Todays Program

• Focus on fresh cow feeding strategies

• KPI (Key Performance Indicators) of a successful transition program
Fresh Cow Rations

- Similar feed ingredients to the high group TMR
- Add functional fiber (3 to 4 lbs of long fiber as hay or 1 to 2 lbs of processed straw)
- Fresh cow additive package (yeast product, Rumensin, chromium, buffer, and organic trace minerals)
- Moving cows vs. stepping up nutrient levels (less fiber, more starch, RUP)
- Rumen fill factor to move fresh cows
### Examples of Fresh, Close-Up, and High Group Rations (Hoards Feeding Guide, 2018)

<table>
<thead>
<tr>
<th>Item</th>
<th>Close Up Dry</th>
<th>Fresh Cow</th>
<th>Early Lactation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter Intake (lb)</td>
<td>22</td>
<td>34</td>
<td>66</td>
</tr>
<tr>
<td>Milk Yield (lb/day)</td>
<td>None</td>
<td>77</td>
<td>120</td>
</tr>
<tr>
<td>Metabolizable Protein (lb/day)</td>
<td>8.0</td>
<td>13.8</td>
<td>11.6</td>
</tr>
<tr>
<td>NE-I (Mcal/lb DM)</td>
<td>0.60</td>
<td>0.65</td>
<td>0.73</td>
</tr>
<tr>
<td>NDF (%)</td>
<td>35</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>NFC (%)</td>
<td>34</td>
<td>35</td>
<td>38</td>
</tr>
</tbody>
</table>

### University of Wisconsin

Hypocalcemia

Risks and Rewards
**Plasma Ca Around Calving**

*Fresh cows with (n=8) or without (n=19) milk fever*

![Graph showing plasma total Ca levels around calving](image)

**Effects of Subclinical Hypocalcemia**

- Subclinical hypocalcemia was associated with:
  - increased risk for metritis (3.2X)
  - increased risk for post-partum fever (2.4X)
  - increased post-fresh BHBA (1.0 vs. 0.7 mmol/L)
  - longer median days open (124 vs. 109 days)

- Identified immune suppression associated with hypocalcemia
  - reduced neutrophil concentration
  - reduced percentage of neutrophils undergoing phagocytosis and oxidative bursts

*Kimura et al., J. Dairy Sci. 89:2588, 2006*

*Martinez et al., J. Dairy Sci. 95:7158, 2012*
Tools to Reduce Hypocalcemia

• Anionic product
  – DCAD below zero (-50 to -100 meq/kg)
  – Urine pH of 5.5 to 6.0 (Holstein); 5.0 to 5.5 (Jersey)
  – 150 to 180 grams of total calcium

• Calcium supplementation (bolus or paste)
  – 50 to 60 grams per treatment
  – Calcium chloride, sulfate, or propionate
  – At calve and 12/24 hours later or as needed

DCAD Guidelines

• SoyChlor, BioChlor, and Aminate (2nd generation); avoid ammonium salts

• Full acidification (pH < 6—Holstein; <5.5 Jersey)

• 150 to 180 grams of calcium (50+ grams as inorganic calcium sourced)

• Not needed for heifers

• Test feeds for sodium, potassium, chlorine, and sulfur (wet chemistry)
Strategies When Using Calcium Bolus(s)

- Older cows (3rd lactation cows)
- Cows that exhibit lameness (score 3 and higher)
- Heavy cows (3.5 BCS or higher)
Experimental Design (Dr. Lock)

• Fresh cows were fed from day 0 to 21 days after calving
• Added 1.5 percent to the ration dry matter intake
• Percent of palmitic and oleic was evaluated
• All cows moved at day 22 to ration with no supplemental fatty acids (carry over effect continued for next 40 days)

