Group Housed Calves: An Overview

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Overview
• Getting started right
• Feeding a higher plane of nutrition
• Feed delivery
• Grouping strategies
• Approaches to weaning
• Monitoring results

History
• Scandinavia
• Canada
• US

Diagram:
- Host
- Agent
- Disease
Getting Started

Failure of Passive Transfer

“it’s a lot more common than you think” (may be as high as 20% nationally)

Failure of Passive Transfer

- IgG- 1000 mg / dl and greater
- Serum TP
  - Brix refractometer – 8.2 and greater
  - Total Protein refractometer - 5.2 and greater

>90 % of calves should meet these numbers

Getting Started

- Time spent in maternity pen
- Maternity pen cleanliness
- Dystocia incidence
- Transportation to calf barn

http://www.extension.umn.edu/dairy/dairystar/03-26-05-Salfer.htm
Increased Nutritional Plane

- Major benefit of group housed calves
- Improved gain and increased resistance to disease
- Improved lifetime productivity

High plane of nutrition (HPN) reduces the effect of disease due to Cryptosporidium parvum in neonatal dairy calves.

HPN improves ADG and feed efficiency.
Summary of Data: Doubling birth weight w/ liquid feed by weaning

<table>
<thead>
<tr>
<th>Study</th>
<th>Response kg / lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar-Peled et al., '98</td>
<td>+452 (994 lbs)</td>
</tr>
<tr>
<td>Foldager and Krohn, '94</td>
<td>1,403 (3086 lbs)</td>
</tr>
<tr>
<td>Foldager et al., '97</td>
<td>519 (1141 lbs)</td>
</tr>
<tr>
<td>Miner Inst., '05</td>
<td>700 (1540 lbs)</td>
</tr>
<tr>
<td>MSU '06</td>
<td>500 (1100 lbs)</td>
</tr>
<tr>
<td>Drackley et al., '07</td>
<td>836 (1839 lbs)</td>
</tr>
<tr>
<td>U. Minn '08</td>
<td>998 (2196 lbs)</td>
</tr>
<tr>
<td>Cornell U., '09</td>
<td>792 (1742 lbs)</td>
</tr>
<tr>
<td>Average Response</td>
<td>+840 (1848 lbs)</td>
</tr>
</tbody>
</table>

Summary of Early Nutrition Effects

- Nutrient intake early in life impacts lactation performance
- All data is positive or neutral (no negative effects)
- Mechanisms are not completely understood

There is future milk in early life colostrum and nutritional management!

Feeding Strategies

- Whole milk/waste milk/transition milk
- Milk replacer
- Acidified milk or milk replacer

Mob feeders, Ad lib feeders, Gang Feeders

- Cheaper
- Easy to construct
- Multiple nipples per pen
- May or may not be ad lib
- Weaning can be difficult
Computerized Feeders

- Greater flexibility for feeding individual calves
- Tremendous amount of information
- Newer feeders have daily weight option
- Numerous options for weaning process
- Can feed warm milk
- Usually 1 nipple per pen
- Expensive

To Acidify or Not to Acidify?

- Chemical form of pasteurization
- Citric acid
- Propionic acid
- Formic acid
How do I Acidify?

Adding Dilute Formic Acid to Milk

30 ml (1 oz) of dilute acid to 1 L of whole milk or milk replacer

Remember:
• Milk should be cool (<70 F)
• Add acid SLOWLY
• Agitate well
• Wear protective eyewear

Formic Acid

• 85% formic acid not approved in USA
• Dilute to 10% solution before adding to milk
• Add water to acid
• Take safety precautions

