

## Feeding behavior of the high producing cow

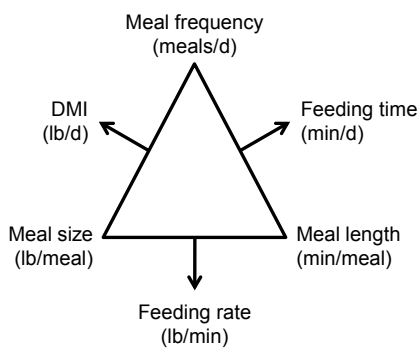
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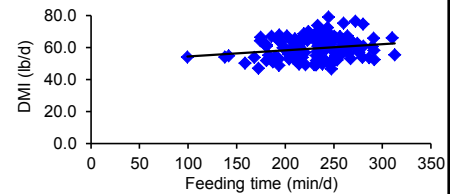
## Why consider behavior at the feed bunk?

- Changes in intake must be mediated through changes in feeding behavior



## More time and meals at the bunk = greater DMI

- DMI was associated with:
  - feeding time (+0.5 lb/10 min)
  - meal frequency (+0.5 lb/meal)



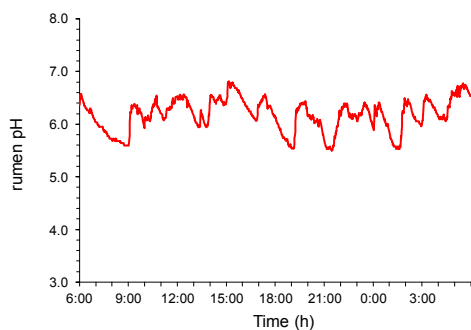
## Why consider behavior at the feed bunk?

- Feeding behavior 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 behavior impacts rumen function...
  - Fewer, larger meals
    - Larger declines in rumen pH (Allen, 1997)

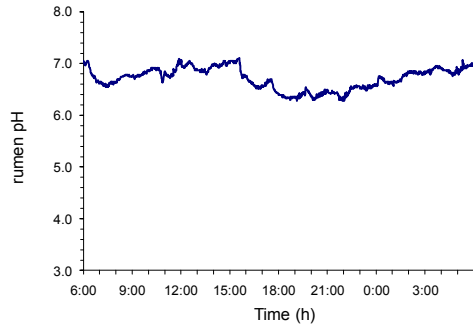
## Large declines in rumen pH following feed consumption...



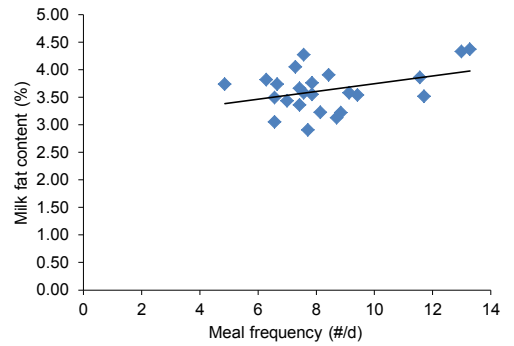
## How do cows eat?

- Eating behavior impacts rumen function...
  - Fewer, larger meals
    - Larger declines in rumen pH (Allen, 1997)
  - Longer feeding times, slower feeding rate
    - More stable rumen environment

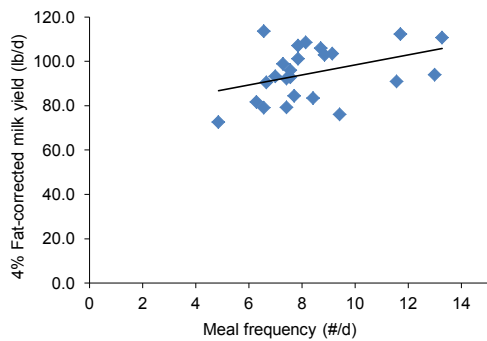
### Minimal declines in rumen pH following feed consumption...



