CHAMPION Feed Services Ltd.

Principles of Bunk Management

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Take Home Message

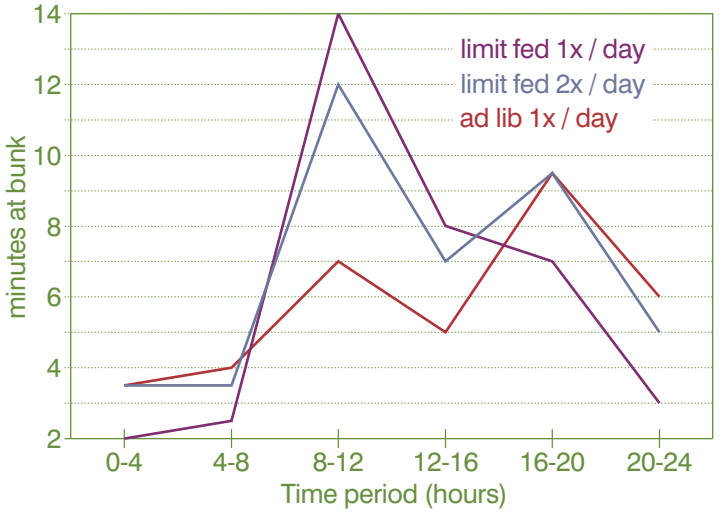
- ✓ Providing unlimited access to feed (ad libitum feeding) is the simplest form of bunk management and is a logical approach when attempting to maximize feed intake of cattle.
- ✓ Appetite may be stimulated and performance enhanced with intermittent unavailability of feed. Interruptions in feed availability can provide time for ruminal buffering that will accommodate the pH insult of subsequent meals.
- ✓ Performance responses to limit feeding are accounted for primarily by improved digestion, altered carcass composition, and reduced maintenance requirements.
- ✓ The potential impact of over-consumption by dominant animals with increased competition is typically over estimated. Dominance at the feed bunk is determined by appetite, not social hierarchy. As a result, increased competition may actually reduce over eating and the associated digestive disturbances.

Introduction

Feed delivery is the final execution and last point of influence of a nutrition program. Astute cattle feeders recognize its importance, and most have strong opinions on the subject. However, there is a lack of research supporting or refuting many of the rules that are frequently considered dogma in cattle feeding. The lack of supporting science renders the topic susceptible to varied opinions.

Historically, cattle feeders have provided feed to cattle *ad libitum*, or in other words, ensured feed was always available. This is a common and an intuitively logical approach to take where the objective is to maximize intake. This method also results in the least competition between animals, requires very little bunk space per animal (**33**), and is the simplest and safest type of bunk management. As there is little opportunity to influence feeding patterns of cattle fed ad libitum (Schwartzkopf-Genswein and McAllister 1999, unpublished information; **33**), the main management considerations in such

Figure 1. Time spent at the bunk for each 4 h period through the day (**14**).



a system is primarily a matter of ensuring availability of fresh feed, keeping bunks clean, and minimizing waste. Attempts to reduce waste by minimizing (without eliminating) orts (left over feed) is a challenging objective that often results in increased inconsistency due to over-reactive bunk callers. Despite the simplicity of such a system, there may be potential advantages in reducing feed availability, and even intakes through parts of the day. Because of the simplicity of ad libitum feeding, most of the discussion will be based on feeding programs that involve increased management. Before discussing aspects of feed delivery, a simple overview of feeding behaviour is in order.

Feeding Behaviour

With minimal competition for food, whether in the feedlot or on pasture, cattle typically have biphasic feeding patterns through the day with primary feeding periods occurring from early to mid morning and a second (possibly larger) feeding period occurring in late afternoon (**14**, Figure 1) These feeding periods appear to be determined by timing of sunrise and sunset (**33**) and will therefore change with day length and season. With ad libitum feeding, there is little feeding activity early in the afternoon.

Figure 2. Intake patterns through the feeding period (**15**). Intake patterns of calves illustrate continual climb in intake that has been noted in some research (**17**, **5**).

Understanding intake trends through the feeding period is also an important consideration. Early in the feeding period, intakes will climb and are followed by a plateau (Figure 2). Depending on history, source and condition of the cattle, intakes will climb rapidly for the first 30 - 50 days and level off for yearlings. Calves will have a similar climb in intakes but will not stabilize until the calves have been on feed for 60 - 80 days (**16**). Unlike yearlings, intakes for calves may continue to slowly increase throughout the remainder of the feeding period (**5**, **17**). Once intake has

plateaued, disruptions in eating patterns are often beyond bunk management control and typically due to weather, changes in dietary energy (i.e. ration change or adjustments in grain processing) or feeding errors.

Bunk Management and Acidosis

Bunk management has been referred to as acid management (**27**) and is considered by many to be its primary purpose. Rapidly climbing intakes followed by an abrupt reduction (intake crash) which are commonly observed at the feedlot have been duplicated in research and confirmed to coincide with low ruminal pH (**12**). Minimizing the negative effects of acidosis by controlling how fast intakes climb is an important part of bunk management. However, managing acidosis is not the only consideration. In fact common bunk management practices may actually increase ruminal acid load. Increased eating rates with fewer, larger meals that result from regulating feed delivery or limit feeding (**14**, **25**, **9**) can result in greater acid production (**9**). The currently held assumption that all production responses (daily gain, feed efficiency) to bunk management are a direct result of reduced acidosis are far from conclusive.

