

High Density Grazing for Soil Health



High Density Grazing for Soil Health

- Purchased soil amendments (fertilizer, lime, etc) should be a capital investment **NOT** an annual expense.
- How can we improve our soil without purchasing additional inputs?

Holistic Management

THIRD EDITION

Allan Savory

with Jody Butterfield

A New Framework
for Decision Making



What is “Animal Impact”??

Animal impact is everything that livestock do to the land. This includes dunging, urinating, hoof action, rubbing, salivating, etc.

Animal impact is **the most powerful tool** we have to manage grassland resources. It effects utilization, reduces spot grazing, controls weed and brush competition, improves manure distribution, improves mineral cycling, water infiltration and produces seed/soil contact.

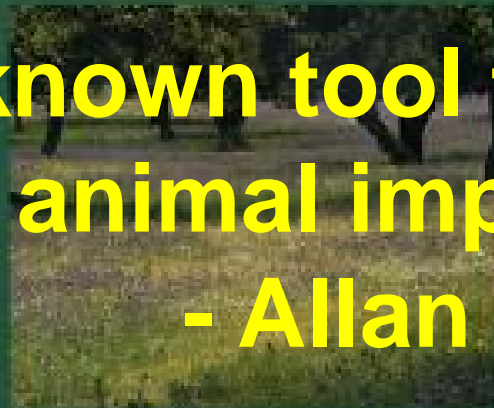
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**“The only known tool to heal
the land is animal impact.”**

- Allan Savory

Building Soil

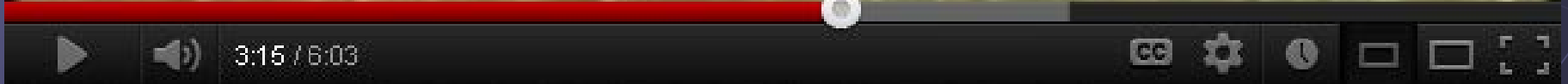
How did nature make all that soil in the first place?



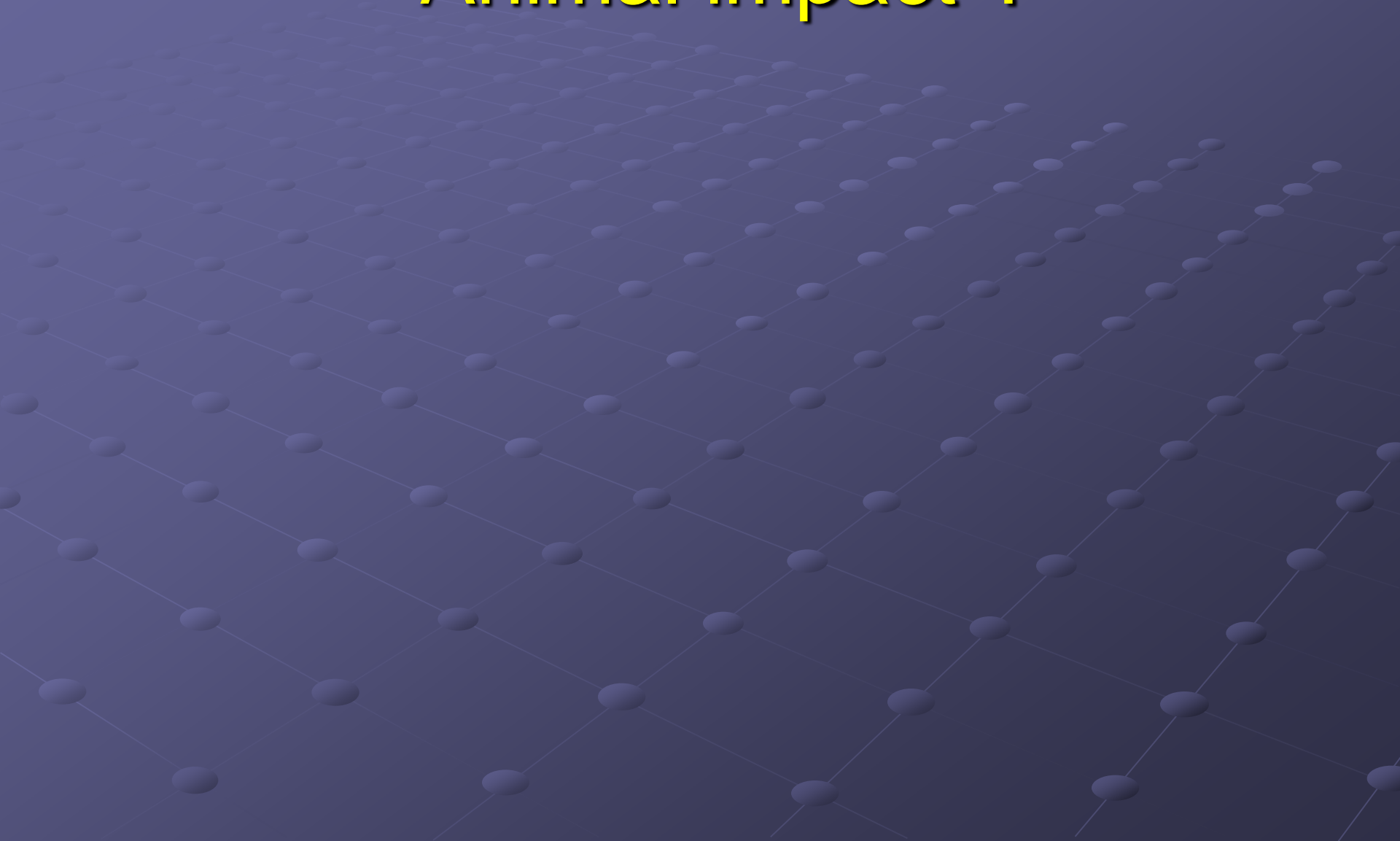
More animal impact?



