Introduction to Management-intensive Grazing

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Why Management-intensive Grazing?

- Livestock “intensively graze” by nature, only you can “intensively manage”
What is Management-intensive Grazing?

- A goal driven approach to managing grassland resources for long term sustainability
What is Management-intensive Grazing? (cont.)

- A goal driven approach to managing grassland resources
  - Lifestyle
  - Economic
  - Environmental
  - Aesthetics
  - Production
Fundamentals of Successful Grazing Management

• Meet the nutritional needs of the livestock from standing pasture

• Optimize pasture yield, quality, and persistence

• Maintain or enhance the natural resource base

• Integrate appropriate technology and knowledge into a practical/profitable system
Fundamentals of Successful Grazing Management

- Meet the nutritional needs of the livestock from standing pasture
Relative Cost of Supplying a Unit of Energy to Ruminants

- Pasture: 100
Relative Cost of Supplying a Unit of Energy to Ruminants (cont.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasture</td>
<td>100</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>152</td>
</tr>
<tr>
<td>Timothy hay</td>
<td>161</td>
</tr>
<tr>
<td>All types of hay</td>
<td>162</td>
</tr>
<tr>
<td>Corn silage</td>
<td>195</td>
</tr>
<tr>
<td>Dehydrated forage</td>
<td>320</td>
</tr>
<tr>
<td>Grains</td>
<td>457</td>
</tr>
</tbody>
</table>
Some Useful Definitions

- **Stocking rate**: The number of animals or animal liveweight assigned to a grazing unit on a seasonal basis.

- **Carrying capacity**: The stocking rate that provides a target level of performance while maintaining the integrity of the resource base.

  - Stocking rate has an effect on intake and availability.
Carrying capacity of pasture is determined by four factors:

\[
\text{Carrying Capacity} = \frac{\text{Forage Production} \times \text{Seasonal Utilization Rate}}{\text{Daily Intake} \times \text{Length of the Grazing Season}}
\]
Carrying capacity of pasture is determined by four factors (cont.)

- Annual forage production
  - Plant species/diversity
  - Fertilization
  - Soils/suitability
  - Pasture condition/health
  - Complementary forage systems
  - Weather
Carrying capacity of pasture is determined by four factors (cont.)

- Seasonal utilization rate
  - Length of grazing period
  - Water location
Grazing Period Length Affects Utilization

![Graph showing the effect of grazing period length on utilization rate. The graph displays two curves: one for temporal utilization and another for seasonal utilization. The utilization rate decreases as the length of the grazing period increases.]
Figure 1. Impact of distance from water on temporal utilization rate in rectangular 10 acre paddocks.

R-square = 0.89
Carrying capacity of pasture is determined by four factors (cont.)

**Intake**

- **Availability**
  - Proper stocking rates
- **Quality**
  - Proper management
Effect of Forage Availability on Relative Forage Intake

![Graph showing the relationship between available forage and relative forage intake.](Image)
Carrying capacity of pasture is determined by four factors (cont.)

- Length of the grazing season
  - For cow-calf, sheep, goats, horses-think 365 days
  - Grass-based dairy 240-270 days
  - Short-season stockers offer more flexibility (180 – 240 days)
    - 1 batch – 180 – 210 days
    - 2 batches – 100 – 120 days each
Some Useful Definitions

- **Stocking rate**: The number of animals or animal liveweight assigned to a grazing unit on a seasonal basis.

- **Stock density**: The number of animals or animal liveweight assigned to a specific pasture area for a specific time period.
  - Stock density is a powerful tool to manage grassland resources (improve utilization, reduce spot grazing/selectivity, control competition, improve manure distribution, produce seed/soil contact, open up a sward for overseeding)
Stock density of pasture is determined by four factors:

\[
\text{Stock Density} = \frac{\text{Daily Intake} \times \text{Length of the Grazing Period}}{\text{Forage Availability} \times \text{Grazing Period Utilization Rate}}
\]
\[
\text{Stock Density} = \frac{50,000 \text{ lbs Beef (40 cows)}}{10 \text{ acres}} = 5000 \text{ lbs live weight / acre}
\]

\[
\text{Stock Density} = \frac{50,000 \text{ lbs Beef (40 cows)}}{1 \text{ acre}} = 50,000 \text{ lbs live weight / acre}
\]

\[
\text{Stock Density} = \frac{50,000 \text{ lbs Beef (40 cows)}}{\frac{1}{4} \text{ acre}} = 200,000 \text{ lbs live weight / acre}
\]
Stock Density

- Low
- Med
- High
- Ultra High
Fundamentals of Successful Grazing Management

- Meet the nutritional needs of the livestock from standing pasture
- Optimize pasture yield, quality, and persistence
The Yield – Quality - Persistence Compromise

PHASES OF PLANT MATURITY

Phase I
- Protein, TDN, Palatability
- Lignin
- Total Pasture Dry Matter (lb/ac)

Phase II
- Optimum Grazing

Phase III
- Growing Season or Regrowth After Grazing
Forage Quality
Pumpkin Pies or Wedding Cakes?
Successful pasture management practices are based on knowledge of physiological and morphological reactions of plants.

Understanding Grass Growth: The Key to Profitable Livestock Production
How Grasses Grow

- 95% of plant nutrients come from the atmosphere
  - (C, H, O)

- 5% of plant nutrients come from the soil
  - (N, K, Ca, P, Mg, S, Cl, Fe, Mo, Zn, B, Cu)
Carbohydrates
- are produced by leaves; stored in stem bases, roots, rhizomes
- are consumed by grazing animals
- grow new leaves, tillers
- keep the plant alive during stress (drought, winter)
# Leaf Removal Affects on 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><strong>50</strong></td>
<td><strong>2 to 4</strong></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>
</tr>
</tbody>
</table>
The Root System is Almost a Mirror Image of the Top Growth

*Short, weak plants = short, weak roots*
Fundamentals of Successful Grazing Management

- Meet the nutritional needs of the livestock from standing pasture
- Optimize pasture yield, quality, and persistence
- Maintain or enhance the natural resource base
Fundamentals of Successful Grazing Management (cont.)

- Maintain or enhance the natural resource base
  - Soils
  - Water
  - Plant community
  - Wildlife habitat
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

Soil loss (tons/A) | Percent runoff
---|---
8 7 6 5 4 3 2 1 | 0 10 20 30 40 50 60 70 80
Fundamentals of Successful Grazing Management (cont.)

- Meet the nutritional needs of the livestock from standing pasture
- Optimize pasture yield, quality, and persistence
- Maintain or enhance the natural resource base
- Integrate appropriate technology and knowledge into a practical/profitable system
Fundamentals of Successful Grazing Management (cont.)

- Integrate appropriate technology and knowledge into a practical/profitable system
- What is needed?
Quote:

• Animals delight most to feed on fresh plants
• Animals supplied with this kind of food would be quickly fatted
• If a farmer divided his land into 15 - 20 equal divisions,
• Stopped his beasts from roaming indiscriminately
Quote cont’d:

• Put the whole number of his beasts into one of these divisions
• Have the number of beasts so great as to consume the best part of the grass in one day
• Give them a fresh park every morning to repeat the same repast
Quote cont’d:

- Have so many parks as days required to advance the grass to the proper length after being eaten fare down
- So the first park would be ready to receive them after going over all the others
- So they might be carried round in a constant rotation

  *James Anderson, a Scotsman, 1777*