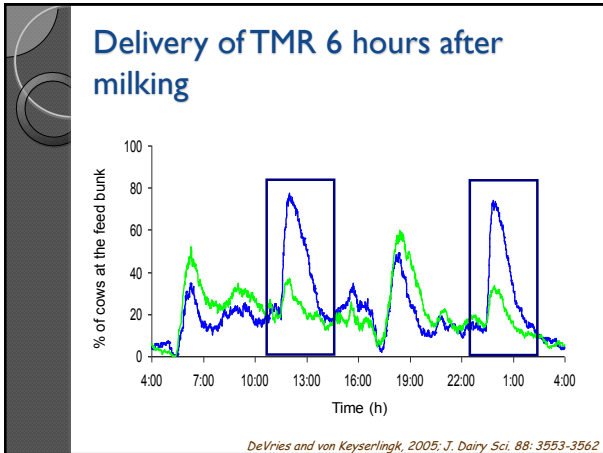
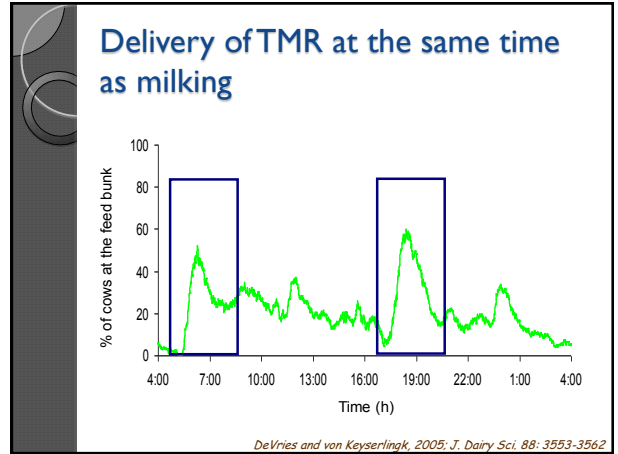
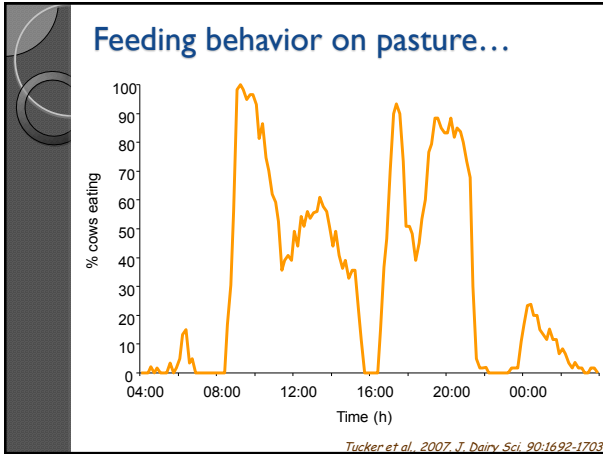
### More meals = greater milk fat %



### More meals = greater 4% FCM yield



### When do cows eat?



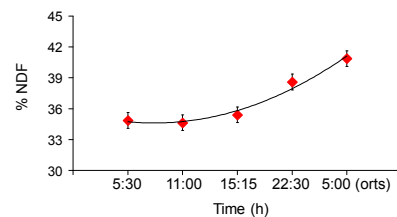
### What do cows actually consume?

## What effects does feed soring have?

- At a cow level...
  - Lower milk fat %
    - DeVries et al. 2011. J. Dairy Sci. 94:4039-4045
    - Fish and DeVries. 2012. J. Dairy Sci. 95:850-855
    - Miller-Cushon and DeVries. 2015. J. Dairy Sci. E-Suppl. 2 98:13.

## What effects does feed soring have?

- Other cows...
  - May not meet nutrient requirements
  - Poor bunk access



*Adapted from DeVries et al. 2005. J. Dairy Sci. 88: 3553-3562*

## What effects does feed soring have?

- At a herd level...
  - Every 2% refusal of long particles =
    - -2.0 lb/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 and productivity?

