Dairy cow feeding behaviour: Basic concepts and practical implications

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CHANGING LIVES IMPROVING LIFE

Why consider behaviour at the feed bunk?

 Changes in intake must be mediated through changes in feeding behaviour







Nielsen . B. L. 1999. Appl. Anim. Beh. Sci. 63:79-91

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...





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)





CHANGING LIV MPROVING LI Data from Dohme et al. 2008 J. Dairy Sci. 91:3554-3567



When do cows eat?

Feeding behaviour on pasture...



Delivery of TMR at the same time as milking



DeVries and von Keyserlingk, 2005; J. Dairy Sci. 88: 3553-3562





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!







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%
 - DeVries et al. 2011. J. Dairy Sci. 94:4039-4045
 - Fish and DeVries. 2012. J. Dairy Sci. 95:850-855
 - 0.10%
 - Miller-Cushon and DeVries. 2015. J. Dairy Sci. E-Suppl. 2 98:13.



What effects does feed soring 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 managementsocial 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!



Hart et al. 2014. J. Dairy Sci. 97:1713-1724.

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





Rioja-Lang et al. 2009. Appl. Anim. Beh. Sci. 117:159-164

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



Sova et al. 2013. J. Dairy Sci. 96:4759-4770



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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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