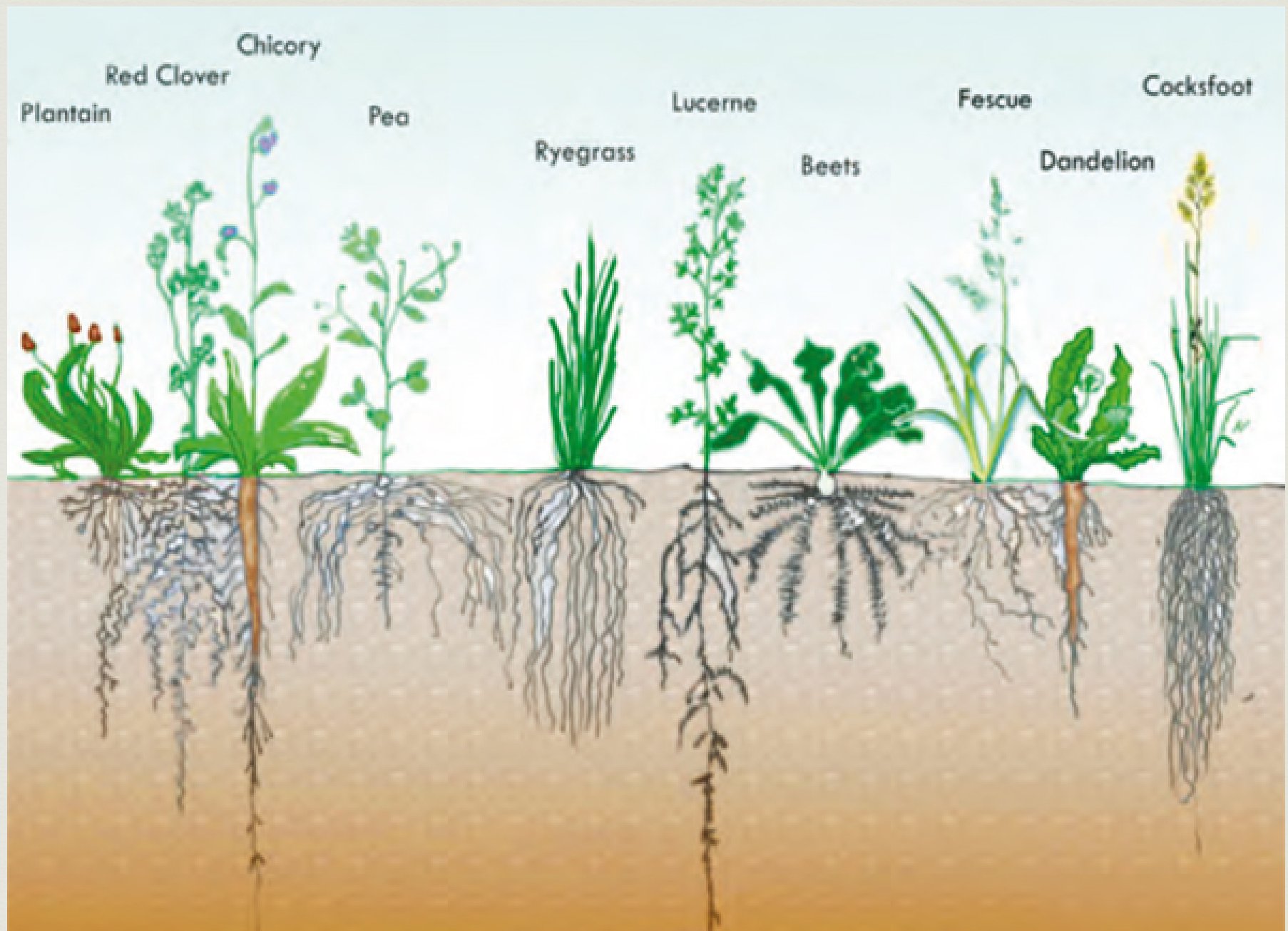
# TDN and Crude Protein of various forages and browse species

% of Dry Matter



# Plants as indicators of problems

- ❧ Acid Soils tolerant – Sorrels, Docks, Fingerleaf Weed, Lady's Thumb, Horsetail, Hawkweed and Knapweed.
- ❧ Crust Formation & or Hard Pan Soils – Field Mustard, Horse Nettle, Penny Cress, Morning Glory, Quack Grass, Camomiles and Pine Apple weed.
- ❧ Cultivated Soils – Lambsquarter, Plantain, Chickweed, Buttercup, Dandelion, Nettle, Prostrate Knotweed, Prickly Lettuce, Field Speedwell, Rough Pigweed, Common Horehound, Celandine, Mallows, Carpetweed.
- ❧ Salty Soils – Shepherd's Purse, Russian Thistle, Sea Plantain, Sea Aster,
- ❧ Plant toxins.. Ranunculus contains a substance which disturbs or even prohibits growth of clovers.



