Consistency is Key For Feed Consumption in Dairy Cows!



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Trevor DeVries tdevries@uoguelph.ca

Is there a problem here?



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• There is more than one ration found on every farm!



- There is more than one ration found on every farm!
 - There is the one formulated by the nutritionist



- There is more than one ration found on every farm!
 - There is the one formulated by the nutritionist
 - There is the one that is delivered to the cows



Is the feed delivered the same as what was formulated?



In a study of herds in Canada the average TMR fed...

- Exceeded TMR formulation for
 - NE_L (+0.05 Mcal/kg)
 - NFC (+1.5%)
 - ADF (+0.5%)
 - Ca (+0.1%)
- Underfed TMR formulation for:
 - CP (-0.4%)
 - NDF (-0.7%)
 - Na (-0.2%)

Sova et al. 2014. J. Dairy Sci. 97:562-571

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 - How often is feed dry matter checked?
 - How often are feed components analysed and rations reformulated?
 - Are mixing protocols in place?
 - Are you able to track what is mixed?

How precisely (consistent) are the rations being delivered?



More variability in ration energy content = lower DMI



Adapted from Sova et al. 2014. J. Dairy Sci. 97:562-571

More variability in ration energy content = lower milk yield



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More variability in ration energy content = lower efficiency



Adapted from Sova et al. 2014. J. Dairy Sci. 97:562-571

More variability in ration particle size = lower milk yield and efficiency

- Variability in % long particles
 - Every 5 point increase
 - -1.2 kg/d milk yield
 - 2.6% reduction in efficiency



Sova et al. 2014. J. Dairy Sci. 97:562-571

Cows love consistency!!!



Another step in ensuring cows eat their feed consistently...

 Make sure feed is mixed and delivered the same way each day



Ensure cows are delivered their ration consistently

- Tools?
 - SOPs and training
 - TMR management programs!
 - Automated feeding systems



- There is more than one ration found on every farm!
 - There is the one formulated by the nutritionist
 - There is the one that is delivered to the cows
 - There is the one that is consumed by the cows

Cows do not always eat what is put infront of them!



More sorting at a cow level = lower milk components







Miller-Cushon and DeVries. 2017. J. Dairy Sci. 100:2213-2218.

More sorting = variability in what is consumed

- Nutrient consumption varies with when cows eat across the day
 - Poor bunk access



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

More sorting at a herd level....





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

More sorting at a herd level....



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Cows need consistency in what they eat!



Coon et al. 2018. J. Dairy Sci. 101:6375-6387



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Havekes et al. preliminary data





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What is the ideal TMR particle distribution?



	Sieve, mm	PSPS 2013,%	Current, %	Rationale
Тор	19	2-8	<5	Sortable material, too long; increases need for chewing, especially if >10%
Middle	8	30-50	50	Still long and functional pef, more so than 4 mm materials, do not exceed 50-60%
Bottom	4	10-20	10-20	Remainder of pef, top 3 sieves combined = pef
Pan	-	30-40	25-30	40-50% grain in diet results in at least 25- 30% in the pan

Source: Grant, 2018





- There is more than one ration found on every farm!
 - There is the one formulated by the nutritionist
 - There is the one that is delivered to the cows
 - There is the one that is consumed by the cows
 - There is the one that is digested by the cows

How the cow eats her feed has an impact on how she digests it...





Declines in rumen pH following feed consumption...



Declines in rumen pH following feed consumption...



More meals = greater milk fat %



Data from DeVries and Chevaux. 2014. J. Dairy Sci. 97:6499-6510

Also remember....DMI relies on eating behaviour...



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

More time and meals at the bunk = greater intake!

- DMI was associated with:
 - feeding time (+0.02 kg/min) and meal frequency (+0.2 kg/meal)



Data from Johnston and DeVries. 2018. J. Dairy Sci. 101:3367-3373

Cows need consistency in when they eat!

• When she is hungry

• When she is hungry



- When she is hungry
- After certain management events



What stimulates cows the most to attend the bunk?

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King et al. 2016. J. Dairy Sci. 99:1471-1482

Is this how we stimulate eating?



How do we stimulate cows to access their feed throughout the day?

- Deliver feed more often...
 - More time at the bunk
 - More meals per day



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



How do we stimulate cows to access their feed throughout the day?

- Deliver feed more often...
 - Less feed sorting





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

More frequent feed delivery = more consistent consumption = improved rumen health

 High de-novo fatty acid free-stall herds tended to be 5x more likely to feed 2x vs 1x per day



Woolpert et al. 2017. J. Dairy Sci. 100:5097-5106

Need to ensure feed is present when cows go to the bunk!



Need to ensure feed is present when cows go to the bunk!



Ensuring feed is available allows cows to use their time efficiently!

- 41 robotic milked herds in Canada
 - Frequency of feed push ups (average = 8x/d; range= 2 to 24)
 - + 0.1 h/d lying duration per extra 2 push-ups per day



King et al. 2016. J. Dairy Sci. 99:9069-9079

Ensuring feed is available ensures cows are not limited in their consumption!

- 33 robotic milked farms in USA Midwest
 - +4.9 kg/d of milk for farms with an automated feed pusher vs manual



Siewart et al. 2018. J. Dairy Sci. 101:8327-8334

Automation may minimize problems related to human inconsistency....



Ensuring cows have access to feed when they want to...





More bunk space = improved behavior = improved milk composition

- Field study of Canadian dairy herds
 - Mean = 56 cm per cow (range 36 to 99 cm/cow)
 - For every 10 cm increase in feed bunk space...
 - +0.06% milk fat
 - -13% SCC



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

More bunk space = improved eating behavior = improved milk composition

 High de-novo herds tended to be 10x more likely to have >46 cm/cow of bunk space



Woolpert et al. 2017. J. Dairy Sci. 100:5097-5106

Take home messages:

- Improve consumption and efficiency by allowing cows to eat consistently!
 - Ensure feed is delivered as formulated and precisely!
 - Ensure feed is consumed as delivered and in a healthy manner

Take home messages:

- Allow cows to eat when they want and what they need!
 - Keep feed in front of cows
 - Stimulate cows to feed
 - Allow cows access to their feed

Questions???



Trevor DeVries tdevries@uoguelph.ca



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