Why consider behaviour at the feed bunk?

- Changes in intake must be mediated through changes in feeding behaviour
Meal frequency (meals/d)

DMI (kg/d)

Feeding time (min/d)

Meal size (kg/meal)

Meal length (min/meal)

Feeding rate (kg/min)

Why consider behaviour at the feed bunk?

- Changes in intake must be mediated through changes in feeding behaviour
  - These changes may also be reflective of the health status of the cow (Weary et al., 2009)
Why consider behaviour at the feed bunk?

- Feeding behaviour can have a direct impact on rumen digestion, health, efficiency, and productivity
  - how feed is consumed
  - when feed is consumed
  - what feed was actually consumed
How do cows eat?

- Eating behaviour impacts rumen function…
  - Fewer, larger meals
    - Larger declines in rumen pH (Allen, 1997)
Large declines in rumen pH following feed consumption…

Data from Dohme et al. 2008 J. Dairy Sci. 91:3554-3567
How do cows eat?

- Eating behaviour impacts rumen function…
  - Fewer, larger meals
    - Larger declines in rumen pH (Allen, 1997)
  - Longer feeding times, slower feeding rate
    - Increased salivary secretion (Beauchemin et al., 2008)
    - Improved digestibility (Aikman et al., 2008)
Minimal declines in rumen pH following feed consumption...

Data from Dohme et al. 2008 J. Dairy Sci. 91:3554-3567
When do cows eat?
Feeding behaviour on pasture...

Tucker et al., 2007. J. Dairy Sci. 90:1692-1703
Delivery of TMR at the same time as milking

DeVries and von Keyserlingk, 2005; J. Dairy Sci. 88: 3553-3562
Delivery of TMR 6 hours after milking

 DeVries and von Keyserlingk, 2005; J. Dairy Sci. 88: 3553-3562
What do cows actually consume?

- Not only may important how she eats to achieve her DMI…but the composition of the dry matter consumed!
More sorting against long particles = lower rumen pH

\[ y = 0.02x + 4.42 \]
\[ R^2 = 0.46 \]

DeVries et al. 2008 J. Dairy Sci. 91:3958-3967
What effects does feed soring have?

- At a cow level…
  - Lower milk fat %
    - For every 10% refusal of long particles milk fat % dropped by…
      - 0.15%
        - Fish and DeVries. 2012. J. Dairy Sci. 95:850-855
      - 0.10%
What effects does feed sorting have?

- At a herd level...
  - Every 2% refusal of long particles =
    - -0.9 kg/d 4% fat corrected milk
    - 2% decrease in production efficiency

*Sova et al. 2013. J. Dairy Sci. 96:4759-4770*
How do we use this knowledge to optimize cow health, welfare, and productivity?

- Make sure dairy cows eat their feed in a manner which is good for them
  - dietary composition
  - feeding management
  - social environment
How do we accomplish this?

- Provide feed that encourages consumption of small, frequent meals & difficult to sort

DeVries et al, 2007; J. Dairy Sci. 90:5572-5579
Other opportunities to impact eating behaviour...

- Utilize feed additives which stabilize rumen conditions
  - Monensin (Erickson et al., 2003; Lunn et al., 2005; Mullins et al., 2012)
  - Sodium bicarbonate (Gonzalez et al., 2008)
  - Yeast supplements (Bach et al., 2007; DeVries and Chevaux, 2014)
Greater frequency of smaller meals with live-yeast supplementation…

Data from DeVries and Chevaux. 2014. J. Dairy Sci. 97:6499-6510
How do we accomplish this?

- Provide feed that encourages consumption of small, frequent meals
- Ensure cattle are stimulated to access their feed throughout the day
How do we stimulate cows to access their feed throughout the day?

- Deliver feed more often…
  - More time at the bunk
  - Less feed sorting

DeVries et al, 2005; J. Dairy Sci. 88: 3553-3562
Feeding 3x/d improved intake… but did not benefit feeding patterns!

How do we accomplish this?

- Provide feed that encourages consumption of small, frequent meals
- Ensure cattle are stimulated to access their feed throughout the day
- Minimize competition at the feed bunk
Subordinate cows given choice to trade-off feed quality with feeding alone or next to dominant cow

![Graph showing the number of choices made by cows with and without a dominant cow. The graph represents the cow IDs (69, 25, 112, 91, 59, 352, 90, 109, 19, 52, 5, 60) and the number of choices made, with bars indicating the choices made with and without a dominant cow.]

What happens when we increase stocking density?

Huzzey et al., 2006. J. Dairy Sci. 89:126-133
Results from cross-sectional study of free-stall herds in Canada

- Greater bunk space (per cow):
  - +0.06% milk fat per 10cm increase
  - -13% SCC per 10cm increase

Take home messages:

- Insight into feeding behaviour should improve our ability to develop feeding management systems
  - Optimize and balance nutrient intake
  - Prevent disease
  - Meet behavioural needs
  - Improve welfare
Further discussion???

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