“A Penny Saved is a Penny Earned!”

Integrating Adaptively-Managed Grazing into Confinement-based Dairies for Improved Profitability

Justin Morris, Regional Soil Health Specialist
Natural Resources Conservation Service
Madison, Wisconsin
## Cost to Raise a Heifer from Birth to Freshening

<table>
<thead>
<tr>
<th>Category</th>
<th>2007</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed</td>
<td>$683</td>
<td>$1,274</td>
</tr>
<tr>
<td>Bedding</td>
<td>49</td>
<td>112</td>
</tr>
<tr>
<td>Veterinary</td>
<td>33</td>
<td>63</td>
</tr>
<tr>
<td>Breeding</td>
<td>49</td>
<td>48</td>
</tr>
<tr>
<td>Electric &amp; fuel</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td>Interest</td>
<td>67</td>
<td>69</td>
</tr>
<tr>
<td>Death loss</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Labor (paid &amp; unpaid)</td>
<td>255</td>
<td>372</td>
</tr>
<tr>
<td>Management (paid &amp; unpaid)</td>
<td>38</td>
<td>32</td>
</tr>
<tr>
<td>Allocated cost (variable + fixed) + labor + mgt</td>
<td>$1,323</td>
<td>$2,274</td>
</tr>
</tbody>
</table>

Vanderwerf et al., 2013 UW Extension survey of 32 WI dairy farms & custom heifer growers (no pasture-based farms)
Dairy Heifer Raising Expenses are the Second Highest Expense on Most Farms

Categorized as:
- Feed: 57%
- Labor & Mgt: 17%
- Other Variable Costs: 15%
- Fixed Costs: 11%

UWEX ICPA Heifer Raising Costs study, 2013
# Heifer Development Goals

<table>
<thead>
<tr>
<th>Breed</th>
<th>Birth Weight, lbs</th>
<th>Average Daily Gain, lbs/day</th>
<th>55% Mature Weight, lbs</th>
<th>82% Mature Weight, lbs</th>
<th>Mature Body Weight, lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holstein, Brown Swiss</td>
<td>100</td>
<td>1.7</td>
<td>750 – 850</td>
<td>1200 – 1300</td>
<td>1500</td>
</tr>
<tr>
<td>Guernsey, Ayrshire</td>
<td>75</td>
<td>1.4</td>
<td>600 – 700</td>
<td>900 – 1000</td>
<td>1250</td>
</tr>
<tr>
<td>Jersey</td>
<td>65</td>
<td>1.3</td>
<td>550 – 600</td>
<td>850 – 950</td>
<td>1100</td>
</tr>
</tbody>
</table>

Kilmer and Tranel. Optimizing Your Heifer Enterprise. Iowa State University.
Comparison of Three Replacement Heifer Feeding Strategies

- Year-round custom confinement (365 days)
- Year-round on-site confinement (365 days)
- Grazing (180 days: May – October) + on-site confinement (185 days: November – April)
Comparison of Three Replacement Heifer Feeding Strategies

Year-round custom confinement:

- $2.00 - $2.50/hd/d*
- $730 - $913/hd/yr

Year-round on-site confinement:

- $1.50 - $2.00/hd/d*
- $548 - $730/hd/yr

*Data from Brown County, WI dairy farmers
Comparison of Three Replacement Heifer Feeding Strategies

Grazing + on-site confinement:

- Grazing: $0.43/hd/d*
- $77/hd for 180 days
- On-site confinement: $1.50 - $2/hd/d
- $278 - $370/ hd for 185 days
- Combined cost
  - $355/ hd/yr ($1.50 on-site confinement cost)
  - $447/ hd/yr ($2 on-site confinement cost)

*Data from Hans Breitenmoser records. Reviewed by Farm Credit Services for validation.
What is the Cost Savings for 100 Head per Year?

Year-round custom confinement ($2/hd/d): $73,000
Grazing + on-site confinement ($1.50/hd/d): $35,500
Savings from replacing custom confinement with grazing: $37,500

51% Cost Reduction
What is the Cost Savings for 100 Head per Year?