Lots of impact!



How do we measure “Animal impact”?



“Stock Density”

Let's say we have 40 head of 1250 lb cows
That is 50,000 lbs of beef on the hoof.

50,000 lbs Beef (40 cows)
10 acres

Stock
Density = 5000 lbs live weight / acre

50,000 lbs Beef (40 cows)
1 acre

Stock
Density = 50,000 lbs live weight / acre

50,000 lbs Beef (40 cows)
1/4 acre

Stock
Density = **200,000 lbs** live weight / acre

What Density is what?

Management Intensive Grazing (MIG)

- up to 50,000 lbs of stock density

High Stock Density (HD)

- 50,000 to 250,000 lbs of stock density

Ultra High Stock Density (UHSD)

- 250,000 lbs or higher stock density

High Stock Density Grazing

- Grazing by relatively large numbers of animals at a high stock density for a short period of time
 - Paddock Number: Infinite
 - Grazing Period: Minutes – 1 day
 - Rest period: months – years
 - Stock Density: 50,000 lbs – 1,000,000 lbs.
 - Utilization: 20 – 80%
 - Lowest selectivity

80,000 lbs stock density



140,000 lbs stock density



09/19/2009

375,000 lbs stock density



375,000 lbs stock density



1,000,000 lbs Stock Density



High Stock Density

How does it improve soil health?



Can we build soil fertility just by adding organic matter to the soil?



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High Density Grazing for Soil Health

- Less disturbance
- Living roots feed soil livestock
- Keep the soil covered
- Diversity

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Less disturbance is important

- Chemical Disturbance
- Physical Disturbance

Chemical disturbances: excessive or repeated applications of pesticides, fertilizers and manures





Physical Disturbance



Grazing is a Disturbance

- Grazing is a disturbance that sets succession back
- Lengthening rest periods means less grazing events per year



What's the biggest disturbance
in grasslands?

