Getting the most from your pastures

Mark Kopecky
Soils Agronomist, Organic Valley/ CROPP Cooperative

Pros and cons of grazing

Pros:
- Low cost feeding and manure spreading
- High quality feed
- High quality livestock products (nutritional quality)
- Environmentally friendly
- Good for livestock health

Cons:
- Climate and weather constraints
- Requires more land than confinement
- Lower production than confinement

Pasture characteristics that can improve or detract from effectiveness

- Soil characteristics:
  - Fertility, drainage, texture, slope
- Forage characteristics:
  - Species and varieties: seasonality, palatability, feed value, yield potential
  - Maturity: palatability, feed value
  - Diversity
- Management:
  - Grazing and rest periods
  - Residual
  - Forage species diversity
  - Soil fertility management
  - Livestock diversity
  - Paddock layout, boundaries, characteristics

Plant-essential nutrients
(Source: University of Wisconsin-Madison Department of Soil Science)

What about other nutrients?

- Plant-essential nutrients (17)
- Beneficial plant nutrients (selenium, sodium, silicon, ???)
- Other nutrients needed by organisms other than plants—too many to mention. For:
  - Microbes
  - Earthworms, arthropods
  - Livestock
  - People!
Soil testing as a tool

- Not perfect....but still pretty good!
- Only representative of the area the sample came from
- Usually not valid for more than a few years
- Best used in conjunction with forage testing or other plant tissue analysis

What about other nutrients?

- Plant-essential nutrients (17)
- Beneficial plant nutrients (selenium, sodium, silicon, ???)
- Other nutrients needed by organisms other than plants—too many to mention. For:
  - Microbes
  - Earthworms, arthropods
  - Livestock
  - People!

Amending soils: Where to start?

- Have target levels for each soil test parameter
- Work on the most substantial imbalances first
- Common problems:
  - pH, phosphorus, potassium (by extraction)
  - Calcium, magnesium (by percent base saturation)
  - Sulfur and boron
  - Other micronutrients: zinc, manganese, copper
Forage characteristics

- Species and varieties:
  - Seasonality, palatability, feed value differences, yield potential, bloat potential, anti-quality factors
  - Timothy, smooth bromegrass: high quality, poor regrowth
  - Kentucky bluegrass, ryegrass: high quality, need moisture and cooler temps
  - Tall fescue: Hardy, durable, good regrowth; lower grazing quality
  - Orchardgrass: Excellent regrowth, variable quality
  - Meadow fescue: Good overall performance

Other forage-based factors:

- Maturity:
  - Affects palatability, feed value
- Diversity:
  - Affects palatability, feed value, soil ecology

Protein and energy

- Immature forages have high digestibility and high protein levels, but may not have enough energy
- More mature forages have less digestibility, less protein, and usually lower palatability
- Aim for a balance
- Consider supplements for energy and minerals

High Quality Forage (dairy)

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Protein</td>
<td>18-21% (N 2.9-3.4%)</td>
</tr>
<tr>
<td>ADF</td>
<td>28-30%</td>
</tr>
<tr>
<td>NDF</td>
<td>40-45%</td>
</tr>
<tr>
<td>NDFd at</td>
<td>40-60%</td>
</tr>
<tr>
<td>IV TDMD at</td>
<td>74-82%</td>
</tr>
<tr>
<td>NE l (Mcal/lb)</td>
<td>0.65-0.70</td>
</tr>
<tr>
<td>RFV</td>
<td>&gt;140</td>
</tr>
<tr>
<td>RFQ</td>
<td>&gt;150</td>
</tr>
<tr>
<td>Ca</td>
<td>&gt;1-1.5%</td>
</tr>
<tr>
<td>K</td>
<td>&lt; 2.5%</td>
</tr>
<tr>
<td>Mg</td>
<td>&gt;0.35%</td>
</tr>
<tr>
<td>P</td>
<td>&gt;0.35 – 0.4%</td>
</tr>
<tr>
<td>S</td>
<td>&gt;0.30% (N:5 10:1)</td>
</tr>
<tr>
<td>B</td>
<td>&gt;40 ppm</td>
</tr>
<tr>
<td>Cu</td>
<td>&gt;15 ppm, 2n &gt;30 ppm</td>
</tr>
<tr>
<td>Mn</td>
<td>&gt;35 ppm</td>
</tr>
<tr>
<td>Fe</td>
<td>&lt; 200 ppm, Al &lt;100 ppm</td>
</tr>
</tbody>
</table>
Factors affecting forage energy

- Type of plant (grass vs. legume)
- Plant maturity
- Plant part (leaf vs. stem)
- Environment (cool/hot, sunny/shaded)
- Species (ryegrass, meadow fescue, orchardgrass)
- Soil fertility

Grazing management

- Grazing and rest periods
- Residual
- Forage species diversity
- Soil fertility management
- Livestock diversity
- Paddock layout, boundaries, characteristics
- Stocking density

The importance of rest period and residual

(Source: University of Wisconsin-Extension)

Diversity: Forage and livestock species

(Source: Guy Jodarski, DVM, Organic Valley)

Paddock layout and management

- Paddock geometry
- Cow magnets: water and shade points
  - Soil quality, forage growth, nutrient distribution
- Paddock boundaries
- Back fences
- Grazing path: front to rear, or rear to front?
- Maximize time in paddocks

Stocking density

- Higher: more animals in a smaller area
  - Means moving more often
  - Improves forage intake
  - Improves nutrient distribution