Putting It All Together To Stay In Business

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University of Florida

Major Challenges
- Milk price
- Cash flow / return on investment
- Environmental regulations

How to strike the most profitable balance?
Feed efficiency = return on investment

Feed inputs: Salable product

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Feed efficiency = proportion of waste

Wasted feed: Manure

Salable product

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It’s an issue of balance….

Better Feed Efficiency

Poorer Feed Efficiency

Shrink Spoilage

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… for the whole farm.

Exported feed, milk, manure & cattle

Purchased feed, fertilizer & cattle

Accumulated Nutrients

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A cow uses nutrients for…

- Milk
- Pregnancy
- Growth
- Reserves
- Maintenance

All nutrients used for maintenance go in with manure.

Feed Efficiency:
Milk/DM Intake
How much feed is used to make milk instead of manure?
**Milk / Feed Intake**

Milk lb / (As Fed Intake lb x Dry Matter%)

- Herd average > 1.4 (Hutjens, Univ. of Illinois)
- High producing groups > 1.65
- One shot herds > 1.2

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**Fat- or Fat- & Protein-Corrected Milk**

3.5% fat- & protein-corrected milk:

\[(12.82 \times \text{lb fat}) + (7.13 \times \text{lb prot}) + (0.323 \times \text{lb milk})\]

<table>
<thead>
<tr>
<th></th>
<th>Holstein</th>
<th>Jersey</th>
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</thead>
<tbody>
<tr>
<td>Milk, lb</td>
<td>70.0</td>
<td>54.0</td>
</tr>
<tr>
<td>Fat, %</td>
<td>3.5</td>
<td>5.2</td>
</tr>
<tr>
<td>Protein, %</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>3.5%FPCM, lb</td>
<td>69.0</td>
<td>68.8</td>
</tr>
</tbody>
</table>

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### Feed Efficiency

<table>
<thead>
<tr>
<th>Milk, lb</th>
<th>1.1</th>
<th>1.3</th>
<th>1.4</th>
<th>1.5</th>
<th>1.6</th>
<th>1.7</th>
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<td>80</td>
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<td></td>
<td></td>
<td>53.3</td>
<td>50.0</td>
<td>47.1</td>
</tr>
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</table>

Increased feed efficiency without major loss in body condition means the ration & cow are working well together.

### Milk / Intake: How to decrease it....

- High intakes: low forage, high ctsd hulls
- Unbalanced ration / slug feeding, etc.
- Acidosis: <1.2, can be below 1.0
- Reduced digestibility
- Days in milk
- Disease & injury
- Increased activity (increases maintenance)
- Environment (increases maintenance)
Heat Stress & Feed Efficiency  

<table>
<thead>
<tr>
<th>Temp F</th>
<th>% Maint</th>
<th>Predicted lb</th>
<th>Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>68</td>
<td>0</td>
<td>40.1</td>
<td>59.5</td>
</tr>
<tr>
<td>77</td>
<td>4</td>
<td>39.0</td>
<td>55.1</td>
</tr>
<tr>
<td>86</td>
<td>11</td>
<td>37.3</td>
<td>50.7</td>
</tr>
<tr>
<td>95</td>
<td>20</td>
<td>36.8</td>
<td>39.7</td>
</tr>
<tr>
<td>104</td>
<td>32</td>
<td>22.5</td>
<td>26.5</td>
</tr>
</tbody>
</table>

Milk/DM Intake

68 77 86 95 104

Temperature, F

NRC, 1981

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Improving Feed Efficiency

Get obstacles out of a cow’s way so she can spend more nutrients on production.
Where the cows are

- Well ventilated
- Comfortable
- Used
- Clean
Where do the cows have to walk?

Do you feel lucky?

What do they have to do to get feed?
Heat Stress causes ruminal acidosis.

- Panting
- Decreased rumination
- Drooling
- Slug feeding
- Sorting

Ruminal Response to Heat Stress

Cool = 18.3°C (65°F), Hot = 29.4°C (85°F)
HR = high roughage, HG = high grain

Mishra, et al. 1970
J. Anim. Sci. 30:1023
Digestive Upset

- Ruminal acidosis
- Displaced abomasum
- Rumen stasis
- Abomasal ulcers
- Constipation
- Sand impaction
- Scours / diarrhea
- Off-feed cows
- Indigestion
- More……….

Any of a variety of GI disorders, often related to ruminal acidosis and/or possibly mycotoxin feeding.

