ONTARIO CATTLE FEEDERS ASSOCIATION

Ontario OMAFRA

Summer 2020

Ontario's Feedlot Cattle Behavioral and Feed Bunk Management Study

Ontario Corn Fed Beef Program Objectives of This Study

Provide proven research information in a "*show me*" format to support Feed Industry Partners and Producers in making informed decisions to discuss, implement and apply the findings of this study to on farm production facilities. The ability to manage the "*details*" that each producer controls within their operations, presents multiple opportunities to maximize cattle performance.

"Maintain Consistency of Feed Intakes = Optimizing Feed Efficiency = Supporting Excellent Feedlot Animal Health"

Objectives:

1. **Encourage producers to strive for consistency in the daily activities of their cattle feeding operations using good management practices**
   - Develop a bunk score system for daily recording of the amount of feed fed and remaining in the bunk at the same time each day – will indicate patterns/trends of Dry Matter (DM) intakes
   - Determine if ration moisture level is relatively consistent with previous feeding – when in doubt consider using a microwave and gram scale - it's quick and easy (or work with a feed supplier)
   - Optimum ration moisture levels improve palatability, thereby increasing DM intake
   - Moisture levels of the ration can also influence sorting of the feed in the bunk
   - Aim to have feed delivered to the feed bunk the same time each day
   - Feed less more often – this will reduce the stress level of the cattle coming to the bunk – more calm visits to the feed bunk, less consumed each visit but encourages more visits, meaning more DM intake, thus increasing performance through better rumen health – maintains proper PH level in the rumen – eliminates/reduces any acidosis occurrences
   - Cleanout activities of the bedded area – strive to be the least disruptive as possible – timing after cattle are fed (allow 1 to 2 hrs. for cattle to be at bunk) – clean area close to feed bunk first - remember, when cattle are removed from the feed bunk and with fresh bedding, their daily routine is disrupted for longer than you may think!

2. **Placement of new cattle on feed - incorporate a "new arrival" health protocol including a beginning step-up ration strategy leading up to the finishing ration phase**
    - Initial observation of cattle upon arrival – determine what level of risk (High, Medium, Low) the cattle are in upon arrival, in terms of health and condition – use this information to determine starter ration formula used
    - Your management team consisting of a Veterinarian and a Feed Consultant should be contacted if any concerns are beyond your **predetermined** animal health and ration protocols
    - Particle size is important in the ration – the smaller the particle size the more risk to the animal's having a digestive upset. Manage length of fiber/roughage - being too long can also create sorting in the bunk
    - Gradual DM increases are extremely important – cattle need to be staged to a consistent daily intake level before changing to next step-up ration or formula
    - As mentioned above – feed less more often – encourage more bunk visits (Dairy Industry use feed pushers to encourage cattle to the feed bunk)
    - Bunk scoring is critical in this time period - be careful **not** to overfeed/ increase daily delivery aggressively as to **stall** the cattle – no more than ½ lb./hd/day and hold for 2 to 3 days before next increase - keep cattle leading/maintaining their DM intakes
    - Remember the importance of water – water should be fresh, readily available and easily accessible. Cattle need to be aware where their water source is- let bowls trickle over for a day or so. Hydrated cattle consume more DM.

The impact of feed bunk management; Excerpted from the 2020 Ohio Beef Nutrition & Management School

Dr. Francis Fluharty, former Ohio State University research nutritionist and current University of Georgia Department of Animal Sciences Chair

Dr Fluharty presentation link -https://www.youtube.com/watch?v=ZVu6r4peU8I

A screenshot of the swings in DM intake in 2 groups of steers on feed for the 1st 60 days in the feedlot.

Dr. Fluharty claims approximately 80% of the animals DM intake is used for Maintenance depending upon the energy density of the ration and genetics of the cattle. Growth/ Performance is achieved with the remaining 20% DM intake. That equates to an animal eating 25 lbs. of DM would be using approx. 19-20 lbs. of DM for Maintenance, leaving approx. 5-6 lbs. of DM for Growth/Performance…. pay close attention to this number. This determines your profit margin – maintaining maximum DM intake is the goal.

Maintenance requirements will always be the priority of the animal, while Growth/Performance needs to be the priority of the feeder/ producer…that's what can be controlled with proper bunk management.