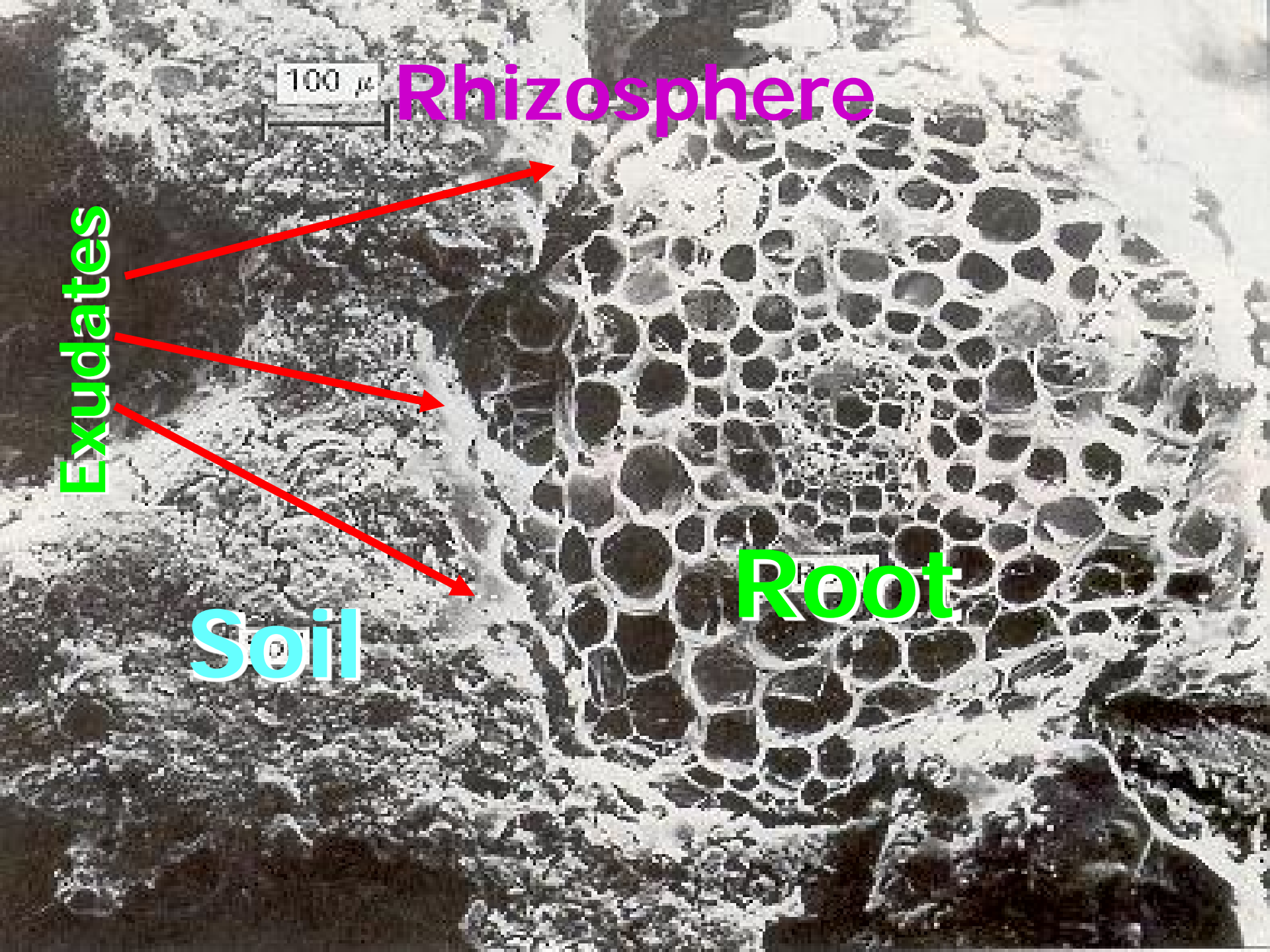


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High Density Grazing for Soil Health

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100 μ

Rhizosphere

Exudates

Soil

Root

Rhizosphere

The number of organisms in the rhizosphere is up to 2000 times higher than in the rest of the soil.



Soil Health

| <u>Type of Organism</u> | <u>number/acre</u> | <u>pounds/acre</u> |
|-------------------------|-----------------------------|--------------------|
| Bacteria | 800,000,000,000,000,000,000 | 2,600 |
| Actinobacteria | 20,000,000,000,000,000 | 1,300 |
| Fungi | 200,000,000,000,000 | 2,600 |
| Algae | 4,000,000,000 | 90 |
| Protozoa | 2,000,000,000,000 | 90 |
| Nematodes | 80,000,000 | 45 |
| Earthworms | 40,000 | 445 |
| Insects /arthropods | 8,160,000 | 830 |

Living roots feed soil livestock

- **More roots in the soil**



Living roots feed soil livestock

More roots in the soil

1. Longer rest periods mean more roots



Living roots feed soil livestock

More roots in the soil

1. Longer rest periods mean more roots
2. Feeds the microorganisms



Grazing initiates plants to release root exudates that feed soil biology.



