PASTURING HEIFERS ON THE WISCONSIN INTEGRATED CROPPING SYSTEMS TRIAL
The Wisconsin Integrated Cropping Systems Trial at Arlington, WI
Cash-grain systems

Dairy (forage-based) systems

Native Systems

Increasingly perennial

Increasingly diverse
Heifer weight gain
with 90% CI (11-yr avg.)

Average daily gain (lb/d)

<table>
<thead>
<tr>
<th></th>
<th>mean</th>
<th>lower CI</th>
<th>upper CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>pastured (N=54)</td>
<td>1.9</td>
<td>1.6</td>
<td>2.2</td>
</tr>
<tr>
<td>confined (N=61)</td>
<td>1.8</td>
<td>1.5</td>
<td>2.1</td>
</tr>
</tbody>
</table>

p<0.0528
First Lactation Performance (10 yr avg)

- Pastured (N=37): 305d milk (lbs/cow) p<0.0934
- Confined (N=48): 305d milk (lbs/cow)

NC WI Grazing Network Winter Meeting - March 2013
Stocking strategies over time

- **1992-1995** – ‘Replicated’
  - 2 heifers/plot/yr
  - 4 plots
  - 8 hd on 2.8 a = 1.4 AU/a
- **1996-1999** – ‘Put-and-take’
  - 12 then 6 heifers/yr
  - Cohort moved through 4 paddocks
  - 1.3 AU/a
- **2000-present** – ‘Constant’
  - 5 heifers/yr
  - Moved as a cohort through 4 paddocks
  - 0.9 AU/a

NC WI Grazing Network Winter Meeting - March 2013
The Wisconsin Integrated Cropping Systems Trial
Effect of management strategy on pasture productivity

- Constant (0.9 AU/a)
- Put-n-take (1.3 AU/a)
- Replicated (1.4 AU/a)

Mgt, M p<0.0329
Period, P p<0.0001
MxP p<0.0001

NC WI Grazing Network Winter Meeting - March 2013
Effect of pasture management strategy on current heifer productivity (vs. confined group)

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<tr>
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<th>Put-n-take (1.3 AU/a)</th>
<th>Replicated (1.4 AU/a)</th>
</tr>
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<tbody>
<tr>
<td>ADG (lb/hd/day)</td>
<td>2.01 (1.87)</td>
<td>1.75 (2.22)</td>
<td>1.29 (1.78)</td>
</tr>
<tr>
<td>Initial BW (lbs/hd)</td>
<td>487 (489)</td>
<td>483 (456)</td>
<td>464 (465)</td>
</tr>
<tr>
<td>Final BW (lbs/hd)</td>
<td>818 (797)</td>
<td>719 (751)</td>
<td>614 (657)</td>
</tr>
</tbody>
</table>
Effect of pasture management strategy on future heifer productivity (vs. confined group)

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<th>Put-n-take (1.3 AU/a)</th>
<th>Replicated (1.4 AU/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME milk, lbs/cow</td>
<td>25,416 (+2000 lbs)</td>
<td>24,057 (-1261 lbs)</td>
<td>21,615 (-1515 lbs)</td>
</tr>
<tr>
<td>(diff.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Yield comparison in pasture vs. 3-yr old alfalfa

![Yield comparison chart](chart.png)

- 3-yr old alfalfa
- Pasture

Tons DM/a

**NS**
RFV vs. RFQ on WICST forage systems (8-yr seasonal average)

- RFV: Conv. Alfalfa
- RFQ: Org Alfalfa
- RFV: Pasture

Quality index

180
170
160
150
140
130
120
110
100

Diff=12
Diff=21
Diff=35

Lactating dairy cow level
Forage Quality Needs of Animals

- Dairy, 1st trimester Dairy Calf
- Dairy, last 200 days Heifer, 3-12 month Stocker cattle
- Heifer, 12-18 mo
- Beef cow & calf
- Heifer, 18-24 mo
- Dry cow

Relative Forage Quality
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Energy efficiency in forage systems

- 'green gold' alf
- org alf
- rotational grazing

System

Tons DM/gal diesel equivalent

0.0 0.1 0.2 0.3 0.4 0.5 0.6

Tons DM/man-hour

0.0 0.5 1.0 1.5 2.0 2.5

Yield efficacy

Labor efficacy

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Grazing Prairie?