Note – *in the above graph, the number of times the cattle crashed in Lot B- not consuming enough DM for just maintenance, not to mention growth development vs the consistent DM intakes in Lot A, demonstrating proper bunk management.*

- Dr Fluharty's presentation provides further support for the data collected and compiled for our Ontario Study of 2020

Take home message – approx.20 % of the ration DM you place in the bunk each day represents the growth potential of the animal. **You** control the DM intake of the animal with proper bunk management each day - **You** control the performance of the animals on your farm. **See chart below !**

South Dakota State University

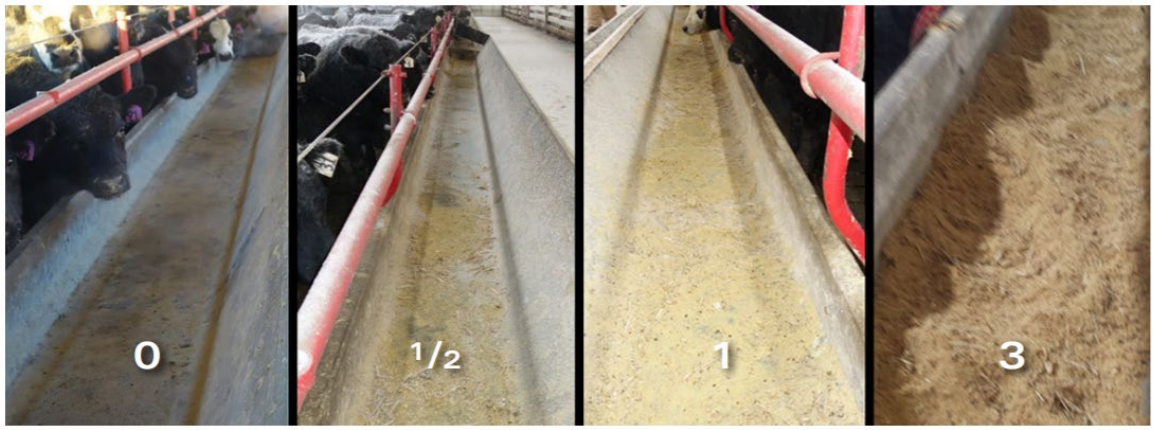
LOT	DMI lb/d	ADG lb/d	Feed/Gain lb/lb
A (controlled intake)	20.2	3.76	5.38 (76% less)
B (Ad libitum intake)	19.6	2.07	9.47

Comparison between both trial groups – indicates proper bunk management pays

Table 1. SDSU 4-Point Bunk Scoring System

Score	Description
0	No feed remaining in bunk.
½	Scattered feed present. Most of bottom of bunk exposed.
1	Thin, uniform layer of feed across bottom of bunk. Typically about 1 kernel deep.
2	25%-50% of previous day's feed remains.
3	Crown of feed is thoroughly disturbed. More than 50% of previous day's feed remains.
4	Feed is virtually untouched. Crown of previous day's feed still noticeable, or undisturbed.

Figure 1. Examples of feed bunk scores



Acidosis symptoms visible in fecal samples below

Fecal Score 1.0

Fecal Score 1.5

Fecal Score 2.0

Fecal Score 2.5

Fecal Score 3.0

Fecal Score 3.5

Fecal Score 4.0

Fecal Scores and Descriptive Conclusions

https://www.scielo.br/j/pvb/a/rwkhGKYkGSKNy9dv4q58ZsF/

Stool score indicating the balance between concentrate and roughage in the diet of feedlot cattle. The score ranges from 1 (excess protein or starch) to 5 (poor digestion of forage. Score 3 represents the balance in the composition of the diet (Adapted from **Vigne et al. 2019**). (**A**) Score 1: liquid stools; diarrheic. (**B**) Score 2: semi-liquid stools. (**C**) Score 3: pasty stools. (**D**) Score 4: Light and moderately dry stools, with concentric rings and 3-4cm layers. (**E**) Score 5: dry and hard stools.

Fecal starch analysis - What can it tell you about your feedlot ration?
An Important Feedback Mechanism for your Feeding Program

Monitoring starch digestion in feedlot cattle is an important aspect of assessing feed utilization efficiency, managing input costs, and gaining a better understanding of cattle performance and health. While feed efficiency is often measured through a feed conversion ratio, taking other measurements such as fecal starch into consideration helps to improve feed use efficiency. A fecal starch analysis is an effective tool for monitoring starch digestion as fecal starch represents starch in the ration that has gone undigested. It provides a measure of the concentration of undigested starch and this unutilized starch represents a direct cost to the feedlot operator. Researchers have found that an increase in 1% fecal starch results in a 0.162 Mcal reduction in net energy for maintenance (NE_m) in cereal grains. Thus, a fecal starch analysis provides important insight into feed utilization efficiency and high values should prompt a review of areas where feed utilization efficiency could be improved.

Most commercial labs offer fecal starch analysis, either by NIRS or wet chemistry, within a $20-$25 price range. NIRS tends to be more cost effective than wet chemistry with quicker results. For the sake of accuracy, integrity in sample collection and submission is important. A few considerations for sample collection protocol include:

- Contact an accredited laboratory for detailed sample collection instructions and sample jars (do not use plastic sample bags!)
- Take multiple samples rather than a spot sample for a representative sample. Take at least 5 samples from different animals at random per pen to mix together, making a composite sample.
- Samples obtained should be taken as freshly expelled manure. Look for cattle defecating and immediately take samples from fresh manure. Make sure the samples aren't contaminated by bedding or other substances as this can lead to inaccuracies in results.
- Composite (mix) individual samples proportionally and freeze samples prior to sending to the lab.

