Stockpiling Forages to Extend the Grazing Season on Your Organic Dairy Pasture

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http://www.extension.org/organic_production
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Extending the grazing season with stockpiled pasture

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eOrganic Webinar, July 28, 2011
Stockpiling versus Hay Cutting

- Pasture growth provides forage for only 5 to 6 months in the northern US.
- Stored winter feed is one of graziers’ largest expenses.

- Hay production: $70-90/ton
- Hay purchase: $90-140/ton
- Pasture production: $14-40/ton
- *It’s always cheaper to let your cows do the harvesting!*

Data from regional SARE beef cost of production study
Begin stockpiling in late summer

Rest/grow until frost

‘Store’ forage in field until winter

Forage mass and quality maintained by cold, dry weather

*Note: you can stockpile pasture at other times of the year, e.g. Summer stockpiling.*
References

Use stockpiling to even out pasture yield throughout the year.

50 to 60% of pasture yield comes in April-June.
Grazing Periods

- October-December (very do-able).
- March-early April (pretty ‘iffy’).

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Mechanism

- Takes advantage of the second flush of growth of cool-season grasses
- Effective stockpiling requires adequate:
  - Nitrogen
  - Water
Research Results

• Potential yields
  – 1 to 1.5 tons w/o nitrogen fertilizer or irrigation
  – 1.8 to 2.7 tons with nitrogen fertilizer
  – 2 to 2.5 tons with irrigation and nitrogen fertilizer

• Quality (in early winter)
  – Crude protein: 11 to 19%
  – Total digestible nutrients: 59 to 74%
  – Dairy farms in WI: 20-25% CP, >150 RFQ
Pasture and Species Selection

- Best grasses: tall fescue* and orchardgrass
- Best legumes: alfalfa and birdsfoot trefoil

*Improved endophyte free tall fescue
Stockpile yield by species

Tons per acre in October starting on August 1

Two years’ data from three non-irrigated sites in Wisconsin (Reiesterer et al)
*Improved endophyte free tall fescue
Stockpile yield by species with irrigation

**Tons per acre in November averaged over 7/15 and 8/15 start dates**

- Festulolium
- Orchardgrass
- Smooth Brome
- Tall Fescue
- Hybrid Wheatgrass
- Meadow Brome
- Creeping Foxtail

Two years’ data under irrigation in Utah (Voleski et al)

*Improved endophyte free tall fescue*
Stockpile yield of legumes

• Robinson et al (Nebraska)
  – Alfalfa averaged 1.2 t/a
  – Birdsfoot Trefoil averaged 1.38 t/a
  – Ladino and alsike clover were dropped from the study due to lack of yield

• Baron et al (western Canada)
  – Alfalfa averaged 1.86 t/a
  – Grazing alfalfa averaged 0.87 t/a
Influence of start date on yield

Two years’ data from western Canada (Barron et al)
Yield & quality trade-offs

<table>
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<tr>
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<th>Dry Matter</th>
<th>Crude Protein</th>
<th>IVDMV</th>
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<tr>
<td>July 15</td>
<td>2.54 t/a</td>
<td>12%</td>
<td>62.5%</td>
</tr>
<tr>
<td>August 15</td>
<td>1.68 t/a</td>
<td>14.4%</td>
<td>67.5%</td>
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Data from Voleski et al
Effects of nitrogen fertilization

Average 68% increase with 60 lb N/acre applied in August
Decline in yield over winter

- **Orchardgrass**
- **Quackgrass**
- **Reed Canarygrass**
- **Smooth Brome**
- **Tall Fescue**
- **Timothy**

Average 23% decline

Average 24% decline
Decline in quality of stockpiled grass* forage over winter

Data from Voleski et al

*Note: Legume forage quality declines much more rapidly
Calculating acreage needs

• Rule of thumb
  – Need ~ 2 acres per AU (1000 lb of animal) for pasture and hay for 12 months