MSU Research Results

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>High Palmitic</th>
<th>Inter Palmitic</th>
<th>Low Palmitic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmitic (%)</td>
<td>None</td>
<td>80</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Oleic (%)</td>
<td>None</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Milk (lb/day)</td>
<td>102.4a</td>
<td>106.9b</td>
<td>107.4b</td>
<td>109.3b</td>
</tr>
<tr>
<td>DMI (lb/day)</td>
<td>44.7</td>
<td>45.5</td>
<td>46.0</td>
<td>48.0</td>
</tr>
<tr>
<td>Milk fat (lb/day)</td>
<td>4.18c</td>
<td>4.73d</td>
<td>4.58d</td>
<td>4.60d</td>
</tr>
<tr>
<td>NEFA (Meq/l)</td>
<td>0.72</td>
<td>0.84</td>
<td>0.75</td>
<td>0.67</td>
</tr>
<tr>
<td>Plasma insulin (ug/l)</td>
<td>0.26</td>
<td>0.27</td>
<td>0.31</td>
<td>0.31</td>
</tr>
</tbody>
</table>
University of Illinois Methionine Research Summary

Feed rumen protected methionine at:
0.09% in DM Prefresh (30d)
& 0.1% in DM Postfresh (60d)

Batistel et al. (2017)
Alharthi et al. (2017)

↑ Fresh ECM 9.5 lb/d
↑ Peak ECM 10.3 lb/d
University of Illinois Methionine Research Summary
Feed methionine at 0.09% in DM Prefresh (30d) & 0.1% in DM Postfresh (60d)

↑ Prefresh DMI 2.6 lb/d
↑ Fresh DMI 3.5kg/d
↑ Peak DMI 3.3 lb/d

↑ Liver Functionality Index
↑ Neutrophil Function
↓ Oxidative Stress
↓ Inflammation
University of Illinois Methionine Research Summary
Feed methionine at 0.09% in DM Prefresh (30d) & 0.1% in DM Postfresh (60d)

↑ Insulin (44%)
↓ NEFA (25%)

↑ 42d Weaning Wt 11 lb
↑ 63d Post-Weaning Wt 13.2 lb
Negative Energy Balance

• Negative energy balance (NEB) is when the sum of the energy needs is greater than the amount of energy supplied to the cow.

• Cows in NEB make up the difference between energy needs and energy required by mobilizing body reserves (losing weight and body condition).
Typical Energy Balance for Transition and Early Lactation Dairy Cows

Impact of BHBA on Cows

- Estimated 30% of cows experience ketosis
- Impact on milk yield and reproductive success are important
- Subclinical ketosis is > 1.2 mmol/liter
- Can use Precision Xtra system cow side / DHI monitoring
- Check cows from 3 to 16 days in milk
- Drench with propylene glycol

adapted from Putnam, 1998
Subclinical Ketosis (Fourdraine, AgSource)

- 3400 herds and 215,000 cows over three years
- Milk KetoMonitor test at 5 to 20 days postpartum
- If 1st lactation cow have ketosis, 22% chance this cow may have ketosis in the next lactation
- If older cows have ketosis, 45% chance she may be ketosis in her next lactation
Impact of Ketosis (Fourdraine, AgSource)

• Lower conception rate
  – 6% in 1st lactation cows/heifers
  – 2% in older cows

• Higher culling rate
  – 6% in heifers
  – 5% in older cows

• Cost of ketosis per case
  – $375 for 1st lactation cows/heifers
  – $256 for older cows

Ketosis incidence observed and measured

<table>
<thead>
<tr>
<th>Location</th>
<th># of cows</th>
<th>Milk, lbs/d</th>
<th>Ketosis observed, %</th>
<th>Ketosis measured*, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY</td>
<td>1,890</td>
<td>92.0</td>
<td>13.2</td>
<td>41.3</td>
</tr>
<tr>
<td>NY</td>
<td>1,827</td>
<td>92.0</td>
<td>14.9</td>
<td>27.3</td>
</tr>
<tr>
<td>WI</td>
<td>2,794</td>
<td>86.7</td>
<td>4.2</td>
<td>40.7</td>
</tr>
<tr>
<td>WI</td>
<td>4,106</td>
<td>77.0</td>
<td>35.2</td>
<td>57.2</td>
</tr>
</tbody>
</table>

Overall measured ketosis = 46%
* Cows with BHBA > 1.2 mmol/L in at least one test (Precision –Xtra meter)
  Highest incidence at 5 DIM
Digital Cushion in Cows

- Cushions contain a higher amount of fat in mature cows compared to heifers.
- Fat content is softer - contains a larger amount of MUFA (mono-unsaturated fat).