Cows actually add biology

- Biology in the manure
- Biology in the saliva
- Biology in the milk foam

High Density Grazing for Soil Health

- Less disturbance
- Living roots feed soil livestock
- **Keep the soil covered**
- Diversity of plants

Keep the soil covered

● Trampling puts more mulch on the surface of the soil

1. Keeps the soil cool so soil organisms remain alive and working



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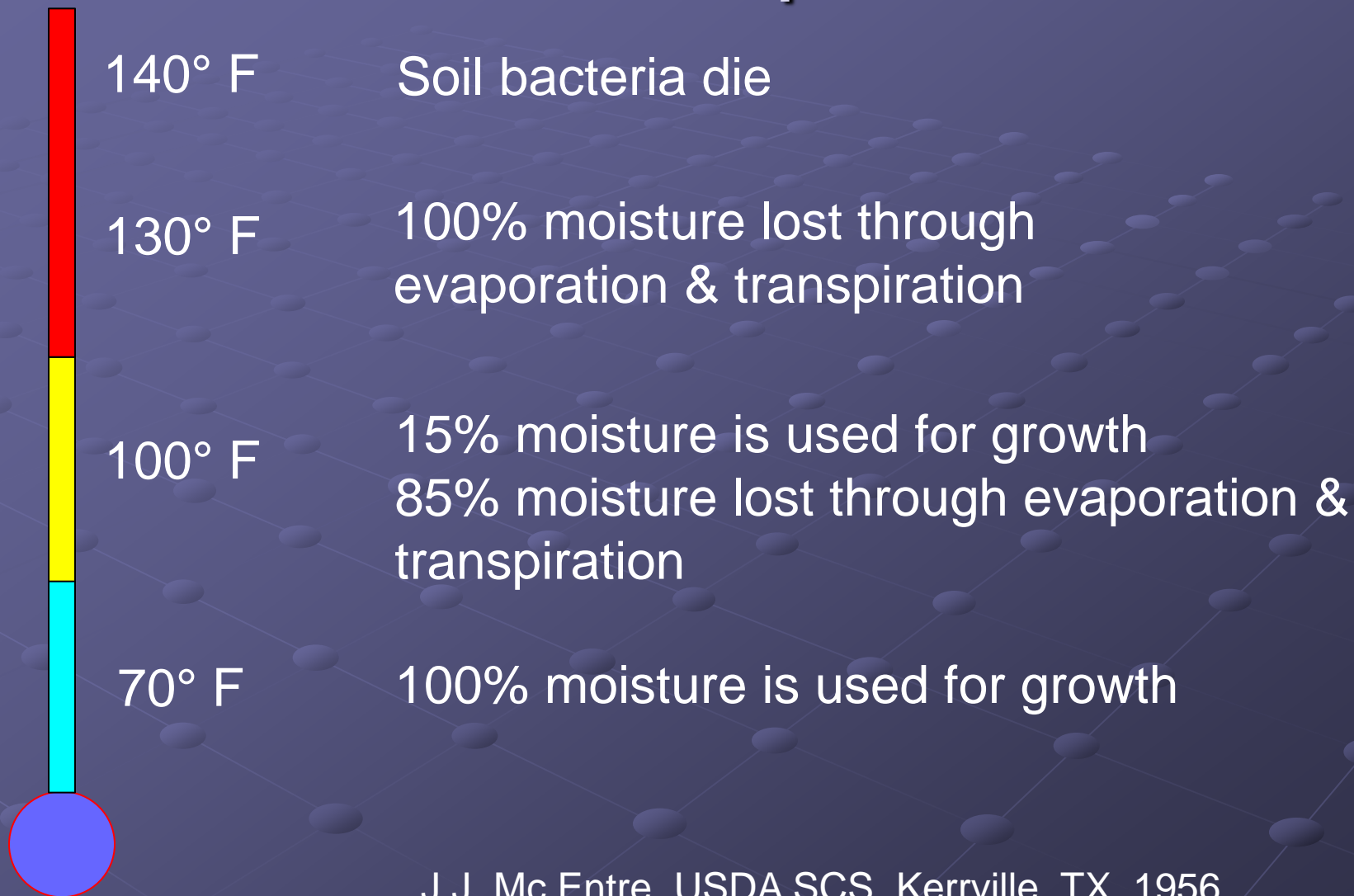


06/28/2010



06/28/2010

When soil temp reaches. . .