- Allow cows to eat...
  - A ration balanced to meet their requirements
  - Their feed as delivered, and in a manner conducive to rumen health and efficiency

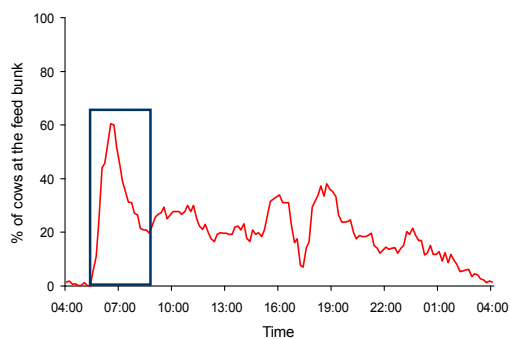
How do we ensure cows eat feed as delivered, and in a manner conducive to rumen health and efficiency?

Ensure cows have access to the ration formulated for them throughout the day!

How do we accomplish this?

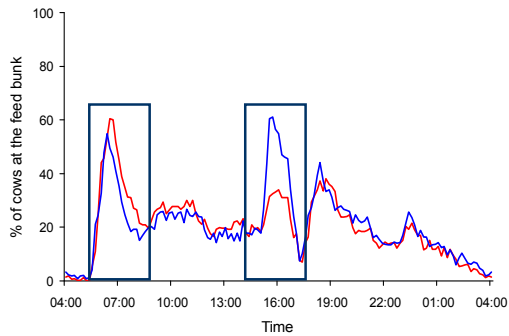
- Ensure cows...
  - Have access to feed
  - Are also stimulated to access their feed throughout the day

Delivery of feed once per day

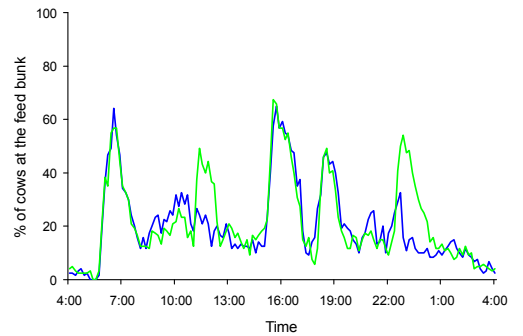


*DeVries et al, 2005, J. Dairy Sci. 88: 3553-3562*

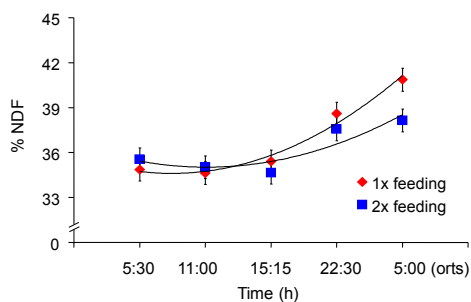
### Delivery of feed twice per day



### Delivery of feed four times per day



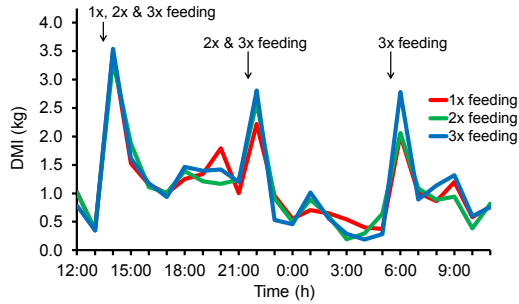
### Reduced sorting with > 1x per day feed delivery!



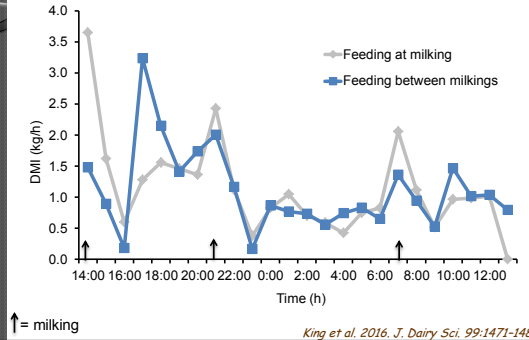
### What does this translate into for the cow?