*Different forage species and their relative root depth and structure.*

*Image by Integrity Soils.*







# Horse nettle Grazing

Before Grazing

After Grazing





# Grazing Lamb's Quarters



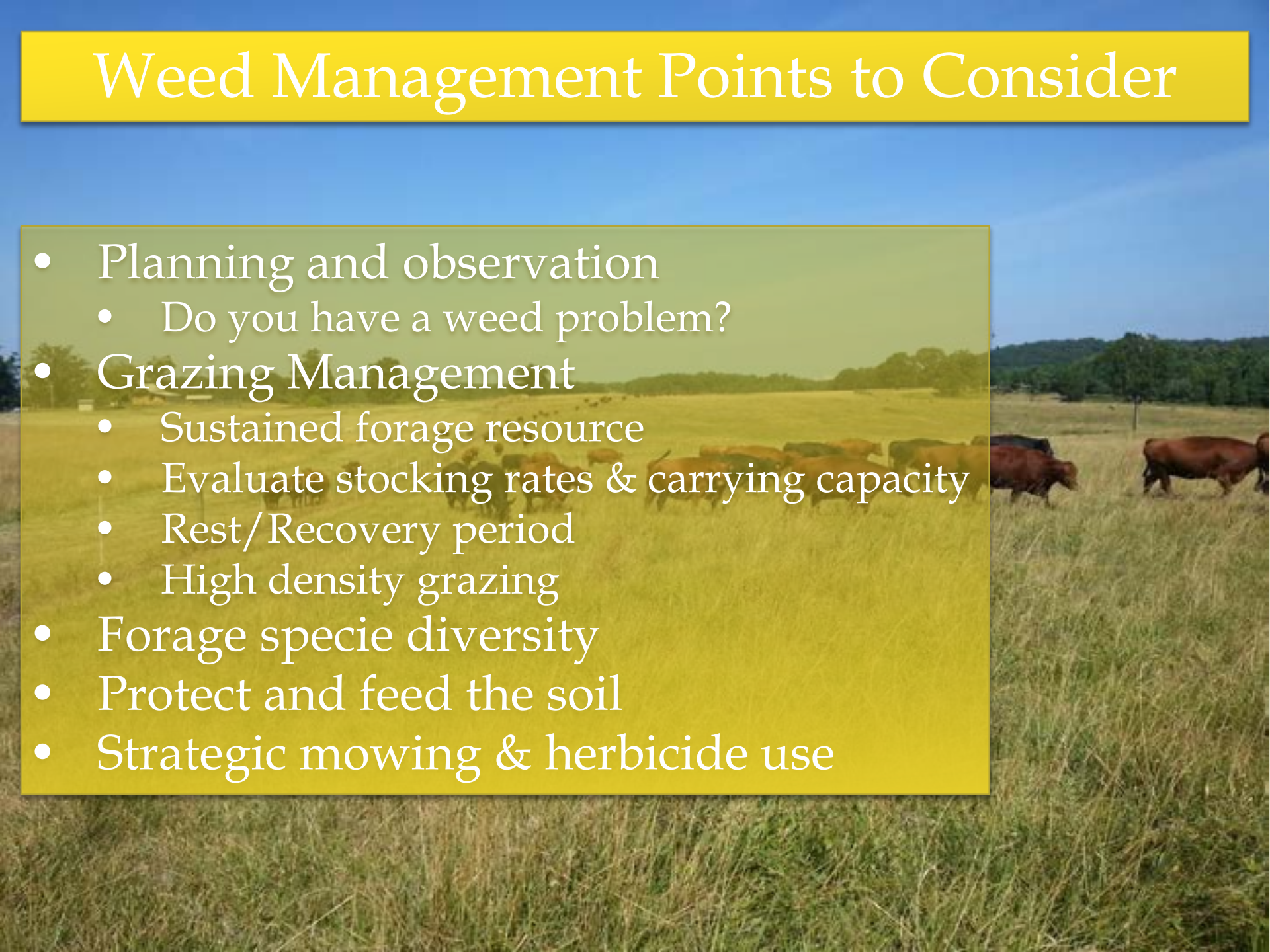







# Weed Management Points to Consider

- Planning and observation
  - Do you have a weed problem?
- Grazing Management
  - Sustained forage resource
  - Evaluate stocking rates & carrying capacity
  - Rest/Recovery period
  - High density grazing
- Forage specie diversity
- Protect and feed the soil
- Strategic mowing & herbicide use





# Extending the Grazing Season

- 
- A photograph of a herd of cattle grazing in a lush green field. The cattle are of various colors, including brown, black, and white. They are spread out across the field, some standing and some grazing. In the background, there are trees and a clear blue sky. The overall scene is peaceful and idyllic.
- All forages can be stockpiled
  - Excellent livestock nutrition
  - Rested plant
  - Feeds the Soil Food Web
  - Nutrient Distribution
  - Ground cover
  - Limited equipment (Safety)



# Grazing Stockpiled Fescue



- ❧ Select fields with a high fescue content.
- ❧ Clip/graze to 3-4 inches residue
- ❧ Fertilize 50 units N
  - ❧ Late Aug. to Mid-Sept. gives the best yield.
  - ❧ Late-Sept to early Oct. gives best quality grazing.
- ❧ Consider livestock nutrient requirements.
- ❧ Dry Fall
  - ❧ Split N applications
  - ❧ Buy other feedstuffs

# Grazing Stockpiled Fescue



- ❧ Strip graze with 1-3 day moves
  - ❧ use daily moves during rain/ice/snow to minimize trample damage.
- ❧ Graze stockpile that contains clover, other cool season forages (i.e. orchard grass) and/or warm season species first.
- ❧ Save heavy fescue field for later grazing
- ❧ Feeding some hay with stretch stockpile and tighten cows up.
- ❧ Do not run a brood stock operation without stockpiled forage.