Ch. J. Lischer and P. Ossent, 12th International Lameness Symposium, Orlando, FL, 2002.

Impact of Changing Body Condition Score

- Digital cushion thickness (DCT) provides cushion to the hoof structure.
- Cows with the highest DCT had 15% lower lameness scores compared to lowest DCT scored cows.
- DCT continues to drop after calving with the lowest level at 120 days after calving.
- Target: Avoid dropping more than 0.5 BCS after calving (reflects dry matter intake and environment).
Indicators of Energy Balance

• Change in body condition score (BCS)
  – Drop of > 0.75 BCS in 60 days

• Non-esterified fatty acids (NEFAs)
  – Levels over 1000 mg/dl

• Fat test in early lactation
  – Milk fat tests over 4.5 (Holstein) or > 1.4 ratio of milk fat to true milk protein
National Jersey Survey of High Herds

Do you have a fresh cow group? (n=38)
  Yes 47%  No 53%

How days are fresh cows kept in the fresh group? (n=17)
  Average: 30.7
  Max: 100
  Min: 10
  SD: 24.1

Jersey Study: Determining when fresh cows are ready to move to the high group. (n=26)
  54% Days in milk
  31% Cows general appearance
  31% Other
  23% Whenever there is a group of cows to move
  19% Milk production
  8% Feed intake
  4% Body temperature
  4% Rumination activity
Determining Days In the Fresh Cow Pen

• The range varies from 3 to 45 days.
• The factors reported for moving fresh cows include the need for space, days in milk, milk yield, and health status.
• Minimum of 10 days to monitor health
• Move the cow when health to allow intake of the high cow ration

FATMUD Tools
Dr. Dick Wallace Approach

F eed
A ttitude
T emperature
M anure
U terine D ischarge
**Feed**

Monitor feed intake

Scoring:
1. Off feed
2. Decreased or declining feed intake
3. Stable intake or good appetite
4. Increasing intake or excellent appetite

**Attitude**

Visually observe cow; eyes, ears, movements

Scoring:
1. Downer; reluctant to rise
2. Depressed; sunken eyes, droopy, slow
3. Slightly off; just don’t look quite right
4. Bright and alert
Temperature

- Record rectal temperature with digital thermometer
- Evaluate trend from day to day and between other cows in barn or pen
- Action point:
  - Summer >104.0 for two or more days
  - Winter >103.0 for two or more days

Manure

Observe feces in gutter, behind cow at lock-up, or passed during exam

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thin, fluid, arcs, green</td>
<td>Sick cow, off feed, cows on pasture</td>
</tr>
<tr>
<td>2</td>
<td>Loose, splatters, little form</td>
<td>Fresh cow, cows on pasture</td>
</tr>
<tr>
<td>3</td>
<td>Stacks up 1 to 1 1/2 inches, dimples, 2 to 4 concentric rings, sticks to boot</td>
<td>Recommended</td>
</tr>
<tr>
<td>4</td>
<td>Stacks up 2 to 3 inches, dry</td>
<td>Dry cow, low protein, high fiber</td>
</tr>
<tr>
<td>5</td>
<td>Stacks up over 3 inches</td>
<td>All forage, sick cow</td>
</tr>
</tbody>
</table>
**Uterine Discharge**

Check tail or stall for uterine discharge

**Scoring:**

1. Fluid, foul smelling; brown, red to yellow
2. Thickened mucous, foul odor
3. Thick white discharge, minimal odor
4. Thick, gelatinous, no odor; dark red to clear

