Soil Health Planning Principles

• Manage more by Disturbing Soil Less
• Grow Living Roots Throughout the year
• Keep the Soil Covered as Much as Possible
• Use Diversity of Plants to add diversity to Soil Micro-organisms

Goal: To create the most favorable habitat possible for the soil food web
Acres of Forage Harvested - Land Used for All Hay and All Haylage, Grass Silage, and Greenchop as Percent of Harvested Cropland Acreage: 2002

United States 21.2 Percent
Soil Health
Planning Principles

• Manage more by Disturbing Soil Less
This is Disturbance!
So is This!
Soil Health
Planning Principles

• Manage more by Disturbing Soil Less

• **Grow Living Roots Throughout the Year**
## Corresponding Root Growth

<table>
<thead>
<tr>
<th>% Leaf Removed</th>
<th>% Root Growth Stopped</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>2 to 4</td>
</tr>
<tr>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>70</td>
<td>78</td>
</tr>
<tr>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>90</td>
<td>100</td>
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</tbody>
</table>
Pasture Soil Quality
by Sid Brantly KY NRCS State Grazing Specialist
Pasture Soil Quality by Sid Brantly KY NRCS State Grazing Specialist

Tall Fescue  Tall Fescue  Tall Fescue Orchardgrass Orchardgrass Fescue/Bluegrass
Rotational  Continuous  Continuous  Rotational  Rotational Rotational

Tall Fescue Rotational  Tall Fescue Continuous  Tall Fescue Continuous  Orchardgrass Rotational  Orchardgrass Rotational  Fescue/Bluegrass Rotational
OVERGRAZING DANGER!

• Overgrazing is not grazing a plant severely!
• Overgrazing happens when a plant that is growing from carbohydrate reserves is grazed. “Grazing the roots.”
• Overgrazing happens when we stay too long, come back too soon and graze too soon after dormancy.
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When soil temperature reaches...

140 F  Soil bacteria die

130 F  100% moisture is lost through evaporation and transpiration

100 F  15% of moisture is used for growth  85% moisture lost through evaporation and transpiration

70 F  100% moisture is used for growth

J.J. McEntire, WUC, USDA SCS, Kernville TX, 3-58 4-R-12198. 1956
Pasture Cover Impacts
Infiltration and Runoff

3 inches of rainfall in 90 minutes, 10% slope, silt loam soil

(University of Nebraska & USDA-SCS, 1937)

- Excellent pasture: 95% ground cover
- Fair pasture: 75% ground cover
- Poor pasture: 50% ground cover

<table>
<thead>
<tr>
<th>Soil loss (tons/A)</th>
<th>Percent runoff</th>
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</thead>
<tbody>
<tr>
<td>8</td>
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</tr>
<tr>
<td>7</td>
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<tr>
<td>0</td>
<td>80</td>
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</tbody>
</table>
Effect of litter on infiltration rate

- Grass and litter present
- Grass with litter removed
- Grass and litter removed (bare soil)

Inches per hour: 0, 1, 2, 3
Infiltration and Runoff

- Tilled
- Reduce
- No-till
- Short
- 8” Grass
- till
- grass
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GRAZE AND REST PASTURE

1. REST FOR GROWTH
2. THEN USE TO MAINTAIN PROPER HEIGHT
3. REST AGAIN FOR GROWTH
4. THEN USE AGAIN

6 - 12"
3 - 4"
4"

AND BUILD UP FOOD RESERVES
AND MAINTAIN A STRONG ROOT SYSTEM
Effect of Plant Residual Left (Height)
Pasture Soil Quality by Sid Brantly KY NRCS State Grazing Specialist
Fast Track to Soil Health

- Get the pH and fertility balanced in medium category
- Manage for cover: green and brown
- High density grazing minimum 4,000 lb to over 100,000 lb/ac
- Leave at least half of forage behind, 2/3 is better
- Recovery period of at least 30, 45 day average, but in general not over 90 days in growing season.
Manure Distribution

One paddock of 3–pasture rotation

One paddock of 24–pasture rotation
50,000 Pounds Stock Density Per Acre
Soil Health Planning Principles
Works for Grazing Systems Too!

Management Can:

• Disturb the Soil Less
• Grow More Living Roots Throughout the year
• Keep the Soil 95% Covered
• Bring Diversity of Plants to add diversity to Soil Micro-organisms

This creates the most favorable habitat possible for the soil food web