Limit Feeding

As the name implies, limit feeding refers to delivering less feed than cattle would eat if offered feed ad libitum. Limit-fed, high energy rations are more economical during periods of low grain prices and relatively high forage prices, than are high forage rations commonly used for backgrounding. Such a program also reduces manure production and simplifies transition onto the finishing diet. Limit feeding finishing rations can be beneficial due to the improved feed efficiency that is frequently observed (**23**,**15**, **21**). The improvement in feed efficiency can be explained by small improvements in diet digestibility, reduced energy required for maintenance, and reduced energy going to fat deposition (**28**). As intramuscular fat is typically the last to be deposited, reduced fat deposition can translate into reduced marbling and carcass quality. Depending on feed prices and marketing grids, slight improvements in feed efficiency may warrant reductions in carcass quality and even rate of gain. As well, reductions in carcass quality may be offset by allowing ad libitum consumption during the last few weeks of the feeding period.

Limit feeding is sometimes referred to as 'programmed feeding' due to the increased accuracy in which performance and costs of gain can be predicted when energy intake is known. Ensuring a specified level of intake and predictable performance requires that feed be offered at some level below ad libitum. A programmed feeding protocol typically outlines how much feed of a given ration is required to obtain a desired rate of gain. Until intakes plateau, feed delivery should be increased occasionally (i.e. weekly) to accommodate increasing maintenance requirements due to the increasing body size. Programmed feeding requires little bunk management as bunk hygiene is rarely a concern and you know what is to be fed without reading bunks or cattle.

Clean (slick) Bunk management

Contrary to limit or programmed feeding, slick bunk management means intakes are regulated, but not necessarily reduced. Although many producers assume that intakes must be reduced if feed is not available ad libitum, this is not necessarily true. Cattle limited access to feed for only 9 hours per day had improved average daily gain, feed efficiency, and dressing percent. In addition, intake, carcass weight, and ribeye area were numerically increased compared to cattle that had unlimited access to feed (**24**). Subsequent trials by the same researchers (**25**, **26**) suggest it is possible to maintain intake by regulating access to feed, either by blocking access or making appropriate feed calls.

Increased appetite resulting from a temporary absence of feed results in changes in feeding patterns including fewer, larger meals and increased eating rates (**9**). Such feeding behaviours may increase consistency of daily intakes compared to the more passive eating patterns of cattle fed ad libitum. Although increased eating intensity is typically followed by reduced rumen pH (**9**), it has also been associated with improved intakes and performance in cattle and sheep (**1**, **6**, **24**). The improved performance observed by Whitley and McCollum and reported by Streeter et al. (**32**) coincided with reduced time at the feed bunk and possibly indicates increased eating intensity is positively correlated to performance.

Reduced settling and sorting of ingredients with less feed wastage are also benefits seen when bunks are 'slicked' every day. In an Australian feedlot trial utilizing 6000 head of cattle fed barley based diets, there was a $0.10/hd/day savings in

feed costs due to reduced feed wastage alone. Although savings in Alberta would be less due to lower feed costs and less wastage with cooler temperatures, potential savings through reduced wastage can be considerable.

The fine line between slick bunk management and limit feeding could be defined in the objective. If the goal is to regulate intake so consumption is maximized through reduced feed waste and avoiding intake crashes, it is obviously not limit feeding and a more appropriate term may be 'regulated feed delivery'. In such a system, upper limits (level where orts occur) are occasionally tested and feed is provided at a level slightly below this (i.e. ½ lb/hd/d less). Although slick bunks with such a program may be frequent, it is not necessarily the objective. However, intakes may be reduced when slick bunks with minimal cattle aggression become the objective. Targeting intake at a level that results in minimal cattle aggression can result in reduced intake as cattle adapt and become comfortable with intakes slightly below ad libitum. Many performance responses to bunk management in which slick bunks are the norm may be responses to limit feeding. Responses to limit feeding are frequently observed (**21**) and can be accounted for biologically (**28**). However, responses to consistent feed delivery which is a common endeavour with bunk management, has been documented in only one trial (**13**) compared to at least four which have found no effect (**29**, **31**, **36**, **2**). Fluctuations in timing of feed delivery likely have a greater impact on acidosis than does fluctuations in quantity delivered (**3**). Potentially small improvements in animal performance with slick bunk management can result from the following factors:

- reduced feed wastage (i.e. improved feed efficiency);
- increased consistency;
- reduced acidosis;
- enhanced eating intensity with more time between meals;
- a response to limit feeding.

The total of these effects along with greater control of intakes often make converted disciples to this type of management.