-220 lb milk
### Digestive Upset Results – Average

<table>
<thead>
<tr>
<th></th>
<th>Avg.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows:</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>Lactation:</td>
<td>2.4</td>
<td>1 – 8</td>
</tr>
<tr>
<td>DIM:</td>
<td>228</td>
<td>31 – 731</td>
</tr>
<tr>
<td>Total Days:</td>
<td>26.9</td>
<td>2 – 48</td>
</tr>
<tr>
<td>Lost Milk, lb:</td>
<td>745.9</td>
<td>40.2 – 3225.3</td>
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### Digestive Upset Results – Average

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<tr>
<td>Treatment Cost:</td>
<td>$5.60</td>
<td>0 – 74.22</td>
</tr>
<tr>
<td>Lost Milk Revenue:</td>
<td>$115.37</td>
<td>6.23 – 499.92</td>
</tr>
<tr>
<td>Cull Value Loss:</td>
<td>$39.56</td>
<td>0 – 672.39</td>
</tr>
<tr>
<td>Early Cull / Dry Off:</td>
<td>$48.28</td>
<td>0 – 1900.97</td>
</tr>
<tr>
<td>Total Cost:</td>
<td>$208.81</td>
<td>6.21 – 2144.45</td>
</tr>
</tbody>
</table>
Diarrhea

Major causes of digestive upset:
- Heat stress
- Cows sorting feed
- Slug feeding
- Too little forage
- Too much starch
- Spoiled feed / mycotoxins (?)

Forage
- Enough: effective fiber
- Dry matter%
- Analysis?
- Well preserved
  - right moisture
  - processed?
  - packed
  - right size storage

If you have any choice in the matter, don’t feed spoiled feed. How much toxin can you afford?
Digestibility & Feed Efficiency

- Fiber: quantity or quality to keep the rumen working
- Feeds: Digestible provides nutrients. Indigestible provides manure.

Eaten Does Not Mean Digested

Poorly chopped/processed corn silage

Coarse corn meal

4 8 16 30 Pan
Feed Efficiency & Phosphorous

- Formulate to meet needs, not to excess
  - May not need to add any mineral P
- Rations 0.35 - 0.40% P (DM basis)
- Impact of a change of 0.1 Milk/Intake…?
Feed Efficiency & Phosphorous

DM intake by Feed efficiency

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As feed efficiency increases, more P goes in milk and less in manure.
Silver Bullets & Phosphorous

- Phosphorous
  - Can’t be created/destroyed/converted
  - Can’t be made volatile like nitrogen
  - Concentration in milk pretty constant
  - Phytase doesn’t work with cattle

- ↓ excretion by ↓ intake or ↑ export

- If a product promises to reduce P in manure or lagoons, find out how it works.

Balancing The Farm

Exported feed, milk, manure & cattle

Purchased feed, fertilizer & cattle

Accumulated Nutrients

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Limited Land or Cropping

- Crops
- Accumulated nutrients
- Manure

Exported products
- Imported feed
- Imported fertilizer

More Cropping

- Crops
- Accumulated nutrients
- Manure

Exported products
- Imported feed
- Imported fertilizer
Bring In Less Stuff, Send More Off

- Recycle manure through crops or export it.
- Enough forage to keep cows healthy
- ↑ forage tends to ↓ phosphorous intake
- ↑ feed efficiency
- Be selective about purchased feeds
- Be careful about feeding excesses

Feeds and Phosphorous

<table>
<thead>
<tr>
<th>Feed</th>
<th>P, % of dry matter</th>
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<tbody>
<tr>
<td>Corn</td>
<td>0.30</td>
</tr>
<tr>
<td>Hominy</td>
<td>0.65</td>
</tr>
<tr>
<td>Corn silage</td>
<td>0.26</td>
</tr>
<tr>
<td>Bermudagrass</td>
<td>0.25</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>0.26</td>
</tr>
<tr>
<td>Wheat midds</td>
<td>1.02</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>0.70</td>
</tr>
<tr>
<td>Distillers grains</td>
<td>0.83</td>
</tr>
<tr>
<td>Whole cottonseed</td>
<td>0.60</td>
</tr>
<tr>
<td>Cottonseed hulls</td>
<td>0.12</td>
</tr>
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</table>

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NRC, 2001
Strike the Right Balance.

Forage Effective Fiber  Costs  Phosphorous
Feed Efficiency  Digestibility  Income
Cow Comfort & Health  Feeding Management
Palatable  No Toxins  Well Preserved

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