N. None observed

**Additional Monitoring Tools**

- Rumination monitoring (> 450 minutes per day)
- Mastitis status
  (CMT number after clearing colostrum)
- Milk yield increase / change
  (an indication of health)
- Blood or milk ketone levels
Factors To Consider

• Heifer grouping (prepartum and postpartum)
• Bunk space (30 inches for Holsteins)
• Cows per stall (less than 90 percent)
• Sand freestall (gold standard)
• Stress factors
Pre-Fresh Bunk Space and Post-Fresh Milk Yield
(modeled relationship; n = 132 first lactation heifers)

Lose 1.6 lbs milk for each 6” decrease in bunk space

30 inches  24 inches  20 inches

Days in Milk

Effect of Days in Pre-Fresh Pen on Subsequent Milk Yield

A short pre-fresh period created a pen move within the 3 to 9 day critical zone for 58% of the cows.

Lactation 1
-9 days

Lactation 2+
Adequate Pre-Fresh
Short Pre-Fresh

Calving

2,857 lbs Milk
24,639 lbs Milk
21,782 lbs Milk
20 Cows
31 Cows
39 Cows
52 Cows
26,373 lbs Milk
25,431 lbs Milk
942 lbs Milk

Calculated from data in Robinson et al., JDS 84:2273, 2001

54th Florida Dairy Production Conference
128
Gainesville, FL, September 26, 2018
Reducing Stress (Dr. Drackley)

- <90% stocking rate in close-up pen
- Training (lock-ups and waterers)
- Avoid excessive pen movement
- Separate cows and heifers
- Avoid drastic ration changes (10%)
- Minimize feed sorting and selection
- Manage heat stress
- Three feet of bunk space

Hutjens KPI

Key Performance Indicates For Transition Cows
KPI #1

Number of culled cows before 60 days in milk:

1\textsuperscript{st} lactation cow < 4%

Cows < 7%

KPI #2

Dry matter intake in close up pens

> 30 lb in mature cow pen

> 28 lb in mix pen

> 25 lb in springing heifer pen
KPI #3
Metabolic disorders goals
- Milk fever < 3%
- Ketosis < 2%
- DA < 5%
- Retained placenta < 8%

KPI #4
Meeting dry matter intake goals after calving

[Graph showing dry matter intake over weeks after calving for 1st Lactation and ≥ 2nd Lactation]
**KPI #5**

**Strategic Use of Additives**

- Yeast culture (20 to 120 grams) **YES**
- Propylene glycol (300 to 500 ml) **YES**
- Calcium propionate (1/3 lb) **YES**
- Rumensin **YES**
- Anionic products (- 50meq/kg) **AS NEEDED**
- Protected choline (15 grams) **AS NEEDED**
- Niacin (protected) **AS NEEDED**
- Direct feed microbes **WATCH LIST**

**KPI #6**

**Drench Strategies**

1. **Which cows?**
   * treat/prevent/parity*

2. **Which product?**
   * calcium and glucose precursors*

3. **How much water?**
   * 10+ gallons*
KPI #7

Solid Trace Mineral Program

<table>
<thead>
<tr>
<th>Trace Mineral</th>
<th>mg/cow/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium</td>
<td>6 to 8</td>
</tr>
<tr>
<td>Cobalt</td>
<td>2</td>
</tr>
<tr>
<td>Copper</td>
<td>200</td>
</tr>
<tr>
<td>Iodine</td>
<td>12</td>
</tr>
<tr>
<td>Iron</td>
<td>500 (varies)</td>
</tr>
<tr>
<td>Manganese</td>
<td>800</td>
</tr>
<tr>
<td>Selenium</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Zinc</td>
<td>800</td>
</tr>
</tbody>
</table>

Part / all from organic sources

Take Home Messages

- Need a fresh cow approach
- Develop early warning system
- Detect little problems before they become BIG problems
- Treat timely and appropriately
- Reduce the number of cows that leave the herd in early lactation
- Keep profitable cows profitable