How do your feedlot fecal starch results stack up?

The objective of a feeding program is to optimize feed efficiency to reduce feed costs whilst maximizing gains in cattle. A high fecal starch result indicates lost opportunity and inefficiencies in feed utilization. Ideally, fecal starch levels should be as low as possible but a fecal starch value of greater than 13% suggest that changes need to be made to increase feed utilization efficiency. Data was collected in 2019 on Ontario feedlots (Figure 1; n=16), and Table 1 provides the results from the Ontario benchmarking study as well as data collected in a study by Schwandt et al. (2017) in the American Midwest.

Table 1. Fecal Starch (% of fecal DM) results from Ontario and Midwest US benchmarking studies

	Fecal Starch (%) n	Fecal Starch (%) Mean	Fecal Starch (%) SD	Fecal Starch (%) Min	Fecal Starch (%) Max	Source
Ontario	16	12	4.8	5.3	20.1	Wood, Van Schaik, and Conlin, 2019 (unpublished)
Midwest US	34	19	6.5	7	36.6	Schwandt et al., 2017

*n represents the number of farms from which composited fecal samples were taken

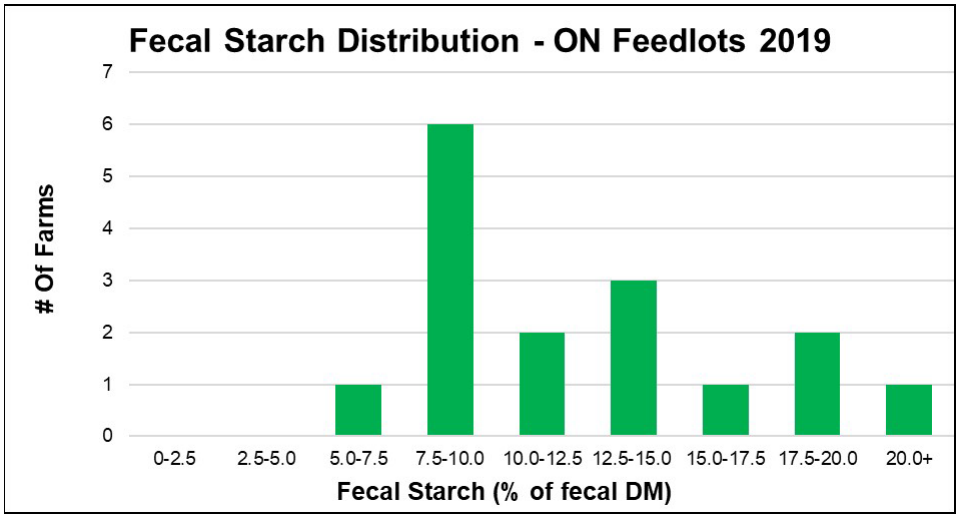


Figure 1. Distribution of fecal starch concentration based on pooled fecal samples from 16 commercial feedlots in Ontario (2019)

What factors need to be considered when fecal starch is high for cattle fed corn-based diets

- Particle Size Distribution - A fecal starch evaluation can be used as an indicator of the impact of grain processing on total tract starch digestion when grain is the primary or only source of starch in the ration. Increased degree of processing is related to improved dry matter and starch digestibility. However, the extent of fines produced must be monitored to manage risk of reduced rumen pH and digestive upsets (e.g. bloat). Particle size distribution is influenced by processing method and settings/maintenance on processing equipment. Processing grains through steam-flaking, rolling, or grinding with a hammermill enhances total tract starch digestibility.
- Corn Vitreousness - Vitreousness describes the nature of the endosperm of the corn kernel. Increased vitreousness reduces starch digestibility and vitreousness varies depending on the corn hybrid and maturity. Ensiling and steam flaking reduce the impact of vitreousness on starch digestion.
- Kernel Processing: Corn Silage - Particularly important in rations with high corn silage inclusion (e.g. grower rations), the degree of kernel processing in corn silage impacts starch utilization

References

Mahanna, B. 2009. Digestibility of corn starch revisited: Part 1. Feedstuffs, volume 81 issue 6.

Mahanna, B. 2009. Digestibility of corn starch revisited: Part 2. Feedstuffs, volume 81 issue 10.

Stanford, K., Swift, M., McAllister, T., Gibb, D. 2015. Fine tuning fecal starch can cut your feed bill. Beef Cattle Research Council. Retrieved April 27, 2020.

Schwandt, E.F., Thomson, D.U., Bartle, S.J., Reinhardt, C.D. 2017. A Survey of Dry Processed Corn Particle Size and Fecal Starch in Midwestern US Feedlots. Kansas Agricultural Experiment Station Research Reports. Volume 3: Issue 1.

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