J.J. Mc Entre, USDA SCS, Kerrville, TX, 1956

Keep the soil covered

● Trampling puts more mulch on the surface of the soil

1. Keeps the soil cool so soil organisms remain alive and working
2. Helps improve water infiltration



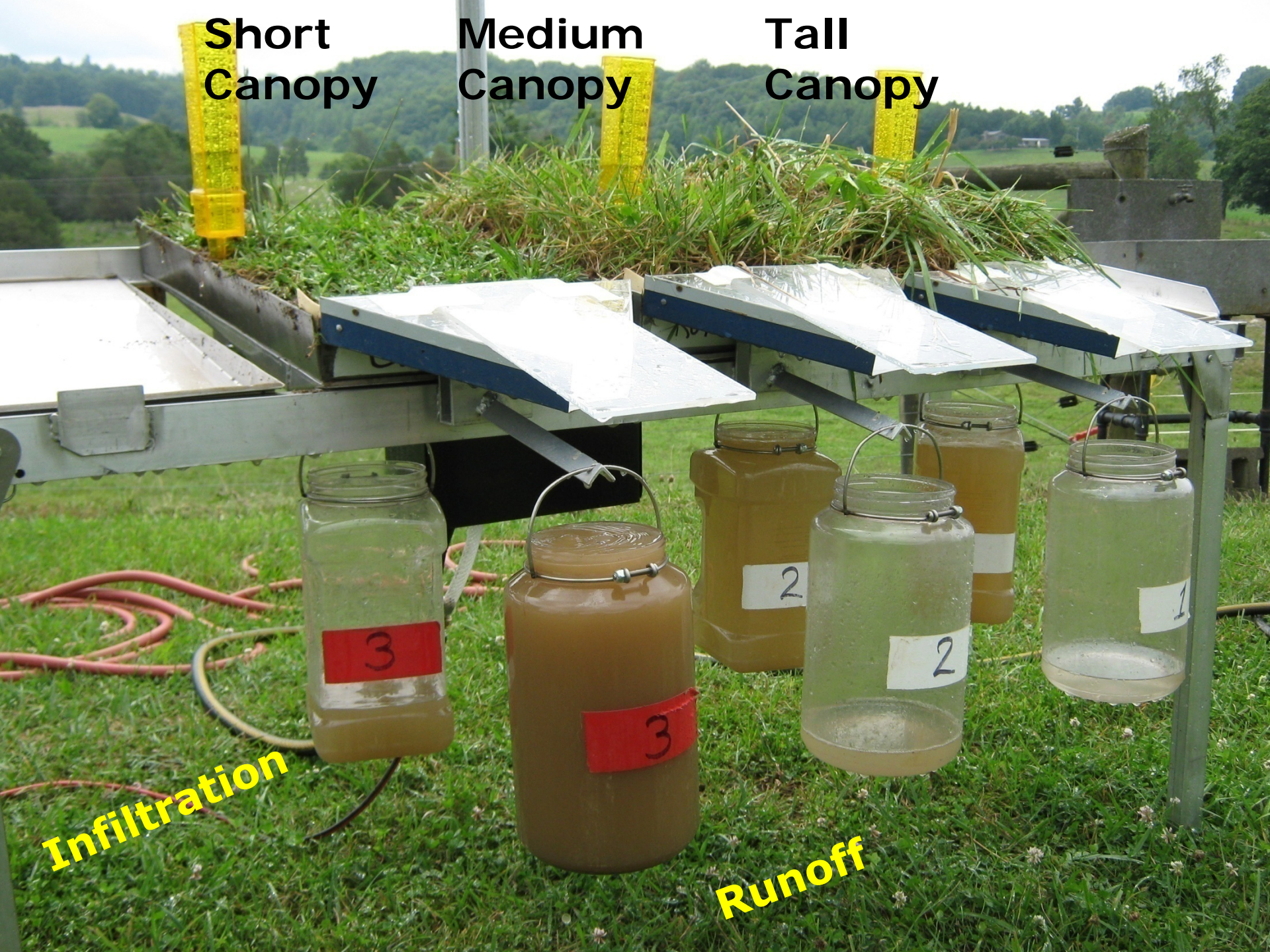
**Short
Canopy**

**Medium
Canopy**

**Tall
Canopy**

Infiltration

Runoff



High Density Grazing for Soil Health

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- **Diversity of plants**

What does diversity really mean?