Table 1. The pH Scale—Some Examples

<table>
<thead>
<tr>
<th>pH Value</th>
<th>Concentration</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 x 10^9</td>
<td>sulfuric acid</td>
</tr>
<tr>
<td>1</td>
<td>1 x 10^7</td>
<td>lemon juice, vinegar</td>
</tr>
<tr>
<td>2</td>
<td>1 x 10^5</td>
<td>orange juice, soda</td>
</tr>
<tr>
<td>3</td>
<td>1 x 10^3</td>
<td>black coffee, banana</td>
</tr>
<tr>
<td>4</td>
<td>1 x 10^1</td>
<td>milk of magnesia</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>iron oxide red</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
<td>soap, amino acid</td>
</tr>
<tr>
<td>7</td>
<td>1,000</td>
<td>milk, cream</td>
</tr>
<tr>
<td>8</td>
<td>10,000</td>
<td>household bleach</td>
</tr>
<tr>
<td>9</td>
<td>100,000</td>
<td>liquid drain cleaner</td>
</tr>
<tr>
<td>10</td>
<td>1,000,000</td>
<td>drain cleaner</td>
</tr>
<tr>
<td>11</td>
<td>10,000,000</td>
<td>brick, oven cleaner</td>
</tr>
<tr>
<td>12</td>
<td>100,000,000</td>
<td>bleaching powder</td>
</tr>
<tr>
<td>13</td>
<td>1,000,000,000</td>
<td>limestone, chalk</td>
</tr>
<tr>
<td>14</td>
<td>10,000,000,000</td>
<td>ground limestone</td>
</tr>
</tbody>
</table>
Citric Acid

- 5.8 g / L (22 g / gallon) of milk or milk replacer
- Variable buffering capacity

Monitoring pH is critical!!

Propionic Acid

- 1% solution of propionic acid
- 35-40 ml / gallon of milk or milk replacer

Evaluate Your Results!!

pH Goal= 4.0-4.2

Managing Group Housed Calf Pens
When to Move?

- Weak calves and calves that don’t suckle well don’t perform well
- Calf must be an aggressive drinker when moved (minimize labor, maximize potential performance for calf)
- Usually occurs around 3 days of life

Group Size

- Not much research exists on proper group sizes
- Some suggest large sized groups get sicker
  - Calves in pens of 12-18 had more respiratory disease than calves in pens of 6-9 (Svensson 2006)
- Minimizing risk factors is likely just as important
  - Stocking density
  - Age disparity
  - Ventilation
  - Bedding volume and cleanliness

Group Size

- Automated systems feed up to 100 calves at a time
  - Can divide into smaller pens that “share” an automated feeder
  - Older feeders only allowed one calf to drink at a time / newer feeders have more flexibility

Stocking Density

- 30 sq ft / calf
- Exceeding this results in:
  - Increase in respiratory disease
  - Decrease in performance
Ventilation

- Humidity
- Ammonia, hydrogen sulfide
- Dust!! (physical irritant - how do you bed?)

[ Thermal Buoyancy diagram ]

http://www.omafra.gov.on.ca/english/engineer/facts/10-059.htm
Ventilation

- Target 4 air changes per hour
- Make sure fan and tube are properly sized - one fan / one tube
- Negative pressure ventilation is very hard to do right in calf barns

Weaning

- Critical to long term success!!!
- Calves on ad lib/high milk diets eat less starter
- Poor starter intake causes weight loss and disease during the weaning process

If not done right, calves lose all the gains you made with the high milk diet

Manage Starter Intake

Do you know how much your calves are eating?

Need to measure to get an accurate picture!!

**Average Daily Gain by Weaning Date**

![Graph showing average daily gain by weaning date](image)

**Cross Suckling**

- Indicates calves are hungry
- Cross suckling behavior more likely in post weaned pens
- Monitor carefully now to avoid “surprises” later

**Evaluating Success**

- Define your metrics and frequency of monitoring
  - FPT
  - Birth weight/weaning weight
  - ADG
  - Height
  - Disease

**Calf Disease by Month**

![Chart showing calf disease by month](image)
Advantages

- Labor efficiency
- Access to feed - easier to deliver a high plane of nutrition
- Socialization
- Potential for increased growth rates
- Potential for improved lifetime productivity

Disadvantages

- Disease transmission
- Impact on slow/weak calves
- Change in management style

Key Points

- Get them started right in the first 24 hours
- Feed a high plane of nutrition
- Fill pens quickly to minimize age variation (7-10 days)
- Ventilation!!!!
- Stocking density ~ 30 sq ft / calf
- Weaning strategy - Don’t lose all the ground you have gained!
- Managing the group housed pen is different than individual housing