Year-round on-site confinement ($1.50/hd/d): $54,800
Grazing + on-site confinement ($1.50/hd/d): $35,500
Savings from replacing custom confinement with grazing: $19,300

35% Cost Reduction
Research Study: Heifers Raised on Pasture versus Confinement


- Data Collected: Average Daily Gain, milk production (1st lactation), health issues, age at first calving

- Heifers: 500 lbs/hd, 6 – 10 months old, mostly Holsteins
Research Study: Heifers Raised on Pasture versus Confinement

Grazing Group:

- Pastured May – October
- 4 – 6 hd on 4, 0.7-acre subdivided pastures
- Red clover, Smooth brome, Timothy, Orchardgrass
- Excess pasture growth cut for hay
- Supplemented with hay to maintain adequate pasture regrowth
- Recovery period: 25 – 35 days
- Grain: 2.5 lbs/hd/d

Confinement Group: TMR → 11 lbs alfalfa haylage, 5 lbs corn silage, 5 lbs (corn, soybean meal, oats, molasses)
Research Study: Heifers Raised on Pasture versus Confinement

- ADG: 54 heifers on pasture, 61 confined
- First lactation performance: 37 heifers on pasture, 48 confined
Heifer Weight Gain (11 year average)

Pastured: 1.97
Confined: 1.86

Average Daily Gain (lbs/hd/d)

0.11 lbs (20 lbs over 180 days)
Heifer Weight Gain
(11 year average)

- Pastured: 1.97 lbs average daily gain (lbs/hd/d)
- Industry Target: 1.8 lbs average daily gain (lbs/hd/d)

0.17 lbs (30 lbs over 180 days)
First Lactation Performance
(10 year average)

305-day Milk (lbs/hd)

Pastured: 25328 lbs
Confined: 23415 lbs

Approximately 1,900 lbs (7.5%) difference.
Potential Revenue Increase from First Lactation Performance

• For 100 heifers, 190,000+ lbs more milk if raised on pasture versus confinement

• 190,000 lbs × $15/cwt = $28,500 (gross)
UW Study Summary

- Pasture-raised heifers can:
  - Exceed target industry standards for ADG
  - Exceed ADG than confined heifers
  - Produce more milk in first lactation

- Stocking rate, pasture management, and amount of grain fed will affect ADG, but can be easily modified depending on goals and resources.

- No significant difference versus confined heifers for:
  - Age at first calving
  - Frequency of displaced abomasums
  - Retained placentas at first calving
Cattle Relative Forage Quality Needs*

*Ball et al. 2008. Extending Grazing and Reducing Stored Feed Needs
Local Success Story
Hans Breitenmoser 400 Head Dairy Dairy
Merrill, WI
Breitenmoser Farms Heifer Weight Summary

Rate of Gain per day: (actual average daily gains from weighed animals)

<table>
<thead>
<tr>
<th>Date</th>
<th>Rate of Gain (kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-April-09</td>
<td>2.112</td>
</tr>
<tr>
<td>01-July-09</td>
<td>0.849</td>
</tr>
<tr>
<td>30-July-09</td>
<td>2.62</td>
</tr>
<tr>
<td>04-Sept-09</td>
<td>1.74</td>
</tr>
<tr>
<td>01-Oct-09</td>
<td>3.35</td>
</tr>
<tr>
<td>31-Oct-09</td>
<td>2.39</td>
</tr>
<tr>
<td>02-Dec-09</td>
<td>2.08</td>
</tr>
<tr>
<td>30-Jan-10</td>
<td>1.89</td>
</tr>
<tr>
<td>03-April-10</td>
<td>1.79</td>
</tr>
<tr>
<td>05-May-10</td>
<td>1.51</td>
</tr>
<tr>
<td>06-June-10</td>
<td>1.86</td>
</tr>
<tr>
<td>05-July-10</td>
<td>2.25</td>
</tr>
</tbody>
</table>
“I am finding after 5 years of managed grazing...I can raise heifers on pasture for about $0.40 per animal per day and reach all of the Industry standards for weight and height rates of gains. They are strong and in good condition when they come into my freestall. This still saves me about $40,000 per year over having them custom raised.”