Cool Season Grass

Warm Season Grass

Cool Season Broadleaf

Warm Season Broadleaf

A Balanced Diet in Pasture

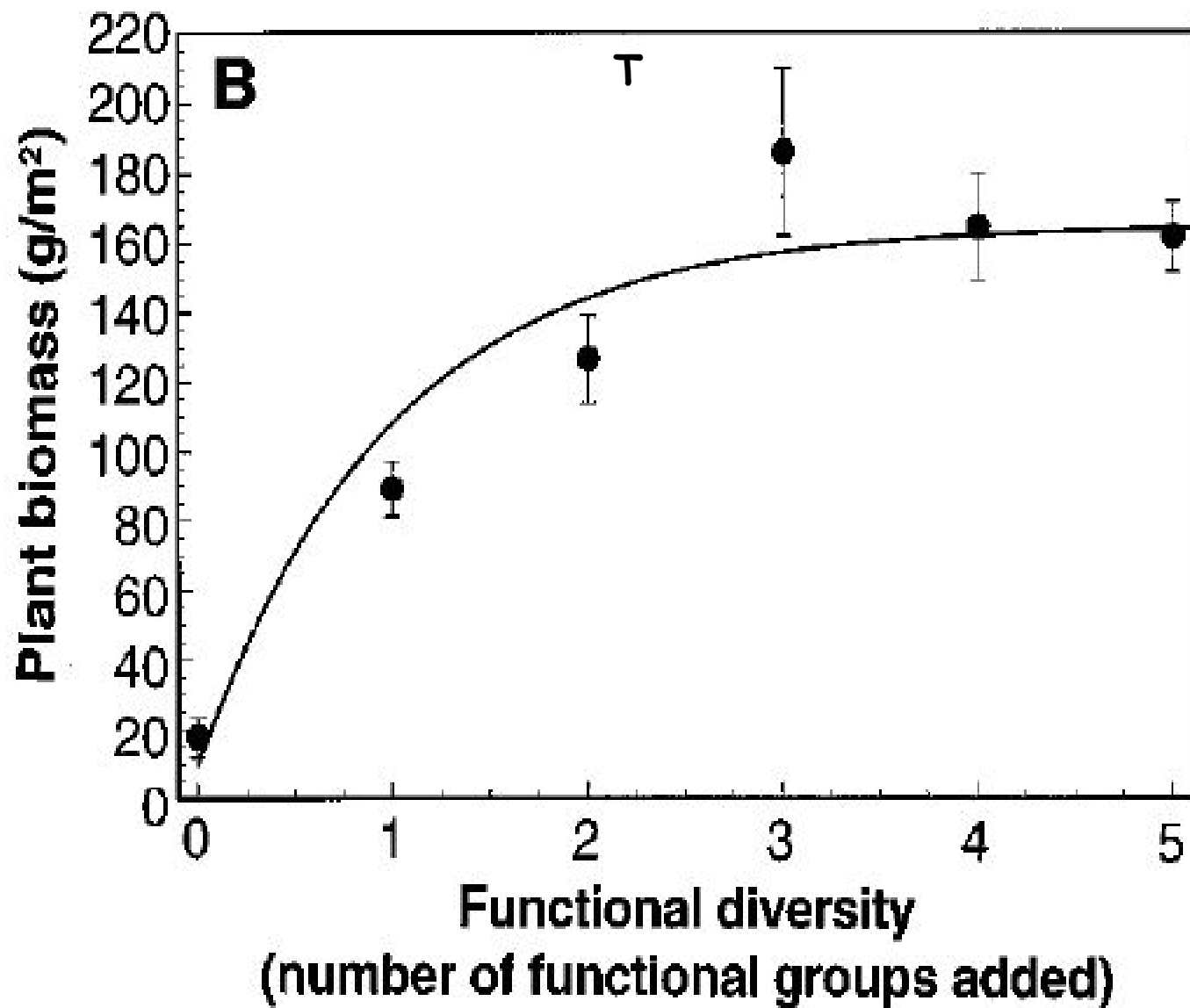


Soil organisms are like livestock...they require a balanced diet to attain high performance