For every \$1.00 your cattle consume they will deposit approximately \$0.85 somewhere on your farm.  
Will they deposit it in the correct location?





# Extending the Grazing Season with Annual Forages



- ❧ Higher quality feedstuff
- ❧ Alternative to toxic fescue
- ❧ Pasture renovation
- ❧ Soil Health Improvement

# Summer Annual Mixtures

Forage Type	2012	2013	2014	2015	Simple Mix
Soybean	30%	20%			
Cow Peas	25%	25%	42%	55%	70%
Sorghum-Sudan	17.5%	25%	18%	10% + 5%	30%
Pearl Millet	5%	10%	6%	7%	
German Foxtail	5%	5%			
Sunflower	7.5%	5%	4%	3%	
Radish	5%		5%	8%	
Turnips	2.5%	2.5%			
Rape	2.5%				
Pasja Brassica		2.5%			
Mastergraze Corn/Soybean			20%		
T-Raptor Brassica			5%	3%	





July 12, 2013







August 7, 2013





September 7, 2014





Feeding All Your Livestock

# Winter Annual Mixtures



	2012	2013	2014	Simple Mix
Ryegrass		6.6%	7.1%	
Crimson Clover	18%	10.6%	9.9%	18%
Oats	82%	19.9%	20%	82%
Vetch		13.2%	12.4%	
Winter Pea		23.9%	23.6%	
Turnip		1.6%	2.4%	
Radish		3.9%	3.7%	
Wheat		19.9%	19.9%	

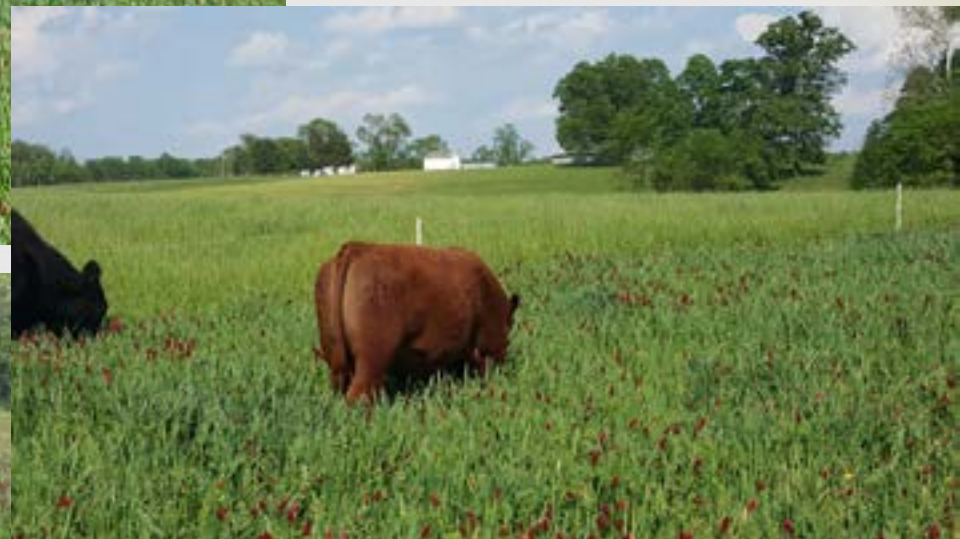


**Winter 2014-15  
Ray's Crazy Mix**





**Winter 2014-15  
Oats and Crimson Clover**





# Observations from Using Annual Forages

- Burn down with glyphosate is important to establishment with Summer annuals.
- Very effective in eliminating fescue and reducing some weeds populations.
- Provides excellent quality forage.
- Improving soil health.
- Impressive yields on marginal soils with limited fertilizer.
- Establishment costs is a concern.
- Simple mix vs. Diverse mix?
- Stagger planting dates
  - Reduce weather risk
  - Stage grazing intervals
- Spend a lot of time waiting to graze.



# Summary



- ❧ Soil is a precious resources that needs management.
- ❧ Developing and executing a sound grazing plan will improve soil health.
- ❧ Understand that all plants contribute to pasture ecology (even weeds).
- ❧ Grazing management can prevent an over population of undesirable plants species.
- ❧ Evaluate alternatives for extending the grazing season and compare to feeding stored forages.
- ❧ Stockpiling forages and strip grazing is a great place to start.
- ❧ Pasture based livestock systems using sound grazing principles provide tremendous economic and ecological benefits to our society.



# Thank you

Johnny R. Rogers  
jrroger3@ncsu.edu