- Slow regrowth of cool-season pasture during summer months (‘summer slump’) – need to feed hay
- Prairies are comprised of warm-season grasses (big bluestem, indiangrass, switchgrass) that can fill the pasture gap during the hot, dry summer
- Good feed value if grazed in vegetative stage
- Mix of grasses and forbs for high selection
- What is impact of grazing on prairie regrowth?
Typical seasonal forage grass distribution

Cool-season grass

Warm-season grass
Summer Forage Availability for Grazing

<table>
<thead>
<tr>
<th>Month</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>July</td>
<td>1500</td>
<td>2500</td>
</tr>
<tr>
<td>June</td>
<td>3500</td>
<td>4500</td>
</tr>
<tr>
<td>July</td>
<td>3000</td>
<td>4000</td>
</tr>
<tr>
<td>August</td>
<td>3500</td>
<td>4500</td>
</tr>
</tbody>
</table>

- **warm-season**
- **cool-season**
Crude protein% of pasture and prairie grasses

The diagram shows the crude protein% of pasture and prairie grasses for different months and years. The y-axis represents the crude protein% ranging from 0 to 25, and the x-axis shows the months from June to August and the years 2009 and 2010.

- **Cool-seasons**: Represented by blue bars.
- **Warm-seasons**: Represented by red bars.

Here are the key observations from the diagram:

- In June 2009 (CP-2009), the crude protein% for cool-seasons is around 15% and for warm-seasons is also around 15%.
- In July 2009, the crude protein% for cool-seasons is significantly higher at around 23%, while for warm-seasons it remains around 15%.
- In June 2010 (CP-2010), the crude protein% for cool-seasons is around 13%, and for warm-seasons it is around 12%.
- In July 2010, the crude protein% for cool-seasons is around 22%, while for warm-seasons it is around 12%.
- In August, the crude protein% for both cool-seasons and warm-seasons remains around 12%.

There are notes indicating statistical significance: **a**, **b**, **c**, **x**, **y**, and **z**. These likely represent differences in means that are statistically significant at certain levels.
Forage quality in early June - Protein

Crude protein

% (+/- SE)

Prairie
Switchgrass
Pasture

Feb 19, 2010
WICST winter meeting
Forage quality in early June - TDN

**Total Digestible Nutrients (TDN)**

- **Prairie**
- **Switchgrass**
- **Pasture**

% (+/SE)
NDF-D of pasture and prairie grasses

<table>
<thead>
<tr>
<th>Month</th>
<th>NDF-D 2009</th>
<th>NDF-D 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>60</td>
<td>x, y</td>
</tr>
<tr>
<td>July</td>
<td>60</td>
<td>x, y</td>
</tr>
<tr>
<td>Aug</td>
<td>30</td>
<td>x, y</td>
</tr>
</tbody>
</table>

a, b

- cool-seasons
- warm-seasons
Forage quality in early June - RFQ

Relative Forage Quality

Quality index (+/- SE)

- Prairie
- Switchgrass
- pasture

Feb 19, 2010 WICST winter meeting
Summary

• Stocking strategy impacts animals and pasture in current season and beyond

• Pastured heifers more productive than those raised in confinement

• Pasture yields more variable than alfalfa
  – Pasture avg. 3 ton DM/a (range 2.7 to 6.5 ton DM/a)
  – Crop insurance? risky
  – Add portable irrigation? costly
  – Add deeper rooted legumes? prairie grasses?
Summary (cont’d)

• Warm season grasses can improve total forage availability
• More delicate to manage (leave higher residual i.e. 6”; graze regrowth when 15” tall)
• Warm season grasses have very good nutritive value while in vegetative growth stage
• Nutritive value falls quickly once grasses start to head out