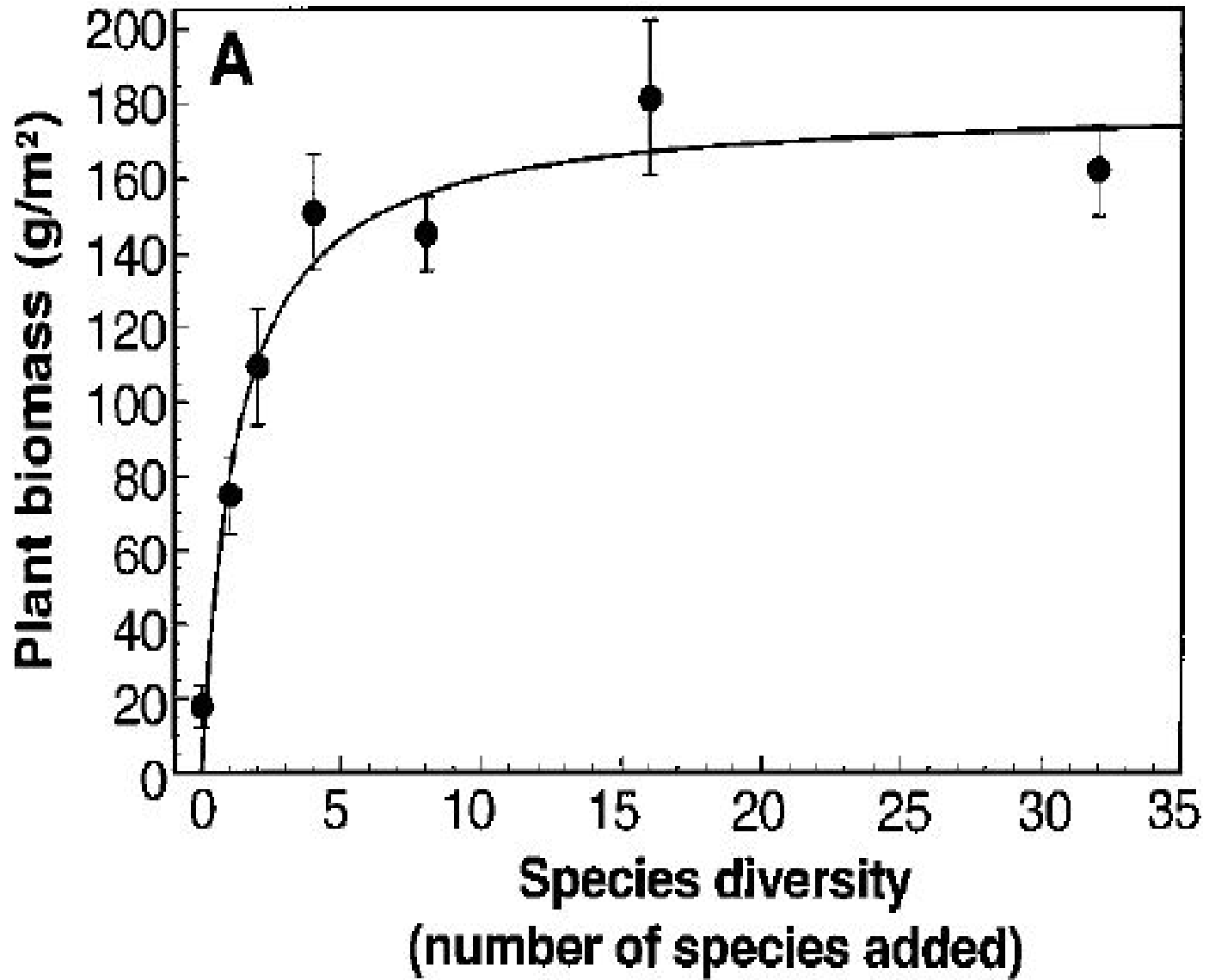
Pasture Diversity



All from the same field

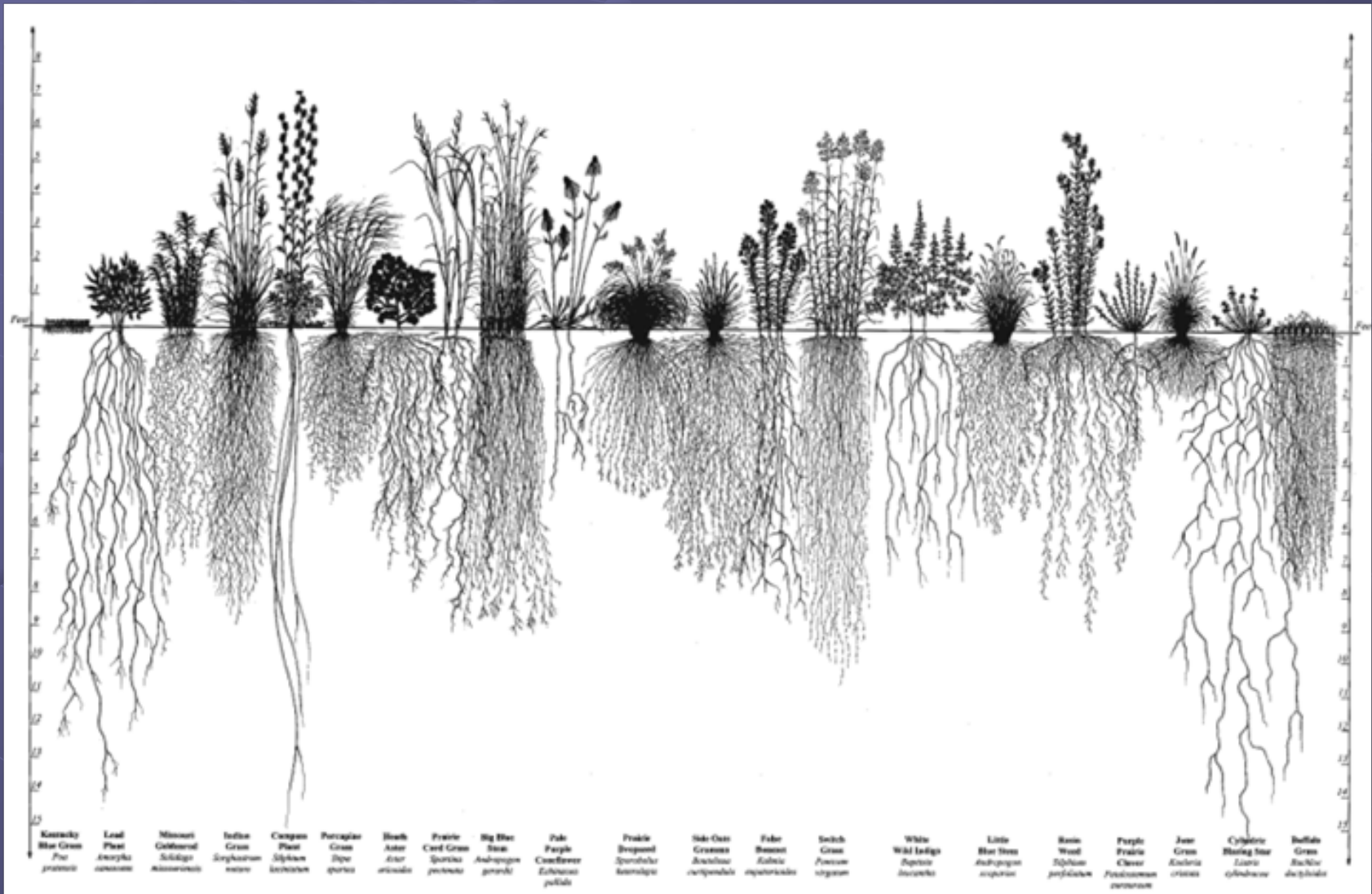


David Tilman,* Johannes Knops, David Wedin, Peter Reich,
Mark Ritchie, Evan Siemann



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Root Diversity is Critical!



Soil Fertility

| Depth | Ca | Mg | K | OM | pH(salt) |
|-------|-------|------|-----|-----|----------|
| 0-8 | 4560 | 484 | 234 | 3.5 | 6.1 |
| 8-13 | 2480 | 580 | 156 | 1 | 4.4 |
| 13-21 | 4600 | 1210 | 312 | .86 | 4.3 |
| 21-28 | 4960 | 1355 | 312 | .69 | 4.4 |
| 28-43 | 5120 | 1258 | 156 | .34 | 4.9 |
| 43-51 | 6560 | 1452 | 78 | .34 | 6 |
| 51-67 | 18360 | 871 | 78 | 0 | 7.6 |
| 67-74 | 17360 | 992 | 78 | .17 | 7.6 |
| 74-78 | 15960 | 1065 | 78 | 0 | 7.7 |

● *Grazing Period/Rest Period length
determines range/pasture
species composition*



10/06/2008

The Answer is to Imitate Native Rangeland Diversity



Animal Performance



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Animal Performance

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- Biggest mistake people make.
 - Scorched earth grazing
 - Goal should be to only have them eat the parts of the plant that meets their nutritional needs
 - Generally that means 60% or less utilization by livestock

The soil is the basis of everything.
I believe the soil is the most important thing
we have to take care of.

HOWEVER, we have to consider the
“whole” when making management
decisions.

- Animal performance goals
- Financial goals
- Personal goals



08/30/2008