• Assume 3% body weight dry matter intake per day
  – 1200 lb cow needs ~36 lb/day or 1080 lb/month
  – 100 1200 lb dairy cows need ~54 tons per month
  – At 1.2 tons/acre, you’d need to stockpile 45 acres for a month of grazing
Role of nitrogen fertility

• Stockpiling takes advantage of the second flush of growth of cool-season grasses

• Requirements:
  – Nitrogen
  – Water
Organic nitrogen sources
(60 lb N/acre application rate)

• Manure: 3 to 5 lb N per ton (dairy/beef)
  – Need ~12 to 20 tons/acre
• Compost:
  – 12 lb per ton (dairy) = 5 t/a
  – 17 lb/ton (poultry) = 3.5 t/a
• Fish based fertilizers: 5-0-0
  – Need ~1200 lb per acre
• These are all slow release nitrogen sources—results may differ.
Organic nitrogen sources
(60 lb N/acre application rate)

• Chilean Nitrate (16-0-0)
  – Need ~375 lb/a

• Cost—*it may not be worth it*
  – $953/ton (online source)
  – 320 lb/N per ton
  – 5.3 acres @ 60 lb N/a
  – $180 per acre
  – 1 to 1.2 tons additional yield with N
  – $150 per ton of additional yield
Creating an Effective Nutrient Distribution System
Role of legumes in pasture productivity & nutrient cycling

## Nitrogen Fixation of Common Legumes

<table>
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<tr>
<th>Lb N/acre</th>
<th>Alfalfa</th>
<th>Birdsfoot Trefoil</th>
<th>Red Clover</th>
<th>White Clover</th>
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<tbody>
<tr>
<td><strong>Alone</strong></td>
<td>151</td>
<td>72</td>
<td>81</td>
<td>128</td>
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<tr>
<td><strong>With Reed Canarygrass</strong></td>
<td>150</td>
<td>71</td>
<td>70</td>
<td>N/A</td>
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Data adapted from Heichel and Henjum (1991).
How most of the N fixed by legumes gets back into the system
Management intensive grazing

- 30 days
- 1 paddock

Rest-Rotation Continuum

- 30 days
- 30 paddocks

- Higher quality
- Higher yield
- More diversity
- More flexibility
Nutrient Cycling

- Feed on pasture
- Mineral on pasture
- Water on pasture
- Avoid single trees
- Paddocks square
Figure 4. Impact of shade and water on distribution of soil phosphorus in a grazed pasture.

P1 soil test (lb P/A)

Distance from water

- 0-2” layer
- 2-4” layer
- 4-6” layer
Enhancing Nutrient Cycling

- Make paddocks as square as possible.
- Avoid sharp angles or narrow areas.
- Make water available in each paddock if possible.
- Feed grain or other supplements on pasture.

Total of 6.7 acres approx. 0.8 acres/paddock
Not the best paddock layout

- Total of 6.7 acres
- approx. 0.8 acres/paddock

High tensile perimeter fencing

Watering site

Temporary interior fencing

Gate
Control Access to Surface Water
Outwintering
Tools for managing nutrient cycling and distribution

- Pasture species composition
- Rotation and paddock layout
- Watering and feeding management
- Outwintering
- Stockpiling
## Managing the System

**Green up**

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*Start here*
Staging Pasture Growth

- Stockpiled, spring grazed paddocks accumulate root reserves until frost and go through the winter protected by fall growth. They will green up first.

- Stockpiled, fall grazed paddocks accumulate root reserves until frost, but are left exposed over the winter. They will green up more slowly.

- Non-stockpiled paddocks go through winter with few root reserves and green up the slowest in spring.
Example

- Hayfield
- Main-season pastures
- Stockpile
- Outwintering area
- Calving pastures
Extending the grazing season with stockpiled pasture

- If we start by maximizing the amount of energy we capture, all other steps in the process have greater potential to yield profits.

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