- Feeding more than 1x results in greater:
  - Milk fat % and yield (Rottman et al. 2014; Macmillan and Oba, 2015)
  - Efficiency of production (Mantysaari et al., 2006)
  - Dry matter intake (Hart et al., 2014)

### Greatest DMI observed when cows were fed 3x/d

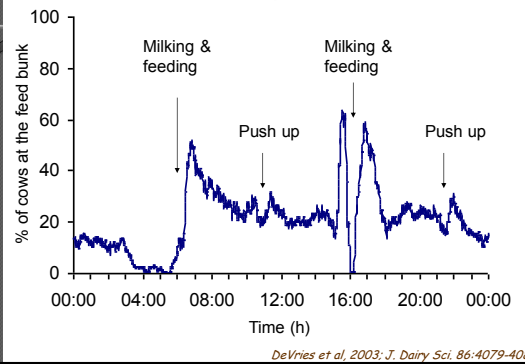


### Stimulate feeding activity across the day!



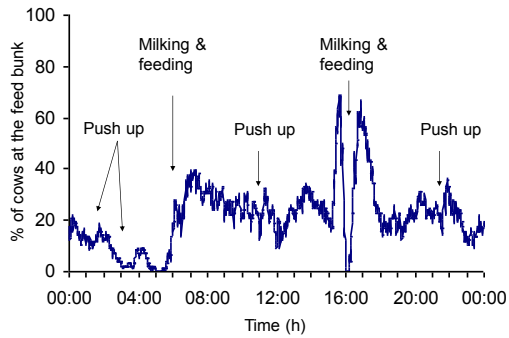
### Ensure feed is pushed in and within reach!

### Does feed push-up stimulate cows the same as feed delivery?





### Does feed push-up stimulate cows the same as feed delivery?



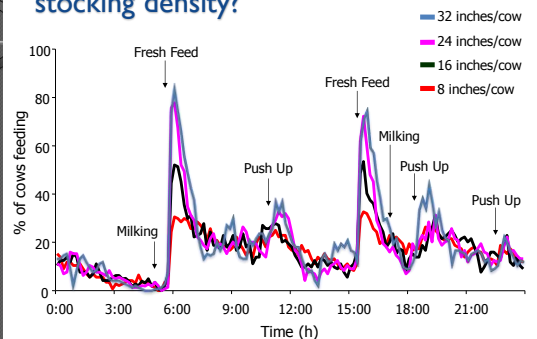
*DeVries et al., 2003, J. Dairy Sci., 86:4079-4082*

### Push-up feed frequently...

- Ensures feed is in the bunk when the cows go there
- Provides a more consistent product in the bunk

### Minimize competition at the feed bunk!

### What happens when we increase stocking density?



*Huzzey et al., 2006, J. Dairy Sci., 89:126-133*

## Results from study of parlor milked, free-stall herds in Canada

- Greater bunk space (per cow):
  - +0.06% milk fat per 4 inch increase
  - -13% SCC per 4 inch increase

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

## Take home messages:

- The manner in which cows consume their feed may be just as important as the feed that we provide to them!
  - Maximize time at the bunk!
  - Encourage small, frequent meals!
  - Discourage feed sorting!

## Questions???

Thank you to NSERC, Dairy Farmers of Canada, Agriculture and Agri-Food Canada, the Canadian Dairy Commission, Dairy Farmers of Ontario, Lallemand Animal Nutrition, Westgen, the Investment Agriculture Foundation of British Columbia, the Canadian Bovine Mastitis Research Network, the Ontario Ministry of Agriculture, Food, and Rural Affairs, the University of Guelph, and the University of British Columbia Animal Welfare Program for their financial support.