Hans Breitenmoser, 2013
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per day to have heifers custom raised</td>
<td>$2.50</td>
</tr>
<tr>
<td>Number of animals</td>
<td>125</td>
</tr>
<tr>
<td>Days of grazing</td>
<td>180</td>
</tr>
<tr>
<td>Hours of labor per day</td>
<td>1.25</td>
</tr>
<tr>
<td>Labor cost/hr</td>
<td>$15.00</td>
</tr>
<tr>
<td>Land rent per acre</td>
<td>$250.00</td>
</tr>
<tr>
<td>Acres</td>
<td>71</td>
</tr>
<tr>
<td>Cost of grazing development per year on 20 yr amortization</td>
<td>$6,174.00</td>
</tr>
<tr>
<td>Amortization &amp; Maintenance</td>
<td>$2,090.00</td>
</tr>
<tr>
<td>Vet. Services ($5/animal)</td>
<td>$625.00</td>
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<tr>
<td>Land rent total</td>
<td>$17,750.00</td>
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<tr>
<td>Cost of labor during season</td>
<td>$3,375.00</td>
</tr>
<tr>
<td>Total cost for grazing season</td>
<td>$23,840.00</td>
</tr>
<tr>
<td>Cost per day per animal</td>
<td>$1.0596</td>
</tr>
<tr>
<td>Savings per year to graze heifers</td>
<td>$43,660.00</td>
</tr>
</tbody>
</table>

Breitenmoser’s Numbers w/ average land rent and custom raising figures

$1.94/day savings over custom raised
Heifers on Pasture versus Confinement: Results at First Calving

• More than 50% reduction in D.A.
• 40% less calving difficulty
• 33% less ketosis
Bottom Line for Heifers on Pasture

- Gain at industry standards
- Improved first lactation production
- Greater longevity
- Higher fertility rates
- Produced at lower cost than comparable custom raising
- Clean and well-conditioned animals
- Greater calmness from daily interaction
Bottom Line for Heifers on Pasture

- Aggressive eaters in pasture and feed bunk
- Improved fitness/athleticism
- Reduced leg and hoof problems
- Reduced D.A. problems
- Reduced calving difficulty
- Reduced milk fever
- Good PR
What do we mean when we say Adaptively-Managed Grazing?

Grazing that is both managed and adaptive!

**Managed:** Grazing is guided on a *daily* basis to meet soil health, plant health, animal performance and producer objectives. Determines where, when, and how long livestock graze in a certain area. Continuous or set-stock grazing *is not* managed grazing.

**Adaptive:** Grazing management must adapt to changing conditions in weather, forage growth rates, livestock numbers, livestock nutrient requirements, and producer needs.
Why do we as land stewards want Adaptively-Managed Grazing on the land?


- Significantly greater earthworm counts: improve infiltration, aeration, nitrogen mineralization

- Significantly greater percent of water stable aggregates: soil particles bound more tightly to withstand tillage, water, or wind erosion

Research Brief #90, Managed Grazing’s Effects on Soil Quality and Structure, UW-Madison; Jan. 2013
• Research by Alan Rotz in Pennsylvania looked at environmental impacts between lactating cows in confinement versus cows grazing on pasture in the summer.

• With summer grazing only:
  • 24% less sediment loss
  • 22% less sediment-bound P runoff
  • 23% less soluble P runoff
  • 27% lower volatilization of NH$_3$
  • 14% lower net emission of greenhouse gases (CO$_2$, CH$_4$, NO$_x$)
  • 25% smaller carbon foot print

How do you set up a successful grazing system?
Proper Layout – There is no right way; but there are definitely wrong ways.
Perimeter Fences
Temporary Fences
Electric Fences are Mental Boundaries that Require Training
Forages

- Graze what grows
- Follow a good nutrient management plan
- Learn how to graze your forages
- Plant species that are suited to your farm
Too Many Animal Units with too Little Rest
Proper Amount of Animal Units with the Correct Amount of Rest
Basic Operation and Maintenance for Adaptively-Managed Grazing

• Paddock rest is extremely important
• Do not over graze
• Square paddocks
• Always work on improving fertility
Other Things to Consider

- Feed Budget
- Nutrient Management
- Plan for the Weather
- Animal Feeding Sites
- Harvest Strategies
- Out-wintering
- Heavy Use Area
For More Information

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