If the popularity of slick or regulated bunk management, or the enthusiasm with which it is practised, are any indication of its value, no supporting science is needed. Galyean (**13**) reported that although recommendations for roughage level, implant programs and protein levels varied among feedlot nutritionists serving over 3.5 million cattle, all consultants felt regulated bunk management is a critical factor influencing feed intake and growth performance.

Increased competition at the bunk and the inequality of feed intake that may result makes many feedlot managers apprehensive of not providing feed ad libitum. This concern is understandable but unsubstantiated and is less of a concern when the natural feeding patterns of cattle are understood. Although there may be increased competition at the bunk at feed delivery, this competition is greatly reduced during times of naturally low attendance (i.e. mid afternoon). Not only are eating rates of submissive cattle increased with competition, but submissive cattle will eat more at times of low attendance (**18**). As a result, dominant cattle do not necessarily have higher intakes (**10**, **11**, **35**). The lack of correlation between bunk attendance and feed intake has been observed by others (**10**, **19**). In a trial utilizing radio frequency technology to monitor bunk attendance, the correlation between time spent at the feed bunk and daily gain was essentially zero (Gibb et al., unpublished). Intake inequality is likely a concern only if there is active competition from feed delivery until feed depletion. Even in moderate limit feeding scenarios, there is very little competition at the bunk observed early in the afternoon. This pattern of feed intake enables more submissive animals access to feed. A simple way to assess the degree of feed restriction is to observe the bunks at this time to evaluate attendance and competition. If there is feed in the bunk with little competition, you can sleep comfortably knowing all cattle are getting access to feed, even without adequate bunk space for all cattle to eat at the same time.

It is important to recognize that dominance and aggression are not synonymous. Appetite is dictated by physiological hunger and determines how aggressively an animal is willing to compete for food (**20**). Hungry cattle considered submissive on the basis of their non-eating interactions frequently displace dominant cattle at the bunk (**34**). Aggressive cattle that dominate the bunk on the first feeding are likely displaced by hungrier cattle on subsequent feedings. Increasing the number of feed deliveries will help ensure equality of intake between animals when cattle are aggressive at the bunk. It is feasible that increased competition resulting from interrupted feed availability stimulates appetite, which may in part explain why cattle typically eat more when group-fed than when fed individually (**4**, **22**). Interrupted feed availability may also be important for cattle susceptible to

digestive upsets. Morbid cattle have timid eating behaviour (**30**) and it is feasible that increased competition helps prevent acidotic cattle, or cattle near satiety from gaining access to feed that is poorly utilized and/or may result in digestive disorders.

Points to ponder

Due to the variation in cattle types, management, and ration formulation, it is essentially impossible to provide bunk management guidelines that are appropriate for all producers. The following points are provided to stimulate thought rather than suggest absolute recommendations. Ruminate on the following:

- It is harder for management to adapt to clean bunks than it is for cattle. Months will likely be required for personnel to become comfortable with clean bunks as they re-evaluate deeply ingrained, preconceived opinions of cattle feeding.
- Look in the bunk to see if you need to make a reduction in feed delivery. Study the cattle to see if you need to make an increase.
- Slick bunks have never hurt cattle, it was how feed managers responded to them. DON'T GET GREEDY AND OVER REACT BY GIVING CATTLE MORE THAN THEY CAN HANDLE!
- Follow a preplanned protocol of feed delivery that is flexible enough to account for different cattle types (i.e. calves vs yearlings).
- Records are a critical part of a bunk management program. Use one page per pen, one row per day to record and provide ample history of feed delivery. Mark maximum intakes and approach these maximums with caution. Calculate and record dry matter intake (DMI) per head and DMI as a percent of body weight at least intermittently.
- Constant communication between bunk readers and pen riders is essential for a continual assessment of a bunk management program. Widespread changes in fecal consistency which will be detected by pen riders can be the first message to bunk readers that something is amiss with feed delivery.
- Reduced bunk shovelling and feed wastage with greater control of intakes is likely to make a feedlot crew converted disciples of a clean bunk management program. Attention to detail can be stimulated as bunk readers more closely monitor intakes while leading rather than following intake patterns of cattle. The increased awareness can have greater implications than in just feed delivery.

- New cattle climbing in intakes early in the feeding period is one of the most difficult times of managing bunks. Remember, the manager knows how much feed the cattle can handle better than they do. Don't fall for the temptation to maximize intakes at this time, particularly for yearlings. Feeding up to three times a day will help even out the competition as intakes are regulated at this time.
- For new cattle, use a program of diminishing increases with increased days on feed. For example, you may want to allow up to 25% daily increase in feed delivery with no days between increases when intakes are at just at 1% of body weight. However, reduce generosity as intakes climb. By the time cattle are over 2.3 - 2.4% of body weight, you may want to reduce increases to 5% with up to 4 days between increases in an attempt to reach maximum intakes without having an intake crash. Have a structured protocol in place that you can follow that will help you gain confidence and enthusiasm in your new management techniques.
- If you are feeding silage, take the time to understand and be able to make calculations using ration dry matters!! Realize that cattle typically get a double insult through ration transition by not only getting a higher percentage grain but also receiving a greater quantity of feed due to the higher dry matter content in the total ration.

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